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# Redescription of *Lepismatophila cruszi* Kundu and Haldar, 1984 (Apicomplexa: Sporozoea) from *Chondracis rosea* (Order: Orthoptera)

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## ABSTRACT

This study describes external characteristics and life history of a species of cephaline gregarine (Apicomplexa: Sporozoea) of the genus *Lepismatophila* [1], from *Chondracis rosea* (Order: Orthoptera) of Manipur, India. Diagnosis characteristic of the species the epimerite a simple symmetrical knob, Protomerite present throughout trophozoite stage, Solitary nature of Sporadins, Cyst without ducts dehiscence by simple rupture and Spores in uncoiling chains, ellipsoidal, boat shaped, without any filamentous process are discussed. And the morphological details of the different stages supported with photomicrographs are also provided.

**KEYWORDS:** Cephaline gregarine, *Lepismatophilacruszi*, Manipur, India

## INTRODUCTION

The genus *Lepismatophila* was established by Adams and Travis [1], described *Lepismatophila thermobiae* as the type species of the genus, obtained from the firebrat, *Thermobia domestica* (Pack.). The characteristic features of the genus as proposed were solitary Sporadins, Epimerite a simple symmetrical knob, Protomerite present throughout different stage, Cyst dehiscing by simple rupture and Spores in uncoiling chains, ellipsoidal, devoid of processes. Later on many workers [2-6] described many new species under the genus from various locations. However, later on studies by Kundu and Haldar [7] on the cephaline gregarine yielded a parasite from the common Silver-fish of the Gangetic plain and named it as *L. cruszi*.

In the present investigation, the cephaline gregarine obtained from *Chondracis rosea* (Order: Orthoptera) collected from Kajipat, Imphal-east, Manipur was found to be *Lepismatophila cruszi* and redescribed.

## MATERIALS AND METHODS

The samples were collected from various grass fields of Manipur as explained previously [11] and prepared for the study [8]. Gametocysts were recovered from the hind gut and placed in moist chambers (80 % relative humidity) for sporulation [9].

The previously reported procedure [11] was followed throughout the study. Nomenclature for shapes used in this paper conforms to those of Clopton [10].

## RESULT

### Trophozoite

The detailed structures of a trophozoite measures 35.9-149.0 (82.8±25.8) μm. The body as usual bears epimerite, protomerite and deutomerite. The epimerite is petaloid or has two horned structure that pushes through the host epithelium. The protomerite is sub-conical or hemispherical in shape, measures 6.4-24.0 (15.1±5.2) μm × 11.7-49.9 (28.1±9.4) μm. It is followed by the deutomerite and measures 45.0-125.0 (69.5±25.6) μm × 15.0-54.0 (30.2±10.2) μm. It is highly granulated and is separated from the protomerite by a clear septa. The nucleus is circular and measures 12.7-47.0 (20.7±7.8) μm in diameter, lodged immediately behind the septum, possesses a distinct nuclear membrane and encloses a big endosome and few chromatin granules in it.

### Sporadin

The sporadin are characteristically solitary and are found within the midgut lumen. In living specimens the cytoplasm appear

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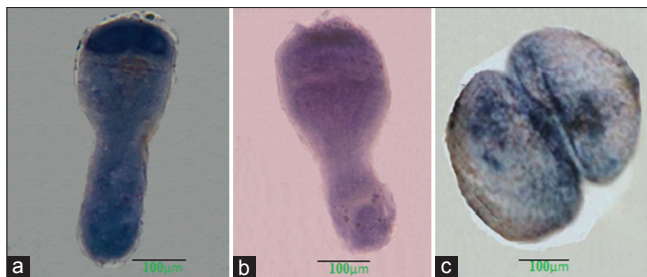
milky-white under microscope. The characters of protomerite and deutomerite and the structure of the nucleus are more or less the same as in trophozoites. The only differences is that the pellicle in the sporadins is very thick.

**Association**

Typical caudofrontal or frontal associations (Syzygy) are not observed.

**Gametocyst**

A freshly collected gametocyst from the hindgut of host is bean shaped with one side convex and the other side slightly concave. The cyst measures 138.8 × 99.9 μm. With the gradual development inside the moist chamber, the cyst becomes deep black in colour.



**Figure 1:** Photomicrographs of *Lepismatophila cruszi* Adams and Travis, 1935 a - Mature trophozoite, b –Sporadin and c - Gametocyst

**Table 1:** Showing R,  $\bar{X}$ , SD, SE and CV% of measurement of *Lepismatophila cruszi*

Different parts	R	$\bar{X}$	SD	SE	CV%
TL	35.9-149.0	82.8	25.3	5.65	30.7
LP	6.4-24.0	15.1	5.2	1.18	34.9
WP	11.7-49.9	28.1	9.4	2.10	33.4
LD	45.0-125.0	69.5	25.6	5.74	36.8
WD	15.0-54.0	30.2	10.2	2.28	33.77
LN	12.0-47.0	20.7	7.8	1.74	37.68

**Spore**

Not observed

**TAXONOMIC SUMMARY**

Material : *Lepismatophila cruszi* Kundu and Haldar, 1984  
 Host : *Chondracis rosea* (Order: Orthoptera)  
 Locality : kajipat, Imphal-east  
 Site of infection : mid gut  
 Prevalance : 50 out of 100 (50.0%)  
 Type : MU/0217/14, deposited in the Protozoan Collection of Parasitology Section, Centre of Advanced Studies in Life Sciences, Manipur University, Canchipur-795003, India. Another Paratype deposited in the National Zoological Collection, Zoological Survey of India, Kolkata bearing Accession No. Pt. 3025.

**Measurements**

Summary of measurements in micrometers of preserved (fixed and stained) Trophozoites are provided:

Specimen (20): Slide No- MU/0217/14

**TROPHOZYTE**

TL = 35.9-149.0 (82.8±25.8)  
 LP = 6.4-24.0 (15.1±5.2)  
 WP = 11.7-49.9 (28.1±9.4)  
 LD = 45.0-125.0 (69.5±25.6)  
 WD = 15.0-54.0 (30.2±10.2)  
 LN = 12.7-47.0 (20.7±7.8)  
 LP:LT = 1:5.6-1:6.2  
 WP:WD = 1:1.0-1:1.2

**DISCUSSION**

In having solitary sporadins, epimerite a simple-knob and ellipsoidal spores, the gregarines is accommodated in the

**Table 2:** Showing the comparative characters of *Lepismatophila Cruszi*

Characters	<i>Lepismatophila Cruszi</i> Kundu and Haldar (1984)	Present specimen
Total length	36.1-150 μm	35.9-149.0 μm
Epimerite	Petaloid with two- horned measuring 13.7-27.6 μm	Petaloid with two- horned
Protomerite	Sub-conical or hemisphere, 17.0-33.7 μm	Sub-conical or hemisphere, 6.4-24.0 μm
Deutomerite	Highly granulated and is separated from the protomerite by a clear septa	Highly granulated and is separated from the protomerite by a clear septa
Nucleus	Circular in logged	Circular
Sporadin	Sporadin are very thick	Sporadin are very thick
Gametocyst	Bean-shaped with one convex and the other side is slightly concave	Bean-shaped with one convex and the other side is slightly concave
Spore	Boat-shaped with one side is convex	-
LP: TL	1:2.75-19.0	1:5.6-1:6.2
WP: WD	1:0.78-1.33	1:1.0-1:1.2
Host	<i>Acrotelsacollaris</i> (Fabricius)	<i>Chondracis rosea</i>
Locality	West-Bengal, India	Kajipat Manipur, India

family Lepismatophilidae. The following characters justify the inclusion of the parasite in the genus *Lepismatophila* [1].

In the present species the body length of the trophozoite is 35.9-149.0 μm. Sporadically solitary. The fully grown trophozoite as usual bears epimerite, protomerite and deutomerite. The protomerite is sub-conical or hemispherical in shape, epimerite is petaloid or has two horned, deutomerite is highly granulated and is separated from the protomerite by a clear septa. The morphological details and measurements are within the range described in the original work. 50% of the host examined were infected with the parasite. The characters of the epimerite, structure of the nucleus, the general shape of the protomerite, shape of the cyst and measurement of the different parts of the body are within the range originally described by Kundu and Haldar [7]. But here in the present work spores could not be observed. The cyst development is completed within 96 hrs inside in the moist chamber, have the same dimension as in the earlier described form and the ratio of LP: TL and WP: WD are in the range provided for the described species. Therefore, the presence species is thus considered to be *Lepismatophila cruszi* and redescribed.

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## AUTHOR'S CONTRIBUTION

The first author conducted the work, the second author planned the work and the third author conducted analysis and presentation of the result.

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