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First report of *Amphiplatyspora striata* Kundu and Haldar, 1984 from *Chondracisrosea* (Order: Orthoptera) of Manipur, India

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ABSTRACT

The present communication deals with the complete life history of a Septate Gregarine (Protozoa: Sporozoa) found in Grasshoppers. Gregarines found in the mid-gut region of Grasshoppers were collected and examined for parasites. A species belonging to the genus *Amphiplatyspora* was obtained from *Chondracisrosea*. The morphology of the gregarine and its affinities with the other genera of the family Amphiplatysporidae are discussed. The morphological details of the different stages supported with photomicrographs are also provided.

KEYWORDS: Gregarine, *Amphiplatyspora*, *Chondracisrosea*, Manipur

INTRODUCTION

Léger and Duboscq [1] established family Stenophoridae for those species that have solitary Sporadins cyst that dehiscence by simple rupture of the cyst wall, tongue-like epimerite and ovoid spores, not extruded in chains. Kundu [2] established a family Leidyaniidae that included characters like solitary sporadins, a distinct simple knob-like epimerite and cysts that dehiscence by several sporoducts, while in Kundu and Haldar [3] the epimerite was all together absent and the cysts were with prominent ectocyst that dehiscence by simple rupture. In the genus *Amphiplatyspora*, the gregarine was unique in having cylindrical spores with two plate like structures on both the poles, prominent longitudinal and cross striations throughout its body.

During the study on the cephaline gregarine of insect pests, one gregarine belonging to the genus *Amphiplatyspora* was obtained.

MATERIAL AND METHODS

All materials and methods including morphology and life history, standard nomenclature and metrics of plane shapes remains the same as explained previously [4].

RESULTS

The findings are presented in (Tables 1 and 2 and Figure 1).

Description

Trophozoite

The youngest trophozoite encountered in the smear preparation is cylindrical in shape with a large ovoidal protomerite and an elongated deutomerite. It measures 110-411.9 (255.5±87.4) μm in average. The fully grown trophozoite has a globular fusiform, rectangular, semi-lunar or sickle-shaped, hemispherical or a hat shaped protomerite. It measures 22.9-79.7 (41.9±15.8) μm \times 29.7-158.9 (79.1±26.2) μm . A thick straight septum separates the protomerite from the deutomerite. The deutomerite is cylindrical flask-shaped vermiform, cylindro-conical with broadly rounded anterior and gradually tapering extremity and pitcher-shaped body. It measures 79.1-332.2 (220.7±49.9) μm \times 29.8-169 (89.7±26.3) μm . It's pellicle is well developed. The epicyteal striation are observed in the protomerite as well as in the deutomerite in the form of longitudinal and cross striations. The longitudinal striations converge at a point near the posterior tip of the body. The various shapes of the protomerite and the deutomerite are probably due to the presence of such strong

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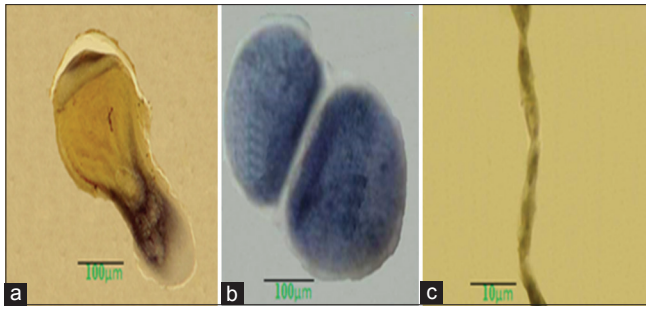


Figure 1: Photomicrographs of *Amphiplatyspora striata* Kundu and Haldar, 1984 a: Mature trophozoite, b: Gametocyst and c: Spore in chain form

Table 1: Showing R, X, SD, SE and CV% of measurement of *Amphiplatyspora striata*

Different parts	R	X	SD	SE	CV%
TL	110-411.9	255.5	87.4	19.5	22.3
LP	22.9-79.7	41.9	15.8	3.5	22.4
WP	29.7-158.9	79.1	26.2	5.8	22.3
LD	79.1-332.2	220.7	49.9	11.1	22.3
WD	29.8-169	89.7	26.3	5.9	22.4
LN	17-50	38.9	4.89	1.08	22.0

Table 2: Showing the comparative characters of *Amphiplatyspora striata*

Characters	<i>Amphiplatyspora striata</i> , Kundu and Haldar, 1984	Present Specimen
Total length	115-415 μm	150-170 μm
Protomerite	Protomerite fusiform, rectangular, semi-lunar or sickle-shaped, hemispherical or hat-shaped	Protomerite fusiform, rectangular, semi-lunar or sickle-shaped, hemispherical or hat-shaped
Deutomerite	Deutomerite cylindrical, flask-shaped vermiform cylindro-conical in shaped	Deutomerite cylindrical, flask-shaped vermiform cylindro-conical in shaped
Nucleus	Semi-lunar	Semi-lunar
Sporadin	Solitary	Solitary
Gametocyst	Ovoidal, with prominent ectocyst; dehisces by simple rupture	Ovoidal, with prominent ectocyst; dehisces by simple rupture
Spore	Spores cylindrical, with polar thickenings; extruded in chains	Spores cylindrical, with polar thickenings; extruded in chains
LP:TL	1:2.5-8.71 (1:5.27)	1: 4.8-1:5.1
WP:WD	1:0.7-1.55 (1:0.91)	1:1.0-1:1.0
Host	<i>Pteronemobius concolor</i> (WLK)	<i>Chondracis rosea</i>
Locality	Ranaghat, West- Bengal, India	Manipur, India

striations in the body. The nucleus is spherical to semilunar in shape and measure 17.1-50.1 (38.7 ± 4.87) μm in average.

Sporadin

The fully grown sporadins are milky-white in colour in living condition. The cytoplasm is filled up with fine as well as coarse granules. The nucleus appears as a translucent area and is

situated anywhere between the septum and the posterior end of the deutomerite. It is spherical to semi-lunar in shape.

Association

The more common caudofrontal or frontal associations are not observed.

Gametocyst

Gametocyst have been collected from the hind gut of the hosts. These are ovoidal, milky white bodies in living condition, enclosing two equal or unequal gametocytes. The cyst measures 277.7-335.4 (300.7 ± 16.1) μm × 222-279.2 (254.8 ± 15.9) μm in average. There are transparent ectocyst varying in thickness from 188.8 μm × 199.9 μm in freshly formed cyst. At about 30 hrs of development inside the moist chamber the separating line between the gametocyst disappears. The cyst normally takes about 168 hrs to dehisce and the dehiscence is by means of a simple rupture of the cyst wall.

Spores

The spores are cylindrical in shape and are released in chains. These measure 16.6 × 7.2 μm. There are characteristic flat, plate-like thickening on both the poles of the spores which probably help in attaching these bodies in chain during their ejection. The sporozoites are arranged in a zig-zag fashion along the long axis of the spore.

Taxonomic Summary

- Type material : *Amphiplatyspora striata* Kundu and Haldar, 1984
- Type host : *Chondracis rosea* (Order: Orthoptera)
- Type locality : Kajipat, Imphal-east
- Site of infection : mid gut
- Prevalance : 44 out of 85 (51.7%)

Paratype : 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 and Sporadins are provided:

Trophozoite:

- TL = 110-411.9 (255.5 ± 87.4)
- LP = 22.9-79.7 (41.9 ± 15.8)

WP = 29.7-158.9 (79.1±26.2)
 LD = 79.1-332.2 (220.7±49.9)
 WD = 29.8-169 (89.7±26.3)
 LN = 17.1-50.1 (38.7±4.87)
 LP: LT = 1: 4.8-1:5.1
 WP: WD = 1:1.0-1:1.0

DISCUSSION

In the present species the length of the trophozoite 110-411.9 μm is in the range between the earlier described species by Kundu and Haldar [3]. Sporadins are solitary. The fully grown trophozoite has a globular, fusiform, rectangular, semilunar or sickle-shaped, hemispherical or a hat-shaped protomerite. The deutomerite is cylindrical, flask-shaped, vermiform and cylindro-conical with broadly rounded anterior and gradually tapering posterior extremity or pitcher-shaped body. The epicyteal striations are prominent in the protomerite as well as in the deutomerite in the form of longitudinal and cross striations. The longitudinal striations converge at a point near the posterior tip of the body. In other morphological details like those of Sporadins, Epimerite, Protomerites, presence of satellites, structure of Gametocytes there are close similarities with the original species of Kundu and Haldar [3]. Comparison of the morphological characteristics and measurements show close resemblances. The cyst development is completed within 168 hrs inside the moist chamber. Spores are cylindrical, have the same

dimension as in the earlier described form and the ratio of LP: TL and WP: WD are in similar range.

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AUTHORS CONTRIBUTION

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

REFERENCES

1. Lèger, L. and Duboscq, O. Nouvelles recherches sur les grégarines et l'épithélium intestinal des trachéates. Arch. Protistenk 1904;4: 335–383.
2. Kundu, M.R. Solar. Phys. 1971;21 – 30.
3. Kundu, T.K. and Haldar, D.P. Observations on *Quadruhyaiodiscus gallerucidae* gen. nov., sp. nov. (Apicomplexa: Sporozoa) from a chrysomelid beetle, *Gallerucida bicolor*. Arch. Protistenk 1984;128: 327 - 334.
4. Yumnam, I. and Mohilal, N. A new species of *Quadruhyaiodiscus* Sarkar and Chakravarty, 1969 (Apicomplexa: Conoidasida) from Orthopteran Insects of Manipur, India. Journal of Parasitic Diseases 2017;41(2): 313-317.