

which would be mostly utilized as energy source for contraction process. After 20·00 h phosphorylase activity decreases as there would be enough glucose in the blood due to post-prandial absorption. The excess glucose is perhaps transported to hepatopancreas for glycogen synthesis. This is evident from the observation that the glycogen level in hepatopancreas gradually increases after 20·00 h reaching a maximal value at 08·00 h in the morning⁵.

It is known in mammals that epinephrine induces greater production of cyclic AMP in muscle resulting in increase of active form of phosphorylase which in turn augments glycogenolysis. It is of interest that a hyperglycemic principle has been identified in the extracts of scorpion cephalothroic nerve mass¹¹. Circadian rhythms in the neurosecretory activity in the scorpion has also been reported². It is probable that the active principle from scorpion neurosecretory system with epinephrine-like action is responsible for activating the phosphorylase system.

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Department of Zoology, D. CHENGAL RAJU.*
S.V. Arts College,
Tirupati,
and

Department of Zoology, R. RAMAMURTHI.
S.V. University, K. S. SWAMI.
Tirupati (A.P.), December 26, 1975.

* Present address : Department of Zoology, S.V. University, Tirupati.

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RETRACTOCEPHALUS—A NEW GENUS OF CEPHALINE GREGARINES (PROTOZOA: SPOROZOA) FROM INSECTS

KUDO¹, recognised 12 genera of cephaline gregarines (Protozoa: Sporozoa) under the family Gregarinidae Labbé, 1899. In our studies on this group of parasites from insects of this locality, we have found that the cephaline gregarines inhabiting the various parts of the mid gut of the beetles, belonging to the family Chrysomelidae possess sporonts in syzygy, simple globular retractile epimerite, cysts without ducts and barrel-shaped spores extruded in chains—characters absent in any known genus of the family Gregarinidae. A new genus, *Retractocephalus* is, therefore, proposed here to accommodate these gregarines. The genus is characterised by the following diagnostic features :

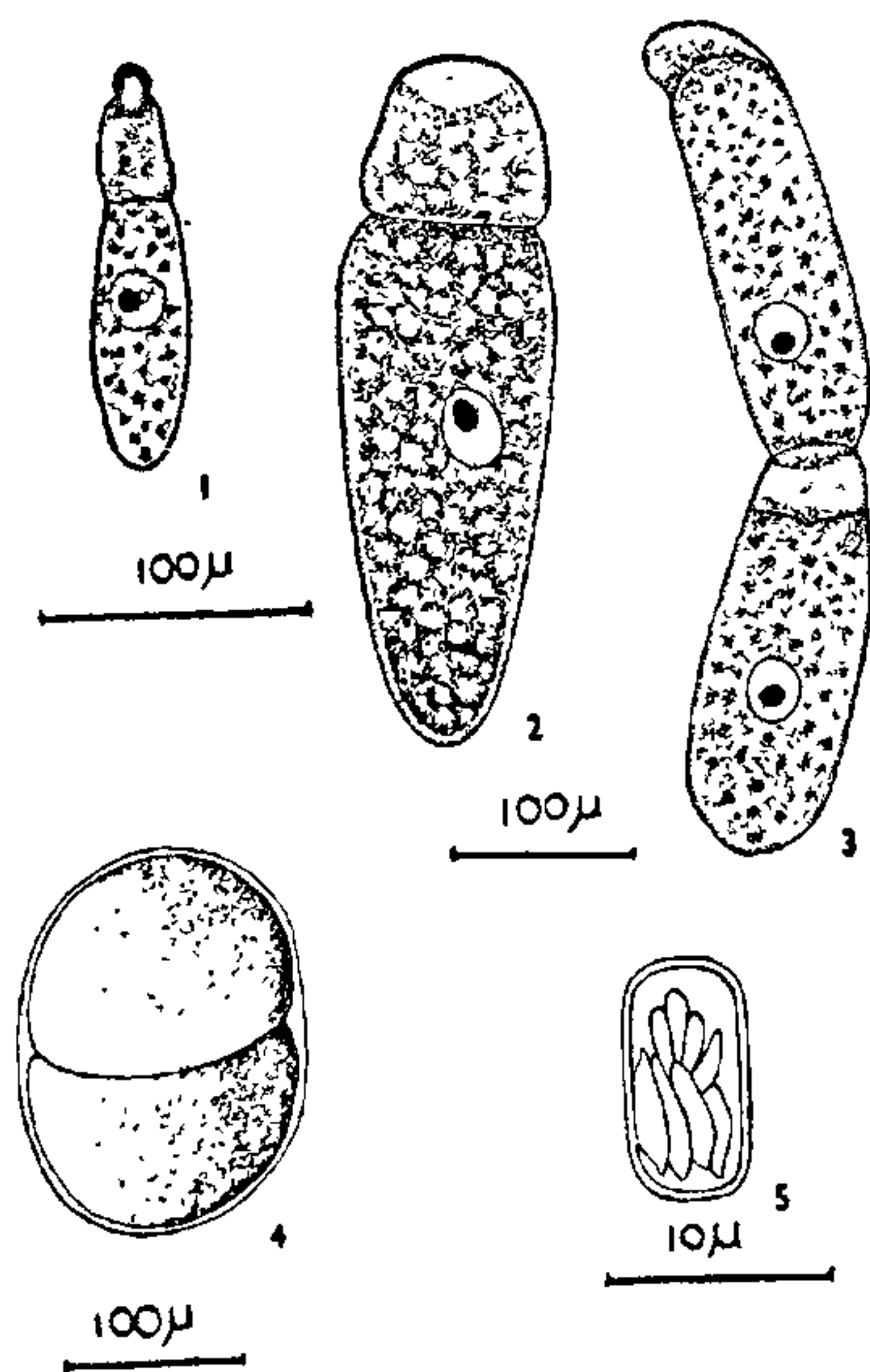
- (1) initial development of the parasite is intracellular ;
- (2) sporonts are in syzygy and the association is caudo-frontal in nature ;
- (3) the epimerite is a simple symmetrical globular structure and retractile into the protomerite ;
- (4) dehiscence of the cyst is by simple rupture ;
- (5) the spores are barrel-shaped and extruded in chains.

The gregarine, *Retractocephalus raphidopalpii* obtained from the mid gut of the beetle, *Raphidopalpa* (= *Aulacophora*) *foveicollis* (Lucas) is designated as the type species of the genus. A brief description of the organism is given here. Details of its morphology and life history will be dealt with separately.

The parasite undergoes its initial development within the epithelial cells of mid gut of the host. With the development of the epimerite, it leaves the infected cell and remains attached with it by the epimerite for some time. Later, it frees itself from there, begins to live inside the gut lumen. A fully grown trophozoite (Fig. 1) has an elongated body. Its epimerite is a simple hyaline globular structure and occasionally retracts completely into the protomerite. The protomerite is elongated, cylindrical and has a depression to receive the epimerite. The deutomerite is the largest segment of the body and is separated from the protomerite by a thick straight septum. The nucleus is spherical or slightly oval enclosing one or two karyosomes.

The sporonts (Fig. 2) are larger in size than the trophozoites and an epimerite is wanting at this stage. The sporonts associate caudo-frontally (Fig. 3) when the posterior tip of the primite fits firmly into a concavity of the protomerite of the satellite.

A freshly collected gametocyst from the hind gut of the host is oval, opaque white and encloses two equal gametocytes (Fig. 4). The cyst measures $250.0 \times 210.0 \mu$ to $310.0 \times 250.0 \mu$ in dimensions. At 48 hours of development the cyst dehisces by normal rupture. The spores are barrel-shaped and are extruded in chains. These measure $7.0 \times 4.0 \mu$ and have a double wall. Formation of eight sporozoites is completed at 70 hours of development (Fig. 5).



FIGS. 1-5. Camera lucida drawings of *Retractocephalus repahidopalpii* n. gen., n. sp. Fig. 1. A trophozoite. Fig. 2. A sporont. Fig. 3. Sporonts in syzygy. Fig. 4. A freshly collected gametocyst enclosing two gametocytes. Fig. 5. A fully developed spore with 8 sporozoites inside.

Measurements (in microns):

(i) Trophozoites—LE 7.5 to 15.0 (average 10.0); LP 15.0 to 32.5 (average 26.5); LD 35.0 to 92.5 (average 83.0); TL 57.5 to 135.0 (average 116.5); WP 17.5 to 27.5 (average 22.0); WD 20.0 to 37.5 (average 28.5); nucleus 12.5 to 22.5 (average 16.0).

(ii) Sporonts—LP 22.5 to 85.0 (average 36.8); LD 65.0 to 290.0 (average 147.4); TL 87.5 to

360.0 (average 183.6); WP 20.0 to 100.0 (average 34.2); WD 25.0 to 120.0 (average 44.2); nucleus 10.0 to 45.0 (average 22.7).

LP : TL = 1 : 4.9; WP : WD = 1 : 1.2.

The generic name *Retractocephalus* has been given to emphasize the retractile nature of the epimerite, and the genus denotes a neuter gender. The specific trivial name has been derived from the generic name of the host of the type species. The type materials have been deposited at the Zoology Department, Kalyani University.

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Protozoology Laboratory, D. P. HALDAR.
Department of Zoology, N. CHAKRABORTY.
Kalyani University, Kalyani 741 235,
India, September 22, 1975.

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CYTOLOGICAL FEMALE HETEROGAMETY IN JET-BLACK MOLLY, *MOLLIENESIA SPHENOPS*

EARLY workers on fish material could not find any morphologically distinguishable sex chromosomes mainly because of two reasons. Firstly, their techniques revealed little details of the chromosome morphology and secondly, their studies were mostly limited to the male germinal chromosomes or to the somatic chromosomes of immature, sexually undifferentiated specimens (cf. Chiarelli and Capanna)¹. Recently, however, many workers have begun exploiting the colchicized somatic tissues from both the sexes, and with this, there have appeared quite a few reports on the occurrence of heteromorphic sex chromosome pairs in a number of teleost fishes²⁻⁷. Even multiple sex chromosomes, along with the confirmation of the sex multivalent formation during meiosis, have been detected in three species⁸⁻¹⁰. Therefore, it is not unlikely that fishes, on being cytologically exploited on a more elaborate scale, would reveal a more widespread cytologically expressed heterogamety than previously believed.

A case of cytologically expressed heterogamety has been observed by us in the jet-black molly, *Mollienesia sphenops* (Cuv. and Val.), a cyprinodontid, kept in a well aerated aquarium. For study, each specimen received a 0.01 ml intraperitoneal injection of 0.1% colchicine. After two hours, the gill arches were removed and pretreated with 1.0% sodium citrate solution for 25 min. and fixed