

A GIANT MEROGONIAL STAGE (APICOMPLEXA, COCCIDIA) IN THE INTESTINE OF *Blicca bjoerkna* (L.) (CYPRINIDAE)

LUKEŠ J.*

Summary :

A giant meront containing thousands of merozoites has been found in the intestinal epithelium of an adult specimen of white bream (*Blicca bjoerkna*). The taxonomic position of this unusual coccidian stage is discussed.

KEY WORDS : Coccidia, meront.

A giant meront (figs. 1-5) containing thousands of merozoites has been found in the intestinal epithelium of one out of nine white breams (*Blicca bjoerkna*) from Černovický brook in Soběslav, South Bohemia. The tissue samples of the fish caught in March and April 1989 and 1990, respectively, were processed for histological and electron microscopical examination as described elsewhere (Lukeš, 1992).

The meront was located between the epithelial cells close to the lamina propria and contained mature merozoites (fig. 1). There was no cyst wall around the parasite and also no reaction of the host tissue has been observed in semithin sections. The dimensions of the meront were about $50 \times 55 \times 40 \mu\text{m}$. Considering that about 200 merozoites were present in the cross sections, the total number in this meront can be estimated to be more than 2500 merozoites.

The transmission electron microscopical examination revealed merozoites in the same phase of development (fig. 5). The ectomerogonial origin of merozoites could have been traced in regions where remnants of the residual cytoplasm were preserved (fig. 4). Merozoites were enclosed by a single unit membrane and any additional enclosing membranes or septae were not observed.

In fixed material dimensions of the merozoites were $8.2 - 9.0 \mu\text{m} \times 1.8 - 2.5 \mu\text{m}$. The cross section of the merozoites revealed the presence of 22 subpellicular microtubules (fig. 2). The apical complex was composed of 180 nm long conoid, prominent polar ring and 2 preconoidal rings (fig. 3). The apical part

Résumé : MÉRONTE GÉANT (APICOMPLEXA, COCCIDIA) DANS L'INTESTIN DE *Blicca bjoerkna* (CYPRINIDAE)

Un méront géant contenant des milliers de mérozoïtes a été trouvé dans l'épithélium intestinal de *Blicca bjoerkna*. La position taxonomique de ce stade inhabituel chez les Coccidies est discutée.

MOTS CLÉS : Coccidies, méronte.

contained numerous micronemes and one pair of up to $3 \mu\text{m}$ long dense rhoptries (figs. 3, 5). Oval nucleus with a single dense nucleolus, Golgi apparatus, endoplasmic reticulum, elongate mitochondrion and numerous granules were present in the central and posterior parts of the merozoite. All cytoplasmic granules contained a single prominent dense core which was located eccentrically (fig. 5).

The giant meront represents the only apicomplexan stage found during histological and electron microscopical inspection of the infected fish and therefore its taxonomic position cannot be established. Lack of any cyst wall or septa excluded the possibility of these meronts to belong to the cyst-forming coccidia. Moreover, it is not a stage of the life cycle of the extracytoplasmic coccidium *Goussia pannonica* frequently occurring in the studied population of the white bream (Lukeš, 1992). The possible appartenance of merozoites to *Haemogre-*

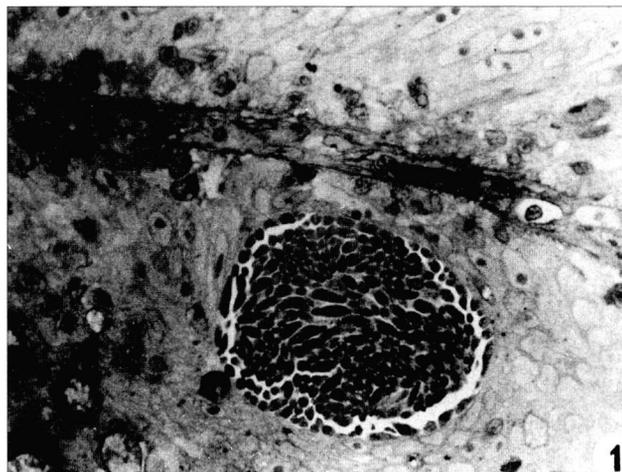
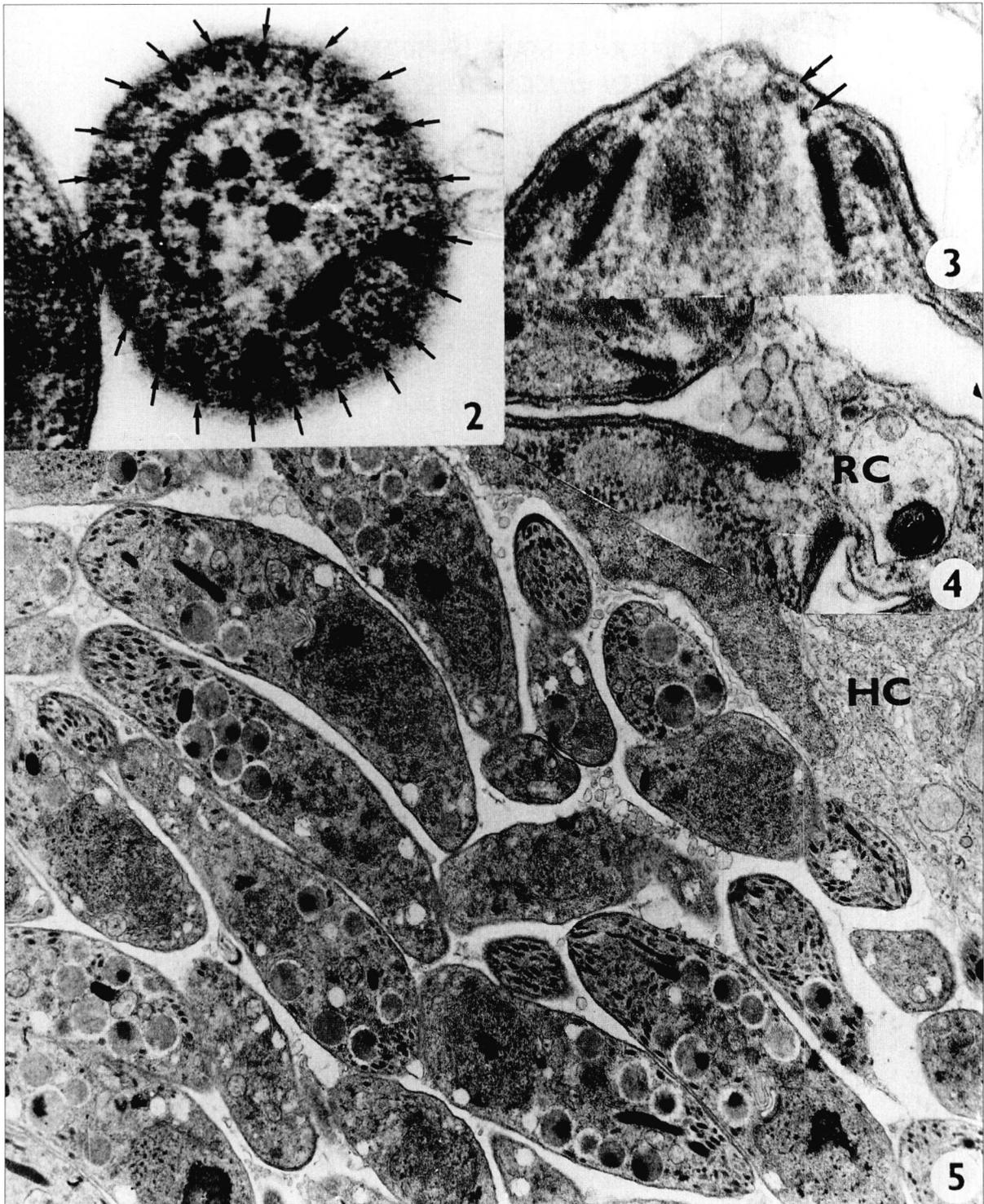


Fig. 1. – Giant meront localized in the intestinal epithelium ($\times 1000$).

* Institute of Parasitology, Czech Academy of Sciences, Braníšovská 31, 37005 České Budějovice, Czech Republic



Figs. 2-5. - Ultrastructure of the merozoites.

Fig. 2. - Cross section of the apical part of the merozoite. Arrows indicate the location of 22 subpellicular microtubules ($\times 90\ 000$).

Fig. 3. - Longitudinal section of the apical part of the merozoite. Two preconoidal rings are indicated by arrows ($\times 100\ 000$).

Fig. 4. - Residual cytoplasm (RC) with merozoite budding by ectomerogony ($\times 47\ 000$).

Fig. 5. - Peripheral part of the meront containing mature merozoites. HC - host cell ($\times 9000$).

garina ultavensis recently described from fish population in this region (Lom *et al.*, 1989) is unlikely especially because of the subpellicular microtubules, the number of which significantly differs from that of the haemogregarine zoites (Paperna and Sabnai, 1982; Paterson *et al.*, 1988).

Meronts of the vast majority of fish coccidia produce only low number of merozoites, usually less than 16 merozoites per merogonial generation. There are only two reports mentioning high number of merozoites in fish. In the description of *Eimeria quentini* from the spotted eagle ray, *Aetobatis narinari*, the number of 3000 merozoites has only been estimated from tissue smears and any histological and ultrastructural data are lacking (Boulard, 1977). The high number of merozoites of *Goussia cichlidarum* located in the swimbladder of cichlid species (*Sarotherodon galilaeus*, *Oreochromis aureus*, and *Tilapia zillii*) (Landsberg and Paperna, 1985) has recently been specified to be 16 to 120 merozoites per meront (Kim and Paperna, 1993).

The described meront is quite similar to the giant meronts, originally called globidia, that are known to be a part of the life cycle of *Eimeria christenseni* (Lima, 1981), *E. apsheronica* (Kanyari, 1990), both from goats, *E. bovis* (Hammond *et al.*, 1946) from cattle, and probably other species of the genus *Eimeria* from warm-blooded vertebrates. They lack a wall visible by light microscopy in contrast to the tissue cysts of the cyst-forming coccidia. As far as I am aware, the ultrastructural data on these stages are lacking.

REFERENCES

- BOULARD Y. Description d'*Eimeria quentini* n.sp., parasite intranucléaire du péritoine de la raie, *Aetobatis narinari* (Chondrichthyes, Myeliobatidae) en Malaisie. *Protistologica*, 1977, 13, 529-533.
- HAMMOND D.M., BOWMAN G.W., DAVIS L.R. and SIMMS B.T. The endogenous phase of the life cycle of *Eimeria bovis*. *Journal of Parasitology*, 1946, 32, 409-427.
- KANYARI P.W.N. *Eimeria apsheronica* in the goat : Endogenous development and host cellular response. *International Journal of Parasitology*, 1990, 20, 625-630.
- KIM S.H. and PAPERNA I. Development and fine structure of intracytoplasmic meronts, merozoites and young macrogamonts of the cichlid fish swim bladder coccidium *Goussia cichlidarum*. *Diseases of Aquatic Organisms*, 1993, 15, 51-61.
- LANDSBERG J.H. and PAPERNA I. *Goussia cichlidarum* n. sp. (Barrouxiidae, Apicomplexa), a coccidian parasite in the swimbladder of cichlid fish. *Zeitschrift für Parasitenkunde*, 1985, 71, 199-212.
- LIMA J.D. Life cycle of *Eimeria christenseni* Levine, Ivens et Fritz, 1962 from the domestic goat, *Capra hircus* L. *Journal of Protozoology*, 1981, 28, 59-64.
- LOM J., KEPR T. and DYKOVÁ I. *Haemogregarina ultavensis* n. sp. from perch (*Perca fluviatilis*) in Czechoslovakia. *Systematic Parasitology*, 1989, 13, 193-196.
- LUKEŠ J. Life cycle of *Goussia panonica* (Molnár, 1989) (Apicomplexa, Eimeriorina), an extracytoplasmic coccidium from the white bream, *Blicca bjoerkna*. *Journal of Protozoology*, 1992, 39, 484-494.
- PAPERNA I. and SABNAI I. A coccidian cyst stage in musculature of *Liza subviridis* (Mugilidae). *Zeitschrift für Parasitenkunde*, 1982, 68, 161-170.
- PATERSON W.B., DESSER S.S. and BARTA J.R. Ultrastructural features of the apical complex, pellicle, and membranes investing the gamont of *Haemogregarina magna* (Apicomplexa: Adeleina). *Journal of Protozoology*, 1988, 35, 73-80.

Accepté le 26 août 1994