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LIFE CYCLE OF THE TAPEWORM TRIODONTOLEPIS KURASHVILII PROKOPIČ ET MATSABERIDZE, 1971

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Abstract. The life cycle of the tapeworm *Triodontolepis kurashvilii* Prokopič et Matsaberidze, 1971 was studied. A characteristic circulation of this species was described. The cestode requires an intermediate host — crustaceans of the genus *Rivulogammarus*, and a definitive host — insectivores, mainly of the genus *Neomys*, for completion of the life cycle. In our studies, the tapeworms reached the adult stage in experimentally infected laboratory mice. A cysticercoid developed in 21 days p.i. in an intermediate host and did not undergo pronounced morphological changes during the subsequent five months. The development of the cysticercoid to the adult stage takes 26 days in the definitive host.

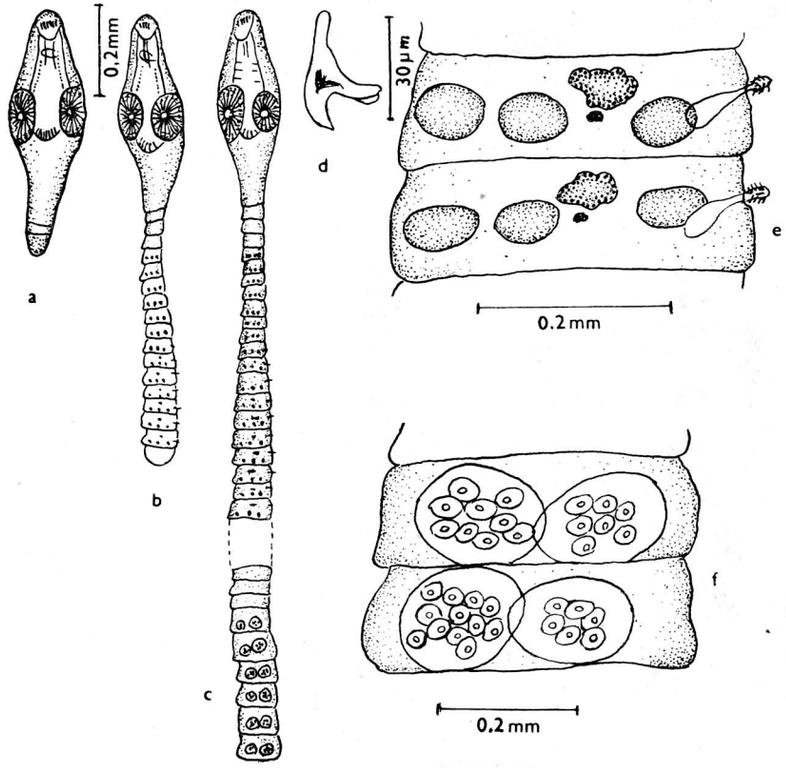

Fig. 1. Development of the cestode *T. kurashvilii* Prokopič et Matsaberidze, 1971 in the intestine of experimental animals. a) scolex — 48 h p.i.; b) strobila at day 7 p.i.; c) underdeveloped cestode at day 21 p.i.; neck of an underdeveloped cestode; e) underdeveloped proglottid; f) mature segments with eggs.

Tapeworms of the family Hymenolepididae parasitize mammals and birds. The genus *Triodontolepis* inhabits primarily insectivores of the genus *Neomys*. Six species of that genus, including the life cycles, have been described until now (Baer and Joyeux 1943, Hamann 1891, Mrázek 1891, Odening 1959, Prokopič and Groschaft 1961, Prokopič et al. 1970, Spassky 1970, Spassky and Andreyko 1968).

Prokopič and Matsaberidze (1971) described a new species, *Triodontolepis kurashvilii* from 2 of 12 *Neomys fodiens* examined that were captured in western slopes of the Likhskiy Khr. in the surroundings of Kharagouli, Georgian SSR. Further investigations were conducted to detect the intermediate host of the cestode. In one of 600 *Rivulogammarus pulex* examined, many cysticercoids later identified as *T. kurashvilii* were detected (Fig. 1). Experimental studies to reveal the life cycle of the tapeworm were initiated in 1983.

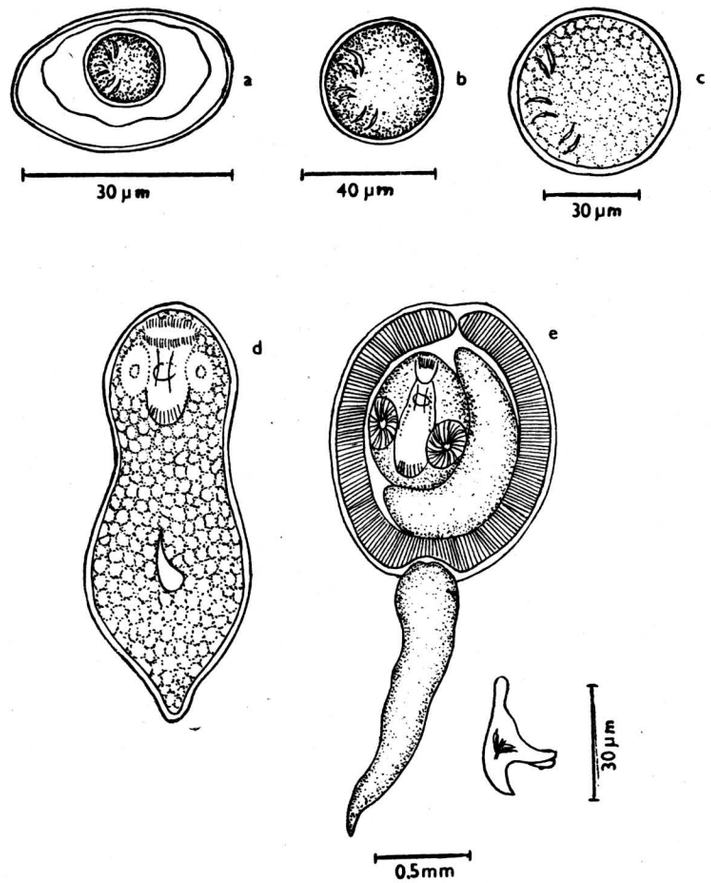

Fig. 2. Development of the cestode *T. kurashvilii* Prokopič et Matsaberidze 1971 in *G. (R.) pulex*. **a)** egg; b) oncosphere; c) oncosphere 48 h of its development; d) elongated larvae after 7—8 days of its development; e) infective larva at day 18—21.

MATERIAL AND METHODS

A total of 27 *Neomys fodiens* captured in western slopes of the Likhskiy Khr., Georgian SSR in September 1983 were examined for the presence of *T. kurashvilii*. Seven animals were found to harbour the adult cestode. A total of 270 cocoons containing 2 550 eggs collected from the material were pipetted on a watch glass and exposed to 100 *Rivulogammarus pulex* kept in a small aquarium. Cocoons with eggs of the tapeworm were ingested within 24 h. The experimentally infected crustaceans were placed into a larger, aerated aquarium with a constant temperature of 20 °C and the course of the development of cysticercoids was observed. Four months later, 20 laboratory mice were given 15—20 cysticercoids each. Two mice died two days after infection. The first eggs of the tapeworm appeared on day 21 p.i.

RESULTS

The eggs of *T. kurashvilii* obtained from gravid segments of the tapeworm are covered by two membranes encapsulating the oncosphere (Fig. 2a). The oncosphere is enclosed in a two-layered, transparent membrane thicker than that of the eggs. A thin, third layer can be observed between the oncosphere and the egg capsule. The eggs measure 0.034—0.040×0.032—0.036 mm, the size of the oncosphere is 0.020—0.022×0.024—0.026 mm. Embryonic hooks are 0.012—0.014 mm long.

The released, morphologically unchanged oncospheres could be observed in the host's body 24 h after egg ingestion. 48 h after infection the oncospheres divided into 4—6 cells and attained the size 0.035—0.050 mm. Embryonic hooks remained in pairs on one pole. Seventy-two hours after infection, elongation of the tail-like region and the increasing numbers of cells in the oncospheres were observed. The larva grew longer, attaining the size 0.060—0.070×0.040—0.050 mm. Scolex anlages with 34 hooks and suckers were formed. The scolex was fully developed within 14 days. Scolex invagination and development of cysticercoids could be observed between day 18 and 19 p.i. The cyst was encapsulated in a relatively thick, filamentous, dark coloured layer (Fig. 3). Oval cysticercoids measured 1.4—1.5×1.2—1.3mm. The shape of cysticercoids remained unchanged in the hosts for 5 months p. i.

Fig. 3. Larvae in the body cavity of the intermediate host *G. (R.) pulex* (×240).

Fully developed cysticercoids were inoculated to 20 laboratory white mice via a stomach tube. Two mice died two days p.i. Scolex exystation and elongation of the neck were observed 24 h p.i. Further elongation of the neck and the formation of 2—3 segments of the strobila occurred 48 h p.i. when a larva measured 0.5—0.6 mm (Fig. 2). At day 7 p.i., 16—17 proglottids, the most posterior ones possessing the testes, were formed. The tapeworms measured 1.0—1.2 mm. At day 21 p.i. the tapeworm became fully developed and attained the size 5—10 mm×0.4—0.5 mm. The scolex was onion-shaped, measuring 0.32—0.34 mm in diameter. Oval suckers measured 0.115—0.120×0.08—0.09 mm. The sucker was armed with 34 hooks, each measuring 0.03—0.032 mm. Gravid segments possessed 3 testes — one poral and two aporal. The middle of the proglotting was occupied by the ovary and vitellarium. The cirrus sac was 0.090—0.092 mm long. The gravid proglottids, measuring 0.18 to 0.19×0.10—0.11 mm and containing coccoons with 10—12 eggs were released 26 days p.i. The eggs measured 0.020—0.022×0.024—0.025 mm. The embryonic hooks were 0.012—0.104 mm long.

ЖИЗНЕННЫЙ ЦИКЛ ЦЕСТОДЫ *TRIODONTOLEPIS KURASHVILII* PROKOPIČ ET MATSABERIDZE, 1971

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Резюме. Изучали жизненный цикл цестоды *Triodontolepis kurashvilii* Prokopič et Matsaberidze, 1971. Описана характеристическая циркуляция этого вида. Промежуточными хозяевами являются ракообразные рода *Rivulogammarus* и дефинитивными хозяевами насекомоядные, особенно рода *Neomys*. В экспериментально зараженных лабораторных мышах цестоды достигали половозрелой стадии. Цистицеркоид развивался до 21-го дня после заражения в промежуточном хозяине и его морфология не изменилась в течение 5 месяцев. Развитие цистицеркоида до половозрелой стадии в дефинитивном хозяине продолжалось 26 дней.

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