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BOTHRIOCEPHALUS PHOXINI SP. N. (CESTODA, PSEUDOPHYLLIDEA) FROM *PHOXINUS PHOXINUS L.*

K. MOLNÁR

Veterinary Medical Research Institute of the Hungarian Academy of Sciences, Budapest

Abstract. A new Botriocephalus species is described from the intestines of the freshwater fish *Phoxinus phoxinus*. On the basis of its morphological and ecological properties, the new parasite is readily distinguishable from the closely related species *Botriocephalus gowkongensis* and *B. opsariichthydis*.

Regular examinations of the parasite fauna of *Phoxinus phoxinus* fishes found in a tarn near the Lake Balaton were conducted during 1965—66. In the course of complete parasitological sections carried out at monthly intervals, a Bothriocephalus species was frequently encountered. A closer examination of this species was carried out on 840 *Phoxinus phoxinus* fishes, out of which 17.4 per cent were infected with the cestode. The Bothriocephalus species in question was not found in 400 other *Phoxinus phoxinus* individuals collected from other habitats. Attempts to recover this parasite from other fish species have also failed.

The worms, after having been examined alive, were processed in different ways. Part of them were stained *in toto*, with Blachin carmin without previous fixation and the other part was used for histological sectioning, after fixation in ethanol or Carnoy solution and staining with hematoxy-ineosine.

Bothriocephalus phoxini sp. n.

Maximum length and width of the cestode are 45, respectively 1.4 mm. Dead or fixed worms have a heart-shaped scolex. All descriptions of the scolex given in this paper apply to dead or fixed worms. The shape of the scolex varies with the relaxation or contraction of the parasite. On relaxation, it assumes a prismatic shape. In this position, the terminal disc as well as the two bothria are well visible. In contraction, the scolex is globoid; on relaxation it starts to taper at one pole, thus assuming the heart shape until it becomes prismatic. Terminal disc on the scolex is unlobed.

There is a conspicuous segmentation throughout the entire strobila. No subsegmentation is present. The proglottids broadening distally, gives the strobila its saw-like appearance. The anterior proglottids are distinct, equal or almost equal

with the scolex in width, varying from 0.48 to 0.63 mm. Mature proglottids are 0.6 to 1.4 mm broad. The length/width ratio for proglottids varies in dependence of fixation. In contracted worms it is 1 : 8, in relaxed ones 1 : 1.

The vitelline follicles are scattered in the cortical parenchyma on both sides of the proglottis. Their number varies from 420 to 540 per proglottis. In immature proglottids they measure 0.012—0.017 mm, in gravid ones 0.020—0.026 mm. The testicles, 60—70 in number for each proglottis, are situated in the medullary parenchyma. Their diameters range from 0.036—0.044 mm.

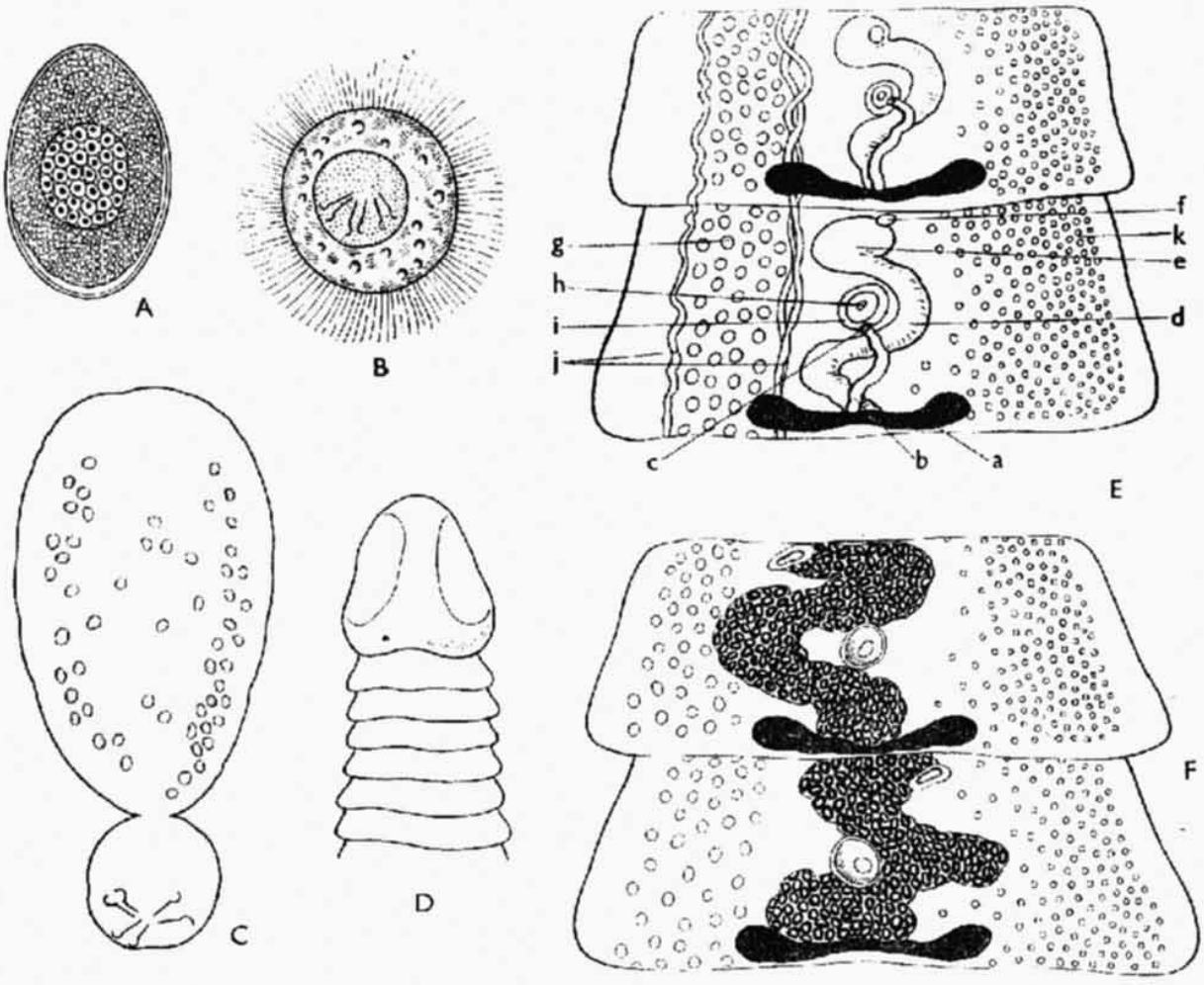

Fig. 1. A — Egg of *B. phoxini*, B — coracidium, C — procercoid, D — scolex of *B. phoxini*, E — proglottids of juvenile *B. phoxini*, F — gravid proglottids of *B. phoxini*; a — ovary, b — vagina, c — opening of vagina, d — uterus, e — uterine sac, f — uterine pore, g — testicles, h — cirrus, i — cirrus pouch, j — excretory canal, k — vitelline follicles.

Cirrus and vagina form a common cloaca, opening adjacently on the dorsal side. The cirrus pouch is maximum 0.08 in diameter. Its muscular wall is 0.008—0.012 mm thick. In the lumen of the cirrus pouch are situated the convoluted vas deferens and the cirrus. The bilobular ovary is situated transversally, close to the posterior margin of the proglottis. The lobules are joint by a slight constriction in the median part. Their parenchyma is compact.

The vagina is tube-like, with an 0.016—0.020 mm thick muscular wall, adjoining the cirrus pouch in the dorsal part of the proglottis and extending to the ovary inside. The uterus extends from the ovary to the anterior end of the proglottis, where it forms an oval uterine sac. From the uterine sac a muscular tube extends to the ventral surface, where it opens to the surface in the form of an uterine pore, situated close to the anterior margin of the proglottis.

In mature proglottids, the uterus is filled with eggs 0.049—0.054 by 0.035—0.040 mm in dimension. Coracidia varying in diameter from 0.052 to 0.078 mm, hatch from the eggs in 48 hours at 24—25 °C or in 3—4 days at 20—21 °C. They contain oncospheres, 0.038—0.044 mm in diameter. Embryonal hooks are 0.012 mm long.

In the not nearer defined Cyclops species used in the experiment, the procercoids developed in 7—12 days. They consist of an ovoid body, in average 0.188 mm long by 0.127 mm wide, and a roundish cercomer, in average 0.057 mm in diameter. The cerconer carries embryonal hooks of 0.012 mm length.

The excretory system consists of 3 pairs of excretory canals, passing longitudinally throughout the strobila, the ventral and dorsal pair in the middle line and one pair laterally.

In Hungary, previously only one Bothriocephalus parasite, *B. claviceps* (Goeze, 1782) was described from freshwater fishes. As far as I am informed, in Europe only two additional Bothriocephalus parasites of freshwater fishes are known: *B. scorpii* (Müller, 1776) and *B. gowkongensis* Yeh, 1955.

The species *B. phoxini*, found by me in the host *Phoxinus phoxinus* differs in respect of host range, endemic occurrence and morphology not only from all known European Bothriocephalines but also from *B. opsariichthydis* Yamaguti, 1934, found in the Far East. First of all, the strobila of *B. phoxini* is much shorter than that of the other Bothriocephalines, attaining maximally half the length of any of them.

It differs from *B. claviceps* and *B. scorpii* also in the shape of the ovary. The latter two species have uniformly thick, transversally situated ovaries, whereas that of *B. phoxini* is bilobed and narrowing at the middle. *B. scorpii* has a conspicuous subsegmentation, whereas *B. phoxini* has none at all. *B. phoxini* and *B. gowkongensis* differ in the dimensional relation of scolex and neck part. Whilst with the latter, the scolex is 2—3 times broader than the first segments, with *B. phoxini* they are uniformly or nearly uniformly broad. *B. phoxini* and *B. opsariichthydis* differ in the structure of their excretory systems. Whilst according to Yamaguti (1934) *B. opsariichthydis* possesses two longitudinal excretory canals, there are three pairs of them in the strobila of *B. phoxini*.

REFERENCES

Bykhovsky B. E. et al., (Key to parasites of freshwater fishes of the U. S. S. R.). Moscow—Leningrad 1962. (In Russian.)

Jarecka L., On the life-cycle of Bothriocephalus claviceps (Goeze, 1782). Acta Parasit. Polon. 7: 227—233, 1959.

Self J. T., Parasites of the goldeye, Hiodon alosoides (Raf.), in lake Texoma. J. Parasit. 40: 386—389, 1954.

Shcherban N. P., (Cestodoses of carps). Kiev 1965. (In Russian.)

Wardle R. A., The Cestoda of Canadian fishes. I. The Pacific Coast region. Contrib. Canad. Biol. Fish. 7: 222—244, 1932.

Wardle R. A., The Cestoda of Canadian fishes. II. The Hudson Bay drainage system. Contrib. Canad. Biol. Fish. 7: 377—404, 1932.

Yamaguti S., Studies on the helminth fauna of Japan. IV. Cestodes of fishes. Jap. J. Zool. 4: 12—21, 1934.

Yamaguti S., Systema Helminthum. II. The cestodes of vertebrates. New York—London 1959.

Yeh L. S., On a new tapeworm *Bothriocephalus gowkongensis* n. sp. (Cestoda: Bothriocephalidae) from freshwater fish in China. Acta Zool. Sinica 7: 69—75, 1955.

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K. M., A Magyar Tudományos Akadémia,
Állategészségügyi Kutató Intézete,
Budapest XIV., Hungária Körút 21