

Trematode larvae in snails of Lake Glubokoe

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Abstract

In the Augusts of 1984 and 1985, 6 species of snails in Lake Glubokoe were investigated: *Viviparus viviparus* (Linne, 1758), *Lymnaea ovata* (Draparnaud, 1805), *L. stagnalis* (Linne, 1758), *L. corvus* (Gmelin, 1791), *Planorbis planorbis* (Linne, 1758), and *Planorbarius corneus* (Linne, 1758), which were found to be infected by 9 species of trematode larvae. *V. viviparus* showed the highest rate of infection – 48.15% ± 6.8. The larvae of trematodes belonging to the families Echinostomatidae and Plagiorchiidae predominate in the snails of the lake.

The objective of the present investigations was to study trematode larvae found in the snails of Lake Glubokoe. Interest in this problem arises from lack of data on the parasite fauna of animals in this water body. In this connection, in the Augusts of 1984 and 1985 the Department of Zoology and Comparative Anatomy of Invertebrates of the Moscow State University initiated studies on the parasite fauna of animals in the lake. The initial stages of work dealt with investigations of larval stages of trematodes developing in snails, which act as intermediate hosts in the trematodes' life cycles.

The collection of snails was carried out in a shallow-water zone with thickly growing vegetation by a Petersen's grab and a dip net. This was followed by dissection and examination of organs for infection.

To study the emission of mature cercariae, the snails were placed in vessels containing 100 mls of water which were subsequently examined at 2 hour intervals. Observations on the emission of cercariae were carried out for 3 days to ascertain the cyclic recurrence of their escape.

Altogether, 6 species of snails were investigated: *Viviparus viviparus* (Linne, 1758), *Lymnaea ovata* (Draparnaud, 1805), *L. stagnalis* (Linne, 1758), *L.*

corvus (Gmelin, 1791), *Planorbis planorbis* (Linne, 1758), and *Planorbarius corneus* (Linne, 1758). Only a few individuals of *L. ovata* and *L. corvus* were found in the lake and no infection by parasitic worms was detected in them. The four other species of snails showed infection by larvae of 9 species of trematode which consist of 4 cercarial groups according to M. Lühe's system (Lühe, 1909): Monostomata, Furcocercaria, Echinostomata, and Xiphidiocercaria.

Group Monostomata

fam. Notocotylidae Diesing, 1839.

Notocotylus attenuatus (Rudolphi, 1809)

Parthenitae and cercariae infect *P. planorbis* with the infection rate being 3.85% ± 2.18 and the intensity of infection from 11 to 25 individuals of parthenitae, and *V. viviparus* with the infection rate being 1.85% ± 1.83 and the intensity 7 individuals of parthenitae.

The final host: domestic and wild water fowl.

Notocotylus thienemanni L. Szidat et U. Szidat, 1933

Parthenitae and cercariae were found in *P. planorbis*, the infection rate being $6.42\% \pm 2.78$, and the intensity of infection being 13 individuals of parthenitae, and in *L. stagnalis*, the infection rate being $5.1\% \pm 2.86$, and the intensity, 18 parthenitae.

The final host: wild duck, chicken, etc.

Group Furcocercaria

fam. Alariidae (Goeze, 1782) Krause, 1914

Alaria alata (Goeze, 1782) Krause, 1914

Parthenitae and cercariae were found in *L. stagnalis*, the infection rate being $1.28\% \pm 1.27$, and the intensity 78 parthenitae. For *P. planorbis*, the infection rate was recorded at $1.7\% \pm 1.68$ and the intensity at 16 parthenitae.

The final host: mammals of the Canidae family.

fam. Sanguinicolidae Graff

Sanguinicola sp. (*armata*?)

Parthenitae and cercariae were found in *L. stagnalis*, the infection rate being $3.39\% \pm 2.36$, while the intensity was high (not recorded precisely).

The final host: fishes of the Cyprinidae family.

The morphological features of cercariae of certain species in this genus are very similar. Therefore, it was impossible to identify the species with certainty without additional investigations or experiments. In morphological features, it is most closely related to *Sanguinicola armata* Plehn, 1905.

fam. Azygiidae Odhner, 1911.

Azygia lucii (Müller, 1776) Lühe, 1909

Parthenitae and cercariae were found to infect *V. viviparus*, the infection rate being $1.85\% \pm 1.83$, and the intensity 3 parthenitae, and *P. planorbis*, the infection rate being $3.83\% \pm 2.18$, and the intensity 5 parthenitae. The cercariae have a chamber in the initial sections of their tail characteristic of this family, which swells to form a space capable of accomodating the body of the cercaria. In our material we found no larva with its body twisted into the chamber.

The final host: predatory fish.

During our work at the biological station in 1984 we dissected 5 pikes the intestine of which contained maritae of *A. lucii*, the maximum intensity of infection being 15 individuals.

Group Echinostomata

fam. Echinostomatidae Dietz, 1909

Echinoparyphium sp. (*aciniatum*?).

Parthenitae and cercariae were found in *L. stagnalis*, the infection rate being $6.78\% \pm 3.27$, and the intensity 17 parthenitae; in *V. viviparus*, the infection rate was $48.15\% \pm 6.8$, and the intensity 25 parthenitae. The mature cercariae escape from the snail during the 24 hour period in a regular manner, the time of day or night exerting no observable effect on their emission rate.

The final host: birds.

In morphological features the species found is most closely related to *Echinoparyphium aciniatum*.

Echinistoma grandis Baschkirova, 1946.

Parthenitae and cercariae were found in *V. viviparus*, the infection rate being $27.12\% \pm 5.7$, and the intensity 15 parthenitae; in *L. stagnalis*, the infection rate was $9.26\% \pm 3.94$, and the intensity 18 parthenitae; in *P. planorbis*, the infection rate was $6.41\% \pm 2.78$, and the intensity 11 parthenitae; and in *P. corneus*, the infection rate was $5.71\% \pm 3.92$, and the intensity 15 individuals.

The final host: birds.

Group Xiphidiocercaria

fam. Plagiorchidae Lühe, 1901

Plagiorchis maculosus (Rud., 1802) Braun, 1901

Parthenitae and cercariae were found in *V. viviparus*, the infection rate being $25.92\% \pm 5.96$, and the intensity very high (not recorded precisely); in *P. planorbis*, infection rate was $2.56\% \pm 1.76$, and the intensity was more than 100 parthenitae; and in *L. stagnalis*, the infection rate was $1.7\% \pm 1.68$, and the intensity of infection was very high (not recorded precisely).

The mass emission of these mature cercariae from the snails is timed with the darkest period: from 9 p.m. to 1 a.m. During this period up to 17 cercariae escape from each snail. The emission of mature cercariae abruptly comes to an end with the day-break and is not observed at all in the daytime.

Metacercariae of *P. maculosus* were found in *V. viviparus* with the infection rate being $1.85\% \pm 1.83$ and the intensity 1 cyst.

Plagiorchis arcuatus Strom., 1924

Parthenitae and cercariae were found in *V. viviparus* with the infection rate being $7.4\% \pm 3.56$ and the intensity 23 parthenitae.

The final host: poultry.

The most infected snails are *V. viviparus* (6 species of trematode larvae occur in it), and *P. planorbis* and *L. stagnalis* (each an intermediate host for 5 species of trematodes). The most common larval stages of trematodes in the snails of Lake Glubokoe are in the families Echinostomatidae, Plagiorchidae and Notocotylidae, the final host of which are wild and domestic birds.

Sites of mass aggregation of snails show multiple infection phenomena. For instance, *V. viviparus* is infected simultaneously by the larvae of *E. aciniatum* and *P. maculosus* – infection rate 1.28%, *P. planorbis* by parthenitae and cercariae of *N. attenuatus* and *P. maculosus* – infection rate 5.1% and *L. stagnalis* by parthenitae and cercariae of *E.*

aciniatum and *P. maculosus* – infection rate 11.1% and larvae of *E. grandis* and *N. attenuatus* – infection rate 1.7%.

The present list of trematode parasites is probably not complete since there is always a possibility of unrecorded species of parasites being introduced by wild animals, migratory birds and man.

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References

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