

## Nematodes found in an endangered and poorly known cyprinid fish, lake minnow *Eupallasella perenurus* (Pallas, 1814)

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### Summary

44 alimentary tracts of a rare and poorly known cyprinid fish – the lake minnow *Eupallasella perenurus* (Pallas, 1814) – were subject to parasitological section. Third stage larvae of two nematode species were found: *Raphidascaris acus* (Bloch, 1799) and *Spiroxys contortus* (Rudolphi, 1819). Both of them are the first nematodes to be found in the lake minnow in Europe; *S. contortus* is a new parasite for this host.

**Key words:** *Eupallasella perenurus*; *Spiroxys contortus*; *Raphidascaris acus*; Nematoda; Poland

### Introduction

Information on the biology of fish species which are of no economic importance is still very fragmentary. One of such species is the lake minnow *Eupallasella perenurus* (Pallas, 1814), whose distribution range extends from the Odra River basin to the eastern fringes of Siberia and the Japanese island of Hokkaido. In the western part of its range, the lake minnow is extremely rare species, inhabiting small water bodies overgrowing with vegetation. Since most of its localities in Poland are situated in areas under increasingly strong human impact, a decrease in the number of its populations has been observed for years (Kusznierz, 1995). As a result, the fish is a critically endangered species under protection in Poland (Kusznierz, 2001). Knowledge of its biology, and possible threats in its natural habitats, including parasitic invasions, is prerequisite to its successful protection.

Information on the lake minnow parasites is still unsatisfactory. There is no comprehensive ichthyoparasitological study on the species, and the existing fragmentary data mostly come from Asian parts of the former USSR. The

most extensive lists of parasites from those areas were presented, among others, by Bychovskaja-Pavlovskaja (1962), Movčan and Smirnov (1981), Malyshev (1982), Bauer (1985), Pugachev (1989, 2002), and from Poland by Prost (1975). The only papers to mention the presence of nematodes in the lake minnow are those by Malyshev (1982), Sous and Malyshev (1983) and Pugachev (1989), on the results of parasitological examination of fishes from rivers and lakes of western Siberia. The authors mention larvae of *Raphidascaris acus* (Bloch, 1799) and *Streptocara crassicauda* (Creplin, 1829). No nematode parasites were found in European sites of the host.

### Material and Methods

During ichthyological studies on the biology and distribution of the lake minnow in Poland, by two of the authors (J. K. and J. W.), 44 freshly dissected alimentary tracts of the lake minnow were subject to parasitological section. The fish came from two localities: Wielkopolsko-Kujawska Lowland, village Cyprianka (19°10'01"N, 52°73'33"W) and Polesie Lubelskie, village Podpakule (23°47'92"N, 51°36'38"W). The isolated nematode larvae were preserved in 70 % alcohol and cleared in glycerol. Measurements were taken and drawings made from impermanent preparations in a drop of glycerol. The specimens are kept in the collection of the Department of Zoology and Ecology, Agricultural University of Wrocław.

### Results and Discussion

Fam. Raphidascarididae Hartwich 1954, *sensu* Fagerholm, 1991  
*Raphidascaris acus* (Bloch, 1799) – third stage larva

Site of infection: intestine (free larva in intestine lumen)  
 Locality: peat ponds, village Cyprianka, Wielkopolsko-Kujawska Lowland  
 Prevalence and intensity of infection. 1 larva in one of 26 examined specimens

**Description**

The specimen is a small larva of stocky body and semi-transparent, clearly transversely striated cuticle. Its body length is 1.785  $\mu\text{m}$ , maximum width 105  $\mu\text{m}$ . The anterior body end is oval, with very poorly developed papillae and well-visible larval tooth. The length of muscular pharynx is 102  $\mu\text{m}$ , the distance from the nerve ring to the anterior body end – 68  $\mu\text{m}$ . The nerve ring is located close to the excretory pore, which is situated 58  $\mu\text{m}$  from the anterior body end. On the border between the pharynx and the intestine there is a poorly visible, roundish ventriculus (diameter 22  $\mu\text{m}$ ) provided with an elongate ventricular appendix that runs along the intestine. In the mid part of the body a small, oval genital primordium is well visible. The length of the conical tail is 72  $\mu\text{m}$ .

**Comments**

The morphology of the examined specimen corresponds well with the species description, the differences involve only some biometrical characters. The length of pharynx and the distance between the nerve ring, the excretory pore and the anterior body end are smaller compared to Moravec's (1994) description. Most morphological and anatomical characters indicate a rather young larva at an early stage of development. This is mainly indicated by poorly developed labial papillae and poorly marked ventriculus. Likewise, the total size of the body is close to the lower values of the range stated in the species description. In the case of this species fishes may be definitive (genera *Esox*, *Salmo* etc.), intermediate or paratenic hosts. Larvae of *Raphidascaris acus* were previously found in the lake minnow, but only from Asia (Malyshev, 1982; Pugachev, 1989).

Fam. Gnathostomatidae Railliet, 1895

*Spiroxys contortus* (Rudolphi, 1819) – third stage larva Fig. 1.

Site of infection: intestine wall

Locality: peat ponds, village Podpakule, Polesie Lubelskie  
 Prevalence and intensity of infection. 2 larvae in 1 fish out of 18 examined

Description (based on 1 specimen).

The specimens are small nematodes, of translucent body, tapered at both ends; the cuticle is transversely striated. The body length is 2.565  $\mu\text{m}$ , the maximum width – 79  $\mu\text{m}$ . The anterior end forms a characteristic and clearly visible cone, built of two larger lateral pseudolabia of triangular outline (length 15  $\mu\text{m}$ ) and two smaller, finger-like papillae adjoining them laterally. The pharynx, constituting ca. 32 % body length, is clearly divided into a much narrower and shorter muscular part (length 123  $\mu\text{m}$ ) and a lon-

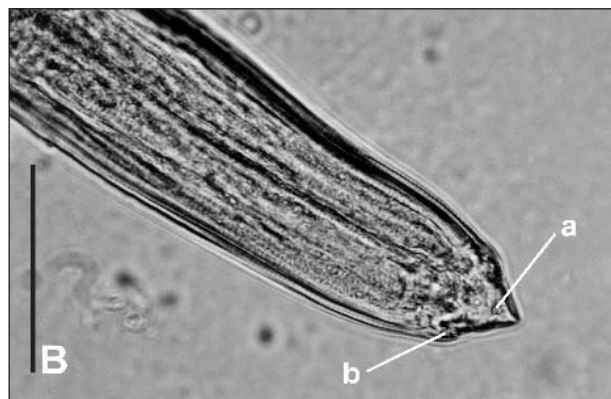
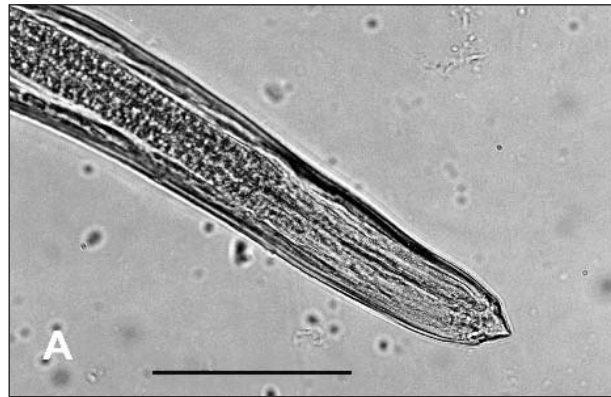


Fig. 1. *Spiroxys contortus* – third stage larva

A – anterior end of body (lateral view); B – head end (lateral view) Scale bars: A – 100  $\mu\text{m}$ ; B – 50  $\mu\text{m}$ . a – lateral pseudolabium; b – papilla

ger (684  $\mu\text{m}$ ) glandular part. The poorly visible nerve ring is located just at the beginning of the pharynx. Small and poorly visible deirids are situated close to the beginning of the glandular pharynx. The length of the bent, tapered tail is 53  $\mu\text{m}$ .

**Comments**

The morphological and anatomical characters fully correspond to the description in Moravec's (1994) monograph. Only the biometrical data show slight differences. They involve only the body width and the tail length which, compared to Moravec's (1994) description, are slightly smaller. In the life cycle of the parasite fishes are paratenic hosts (Hendrick, 1935), while various copepod species are intermediate hosts. In European conditions the definitive host of *Spiroxys contortus* is the pond turtle (*Emys orbicularis* L.) which is confirmed by the site where the parasite was found – one of the larger south-eastern refuges of that reptile in Poland. The distribution range of *Spiroxys contortus* extends from the Middle East, through Europe and northern part of Africa, to Central and North America (Moravec & Vojtková, 1970; Moravec, 1994; Moravec *et al.*, 1995).

In Europe third stage larvae of *Spiroxys contortus* were previously found in *Anguilla anguilla*, *Leuciscus idus*, *Umbra krameri* and *Misgurnus fossilis*, among others in Hungary, Bulgaria and former Czechoslovakia (Moravec, 1994). The lake minnow is thus a new host for this parasite. In Poland it was hitherto found only in its definitive host – the pond turtle (Łukasiak, 1939). Though the parasite is regarded as common, the decreasing number of turtle habitats in Europe may soon displace it to a position of an accessory species.

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