

## RESEARCH NOTE

# First report of *Philometra obturans* (Nematoda) and *Neoergasilus japonicus* (Copepoda) in Germany

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## Abstract

Parasitological examination of 150 young-of-the-year roach (*Rutilus rutilus*) during winter 2001/2002 in northeast Germany revealed the presence of larval *Philometra obturans* and *Neoergasilus japonicus*. This is the first record of roach as a paratenic host for *P. obturans*, and both records are the first for Germany. There is evidence that *P. obturans* has been overlooked in previous studies, whereas *N. japonicus* appears to be a neozoan species originating from Eastern Asia.

## Key words

*Philometra obturans*, Nematoda, *Neoergasilus japonicus*, Copepoda, roach, Germany

Our knowledge about the geographic distribution and host range of fish parasites mainly correlates with the distribution of fish parasitologists, and their favour for certain parasite groups or fish species. Thus, the apparent appearance of fish parasites in new localities might be either because they were simply indigenous species previously overlooked, or that they were recently introduced, e.g. by worldwide trade with living fish, ballast water introductions, or invaded consequent to hydraulic engineering. Recently, parasitological investigations of young-of-the-year roach maintained in ponds at the Leibniz-Institute of Freshwater Ecology and Inland Fisheries in Berlin, Germany, revealed the presence of *Philometra obturans* (Prenant, 1886) (Nematoda, Dracunculoidea) and *Neoergasilus japonicus* (Harada, 1930) (Copepoda, Ergasilidae) that have not previously been recorded from Germany.

Roach, *Rutilus rutilus* L., with a mean length of 50 mm were collected by electrofishing in the mesotrophic Lake Döllnsee, near to Berlin, Germany, in October 2001 and subsequently kept in aerated tap water (10°C) for 3 weeks. During this time, in order to prevent mortality due to protozoan infections, the fish were immersed in 10 ppm FMC (3.4% methylene blue, 3.4% malachite green in 37% formalin; after 3 days water was changed). From November 2001 to May 2002, the fish were maintained in ponds (each surface 40–60 m<sup>2</sup>, depth 0.8 m) situated on the ground of the institute with approximately 5 fish per m<sup>2</sup>. The ponds were supplied with

unfiltered water from the adjacent Lake Müggelsee, with an inflow of 1–2 l sec<sup>-1</sup>. The water temperature in the ponds followed seasonal fluctuations with a minimum of 0.5°C in January.

Samples of 30 roach in December 2001, and 40 roach in each of March, April and May 2002, were selected at random for parasitological examination. The fish were killed by neck cut and immediately inspected for parasites, including the examination of the eyes and the anal fin.

### *Philometra obturans*

Third stage larvae of the nematode *Philometra obturans* were found in the vitreous body of the eye from the roach examined in March and April 2002. For both dates, only 1 of 40 fish was infected with one larva.

The present finding is the first record of *P. obturans* in Germany. According to Moravec (1994), *P. obturans* is a widely distributed Palaearctic species that occurs in both fresh and brackish waters. It has been hitherto recorded from France, the former Czechoslovakia, Hungary, Finland, and from the former USSR (Moravec 1994, Káll *et al.* 2004). The paucity of published records of *P. obturans* larvae might be explained by the small body size of the nematode (length approximately 0.7 mm) and its unusual localization in the host (Moravec 1994). There is no evidence that *P. obturans* recently invaded German waters.

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Adult *P. obturans* are host-specific parasites of the northern pike, *Esox lucius* L. (Moravec 1994). Several cyclopoid copepods were experimentally demonstrated to be intermediate hosts of *P. obturans* (Moravec 1994). Probably, paratenic fish hosts, that acquire *P. obturans* by ingestion of infected copepods, are the main source of infection for pike. Until now, perch, *Perca fluviatilis* L., pikeperch, *Sander lucioperca* (L.) and rudd, *Scardinius erythrophthalmus* (L.), have been recorded as natural paratenic hosts, in which third stage larvae of *P. obturans* are always located in the vitreous body of the eye (Moravec 1994). Although Moravec (1994) assumes that numerous other fish species may serve as paratenic hosts, the present finding is the first report of roach as a paratenic host for *P. obturans*.

For one of the main paratenic hosts, *Perca fluviatilis*, Scholz (1987) showed that prevalence and mean intensity can show high variations, without a distinct seasonal pattern (in the Mácha Lake pond system, Czech Republic, prevalence was 19.4% and intensity varied from 1 to 38), and both prevalence and mean intensity increased with the body size of the host. Thus, it is not surprising that only few *P. obturans* were found in the young roach examined in the present study.

#### *Neoergasilus japonicus*

The ectoparasitic copepod *Neoergasilus japonicus* was found on 2 of 30 roach examined in December 2001, and on 1 of 40 roach examined in both March and April 2002. There were 1–2 parasites per anal fin.

This is the first report of *N. japonicus* from Germany. From the original descriptions of all 5 species of *Neoergasilus* Yin, 1956, Hudson and Bowen (2002) concluded that all originated in Eastern Asia, and they assume that *N. japonicus* was transferred to Europe and North America together with exotic fish hosts and/or ballast water introductions (Table I). *N. japonicus* was first detected in Europe in the 1960s, but few observations followed (Tuuha *et al.* 1992). Tuuha *et al.* (1992) suppose that *N. japonicus* is more widely distributed than one might assume, because this species is mainly found loosely attached on the fins of the host, and thus is likely dislodged, and may be absent from parasite surveys.

According to Tuuha *et al.* (1992) the life history of *N. japonicus* is characterised by at least two generations per year. Similar to other ergasilids only gravid females are parasitic and can be found on a variety of fish hosts (Hayden and Rogers 1998, Hudson and Bowen 2002). In contrast to typical ergasilids, *N. japonicus* are mainly attached to the host's fins, and are able to move from one host to another (Ponyi and Molnár 1969). Preferred sites of attachment of *N. japonicus* on the fish host are the dorsal and the anal fin (Hayden and Rogers 1998, Hudson and Bowen 2002). Nevertheless, our study is based only on the examination of the anal fin, and thus likely underestimates prevalence and intensity.

**Table I.** Date of first discovery and spread of *Neoergasilus japonicus*, modified from Hudson and Bowen (2002)

Continent	Country	Date of discovery
Asia	Taiwan	1920s*
	China	1950s*
	U.S.S.R.	1951*
	Japan	1976
Europe	Hungary	1965
	Czechoslovakia	1967*
	France	1978*
	Great Britain	1980
	Finland	1985
America and the Caribbean	Germany	2001 (present study)
	Cuba	1980s*
	U.S.A.	1993

\*Date was estimated by Hudson and Bowen (2002).

A study on ergasilid copepods of roach in Central Finland (Tuuha *et al.* 1992) did not reveal a regular seasonal pattern of occurrence, indicating that *N. japonicus* might reproduce, or recruit fish hosts not only at higher temperatures, but also in autumn and winter. However, Hudson and Bowen (2002) found that overwintering populations were very low in the Great Lakes, North America, which corresponds to the sporadic findings of this parasite during the present study performed during the winter months.

**Acknowledgements.** We wish to thank A. Krieger for supplying the fish and Dr S. Poynton for revising the English of the manuscript.

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