

Occurrence of two skrjabillanid nematodes, *Sinoichthyonema amuri* and *Skrjabillanus schigini* in grasscarp (*Ctenopharyngodon idella*) in Hungary

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ABSTRACT. Two skrjabillanid nematodes known from the Far East and the Soviet Union, *Sinoichthyonema amuri* (Garkavi, 1972) and *Skrjabillanus schigini* Tikhomirova et Rudometova, 1975 are reported from grasscarp (*Ctenopharyngodon idella*) older than two years in Hungary. *Sinoichthyonema amuri* occurs freely on the mesentery while *Skrjabillanus schigini* is coiled up within the serous membranes.

KEY WORDS: Nematoda, *Skrjabillanus*, *Agrachanus*, *Sinoichthyonema*, *Molnaria*, grasscarp, new area of spread.

With herbivorous fishes brought in for breeding (*Ctenopharyngodon idella*, *Hypophthalmichthys molitrix*, *H. nobilis*) numerous new parasites have been introduced to Europe. In Hungary the parasitological consequences of fish transfers were reported by SZAKOLCZAI and MOLNÁR (1966). The introduced parasites were mostly protozoans: these were reviewed by MOLNÁR (1971). The majority of helminths found in the three introduced fish species were monogeneans (MOLNÁR 1984). As concerns other helminths, the sole representative of the original Far-Eastern parasite fauna of these fishes was *Bothriocephalus acheilognathi* which was demonstrated in Hungary by BUZA et al. (1970).

The first representative of helminths of the genus *Skrjabillanus* was *S. lineae* Schtein et Schigina, 1958 reported in the Soviet Union from tench. In Hungary MOLNÁR (1966) reported two *Skrjabillanus* spp. from rudd and described them as new species by the names *S. scardini* and *S. erythrophthalmi*. Other known skrjabillanid species include *Skrjabillanus amuri* and *S. schigini* found in grasscarp (GARKAVI 1972; TIKHOMIROVA and RUDOMETOVA 1975) and *Esocinema bohemicum* reported by MORAVEC (1977) from otke.

During revision of the genus *Skrjabillanus*, first MORAVEC (1968) lifted out the species *S. erythrophthalmi* for which he created the genus *Molnaria*. Subsequently TIKHOMIROVA (1971) established the genus *Agrachanus* for *S. scardini* and LOMACHIN and TSCHERNOVA (1980) created the genus *Garkavillanus* for *S. amuri*. Later on BAUER et al. (1987) identified *Molnaria erythrophthalmi* with the species erroneously described as *Philometra leucisci*.

Agapova, 1956 and renamed it *Moinaria leucisci*, MORAVEC (1982) synonymized *G. amuri* with the species *Sinochthyonema stenopharyngotoni* Wu, 1973, renaming the species *Sinochthyonema amuri* (Garkavi, 1972).

MATERIALS AND METHODS

The study was conducted between November 1988 and February 1989. The age and place of origin of the grass carp examined were as follows: 1. Three 3-year old grass carp from the dead arm of River Körös. 2. Ten 3- to 4-year old grass carp submitted for laboratory examination from fish louse infested farm ponds of a fish farm situated between the Rivers Danube and Tisza. 3. The inner organs of 60 3- to 4-year old grass carp of unknown origin and processed for meat. 4. Sixty grass carp fry and 2-year-old grass carp from different farm-ponds.

The swimbladder and the mesentery off the intestine and kidney were placed in 0.65% saline. Actively moving helminths were looked for by gradually tearing the serosa to pieces. The collected helminths were placed under a coverslip either alive or after fixation in 70% ethanol and were cleared in lactophenol solution.

RESULTS

Specimens of the helminth species *Sinochthyonema amuri* (Garkavi, 1972) and *Skrjabillanus schigini* Tikhomirova et Rudometova, 1975 were found in all 3 and 10 fish obtained from the Dead Körös and from the territory east of the River Danube respectively. About 10 to 15 specimens of both *S. amuri* and *S. schigini* were found in each fish. In most cases the specimens of *S. amuri* occurred freely on the abdominal and peritoneal serous membranes, while those of *S. schigini*, showing multiple coils, were released from the mesentery connecting the two swimbladder sacs with the intestines. Only 4 out of the 60 grass carp processed for meat were parasitized by 1 to 4 specimens of *S. amuri* and *S. schigini*. No helminths were found in grass carp fry and 2-year old grass carp. Male and female nematodes occurred in the same number in the test material. Their measurements corresponded to those reported by BAUER et al. (1987). The males were much smaller than the females. Morphologically *S. amuri* (Fig. 1/a, b, c) did not differ from drawings published by LOMACHIN and TSCHERNOVA (1980). However, both the buccal apparatus and the male copulatory organs (Fig. 2/a, b) of *S. schigini* differed from those depicted on drawings published by TIKHOMIROVA and RUDOMETOVA (1975) and were much more similar to those of *S. amuri*.

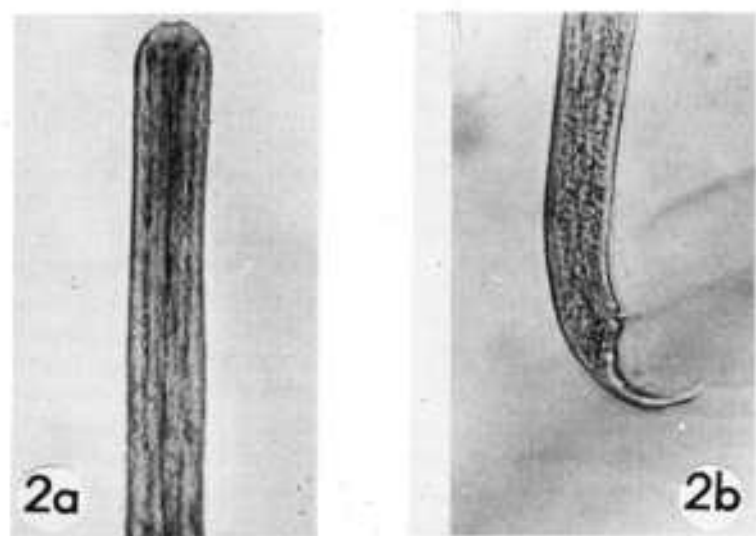
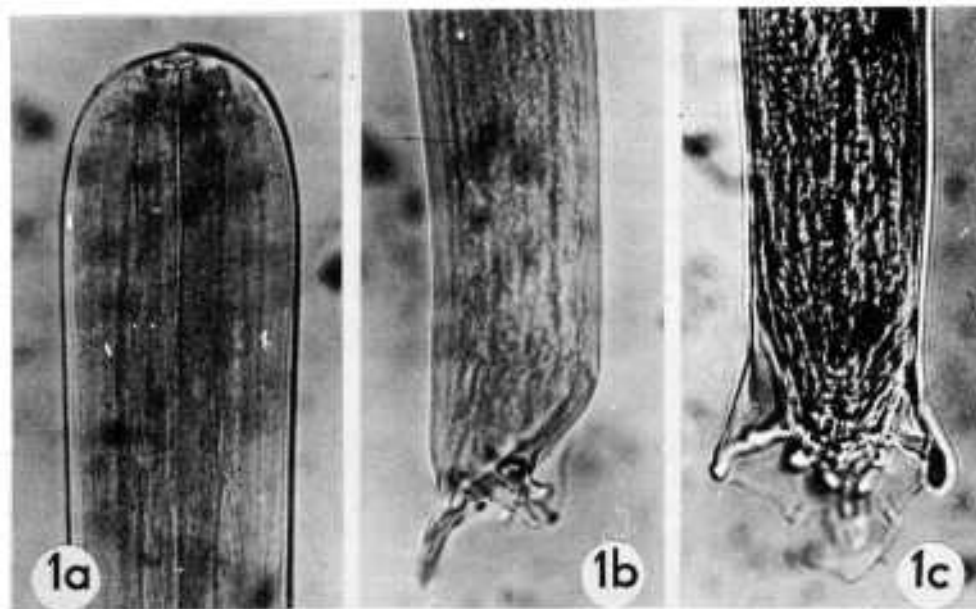
DISCUSSION

The present study shows that the specific grass carp parasites *S. amuri* and *S. schigini* are common in fish older than two years. The high prevalence of infection in the stock infested by fish louse can be explained by the development of skrjabillanids. Namely, from the stud-

Legend to the figures:

Fig. 1. Anterior and posterior end of *Sinochthyonema amuri*. (a) Anterior end with sclerotized buccal capsule. (b) Posterior end in lateral view. (c) Posterior end from above. $\times 500$

Fig. 2. Anterior and posterior end of *Skrjabillanus schigini*. (a) Anterior end. (b) Posterior end. $\times 500$ (Authors photo.)



Agapova, 1966 and renamed it *Molnaria leopoldi*. MORAVEC (1982) synonymized *G. amuri* with the species *Sinoichthyonema stenopharyngodonj* Wu, 1973, renaming the species *Sinoichthyonema amuri* (Garkavi, 1972).

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les of TIKHOMIROVA (1975) it is known that these parasites can develop only in the presence of fish louse (*Argulus*) as intermediate host. However, it is not clear whether fish younger than two years are free from skrjabillanida because they are kept in ponds free from fish louse and thus there is less opportunity for infection, or because susceptibility is age dependent. My unpublished observations and data published by TIKHOMIROVA (1971) indicate that the probability of *A. scardinali* and *M. leucisci* infection in rudd living in natural waters increases with age. It is rather uncommon but not at all surprising that besides the rudd the grasscarp is the other fish species which is parasitized by two morphologically similar skrjabillanids of different location. The two fish species are closely related. Though in a given fish species the skrjabillanids living freely in the abdominal cavity and those parasitizing the swimbladder serosa are highly similar in morphology of the buccal apparatus and the tail end of the males, by its location and measurement *Molnaria leucisci* corresponds to the species *S. amuri*, while *Agrachanus scardinali*, coiled up in the serosa, bears resemblance to *S. schigini*.

MOLNÁR K.: Két skrjabillanida nematoda, *Sinoichthyonema amuri* és *Skrjabillanus schigini*, előfordulása Magyarországon amurban (*Ctenopharyngodon idella*)

A Távol-Keletről és a Szovjetunióból ismert két fonálféreg fajt *Sinoichthyonema amuri* (Garkavi, 1972) és *Skrjabillanus schigini* Tikhomirova et Rudometova, 1975 került kimutatásra Magyarországon kétnyarannál idősebb amurokból (*Ctenopharyngodon idella*). Az előbbi faj a hasüregi csaplecezen szabadon, az utóbbi a savóshártyákon feltékeredve fordult elő.

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