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Research Note

First record of *Schulmanela petruschewskii* Shulman, 1948 (Nematoda: Capillariidae) from cultured Rainbow trout (*Oncorhynchus mykiss*) in Turkey

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Summary

The nematode *Schulmanela petruschewskii* (Shulman, 1948) was identified during the parasitological examination on the liver parenchyma in one specimens of a cultured rainbow trout (*Oncorhynchus mykiss*) which reared in Derbent Dam Lake in Samsun, Turkey (41˚25'6'' North latitude, 35˚49'52'' East longitude) in August 2008. This parasite species was not previously reported from Turkey. With the present study we report *S. petruschewskii* for the first time in Turkey. This specimen which is a parasite of cultured rainbow trout (*Oncorhynchus mykiss*) is a new record for the Turkish parasite fauna. Original measurements and figures are presented.

Key words: *Schulmanela petruschewskii*; *Oncorhynchus mykiss*; Turkey

Introduction

Schulmanela petruschewskii (syn. *Hepaticola petruschewskii* Shulman, 1948; *Capillaria acerinae* Thieme, 1961; *C. eupomotis* Ghittino, 1961) is the best-known parasitic species in the liver of many species of freshwater fishes of different families in Europe. This species exhibits only a low degree of host specificity at in Europe it has been recorded from a number of species of freshwater fish of different families and orders. It is a serious parasite of pond-reared carp and rainbow trout (Moravec, 2004).

During a parasitological survey carried out on sample of cultured *Oncorhynchus mykiss* Walbaum, 1792**,** collected from Derbent Dam Lake in Samsun, Turkey (41˚25'6'' North latitude, 35˚49'52'' East longitude), parasitic nematodes were found a fish. *Schulmanela petruschewskii* was not previously reported in Turkey. This paper describes the morphology of the specimens recovered from the liver parenchyma of *Oncorhynchus mykiss*, including their morphology, studied by light microscopy.

Materials and Methods

The nematodes (a total of 10 gravid specimens) were recovered in the liver parenchyma of *Oncorhynchus mykiss,* Derbent Dam Lake in Samsun, Turkey in August 2008. Nematodes were washed in physiological saline, fixed a hot mixture of 70 % ethanol and glycerin (9:1 parts), and examined as temporary microscopic preparations in glycerin (Moravec, 1994). The nematodes were measured with a microscope (Eclipse 80i, Nikon Corporation) connected to a digital camera with a liquid crystal display and a measurement specific software (Nikon Digital Sight1 DS-L1). Drawings were made with the aid of a Nikon drawing attachment. Identification of capillarid nematodes examined in our material correspond morphometrically to descriptions by (Moravec, 2004). After examination, the specimens were stored in vials with 70 % ethanol. All measurements are in millimeters.

Results and Discussion

Schulmanela petruschewskii Shulman, 1948 (Fig.1)
Syn.: *Hepaticola petruschewskii* Shulman, 1948; *Capillaria acerinae* Thieme, 1961; *C. eupomotis* Ghittino, 1961
Type host: Rainbow trout (*Oncorhynchus mykiss*) (Walbaum 1792, Salmonidae)
Site of infection: Liver
Type locality: Derbent Dam Lake, Samsun (41˚25'6'' North latitude, 35˚49'52'' East longitude), Black Sea Region, Turkey.

* This paper was prepared from the PhD. Dissertation of Zafer Pekmezci.

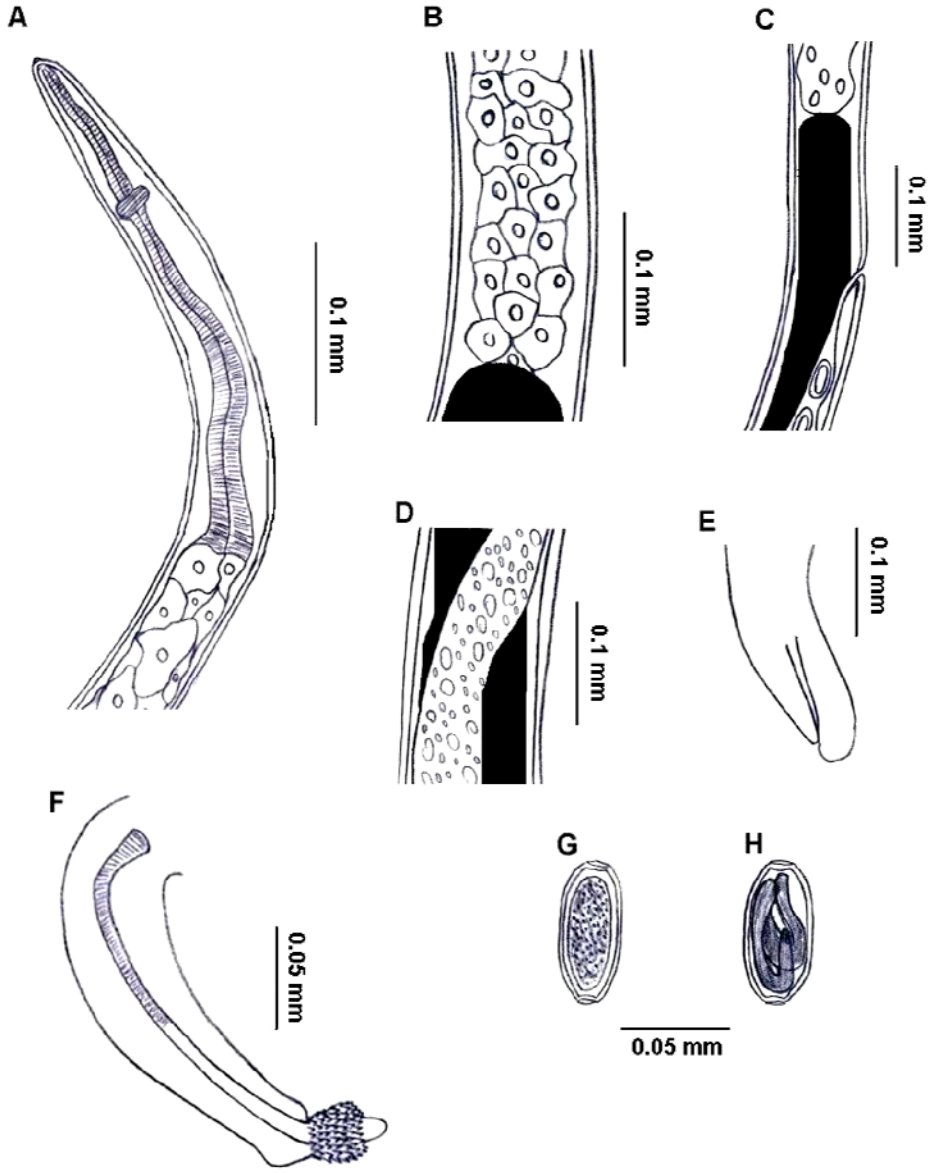

Fig. 1: *Schulmanela petruschewskii* (Shulman, 1948) from *Oncorhynchus mykiss*: **A:** Anterior part of female body; **B:** Stichosome formed by three longitudinal rows of stichocytes at posterior part of oesophagus; **C:** Region of vulva and oesophago-intestinal junction; **D:** Lateral bacillary band (middle of female body); **E:** Posterior end of female; **F:** Posterior end of male; **G:** Full development egg; **H:** Larvaed *S. petruschewskii* egg (Liver parenchyma).

Prevalence: 3.3 % (in 1 out of 30 fish examined).
Deposition of specimens: Department of Parasitology, Faculty of Veterinary Medicine, Samsun, Turkey, Helminth Coll. No. 2008/4.

Male (2 complete specimens): Length of body 7.41 (6.96 – 7.86) mm, width 0.067 (0.060 – 0.074) mm. Maximum width of lateral bacillary band 0.033 (0.032 – 0.034) mm. Length of entire oesophagus 1.62 (1.42 – 1.83) mm, length of muscular oesophagus 0.296 (0.271 – 0.321) mm, nerve ring situated at 0.077 (0.068 – 0.085) mm from anterior extremity. Spicule was well sclerotized and its surface which provided with distinct transverse grooves. Proximal end of spicule somewhat expanded and its distal end rounded. Spiculer sheath bell-shaped and densely cover with tiny flat spines (Fig.1F). Length of spicule 0.239 (0.216 – 0.262) mm, its width 0.010 (0.09 – 0.011) mm. The tail short and provided with cuticular membrane forming bursa. Two lateral dorsally bent rays supported bursa. Behind the cloacal opening a pair of large rounded subventral papillae presents.
Female (8 complete specimens): Body length of gravid females 12.46 (11.88 – 13.67) mm, maximum width 0.121 (0.114 – 0.129) mm. Width of bacillary bands were at mid-body length 0.058 (0.055 – 0.061) mm (Fig. 1D). Length of entire oesophagus 2.18 (2.05 – 2.31) mm and muscular

oesophagus 0.296 (0.286 – 0.318) mm. Stichosome formed by three longitudinal rows of stichocytes containing large nuclei (Fig.1B). Distance of nerve ring from anterior end 0.093 (0.090 – 0.097) mm (Fig. 1A). Vulvar lips not elevating. Vulva situated 0.138 (0.070 – 0.155) mm posterior to end of oesophagus (Fig.1C). Eggs are oval, barrel-shape and thin-walled, two layered egg wall present. Fully development eggs without protruding polar plugs. Larvaed *S. petruschewskii* eggs present in the liver parenchyma (Fig. 1G-H). Length mature eggs 0.064 (0.062 – 0.076) mm and width 0.030 (0.027 – 0.035) mm. Posterior end of body rounded, with sub terminal anus; length of tail present shortly 0.013 (0.012 – 0.015) mm (Fig.1E).

The general morphology and measurements of the specimen were, more or less, in accordance with *Schulmanela petruschewskii* Shulman, 1948 (see the key to genera of Capillariidae parasitic in European salmonids by Moravec, 2004) and, therefore, the capillarid nematodes we observed here were first considered to belong to this species in Turkey.

According to (Moravec, 2004) Superfamily Trichinelloidea Ward, 1907 (1879) has six families, however only members of the Capillariidae are parasitic in salmonids. Nematodes of this family that may occur in European salmonids belong to two genera which are *Schulmanela* and *Pseudocapillaria.* The genus *Schulmanela* Ivashkin, 1964 described as stichosome consisting of three longitudinal rows of stichocytes. Lateral caudal alae in male absent. Posterior end of male with small membranous bursa supported by pair of dorso-lateral finger-shaped lobes (rays) bent dorsally along rim of bursa; dorsal-caudal projection absent. Spicule was well sclerotized, with superficial transverse grooves at its middle region. Vulvar appendage was absent. Parasites infect the liver of fishes. Type and the only species is *S. petruschewskii*.

To date there are known only three species of capillariids (*Schulmanela petruschewskii, Capillaria cyprinodonticola* and *C. cichlasomae*) parasitic in the liver of fishes (Moravec *et al*., 1995). The stichosome of *C. cyprinodonticola* and *C. cichlasomae* consists of a single row of stichocytes (Huffman & Bullock, 1973, Moravec *et al*., 1995). Although the stichosome formed by three longitudinal rows of stichocytes of *S. petruschewskii* (Moravec, 2004) differed from both *C. cyprinodonticola* and *C. cichlasomae*. Bacillary bands indistinct in *C. cichlasomae* (Moravec *et al*., 1995) in contrast of the two lateral bacillar bands present starting near head end and extending posteriorly along whole body of *S. petruschewskii* (Moravec, 2004). *S. petruschewskii* differing from *C. cichlasomae* mainly in a well developed caudal bursa in the male (Moravec *et al*., 1995).

Heavy infections of *S. petruschewskii (C. eupomotis)* are known in farmed rainbow trout in Italy (Ghittino, 1961). According to Wierzbicka *et al.* (1982), the highest degree of *C. petruschewskii* prevalence (96 %) occurred in *Acerina cernua* in Poland. Piasecki and Falandysz (1994) mention that *S. petruschewskii* was recorded in 15 out of 103 and prevalence found as 14.5 % *Lepomis gibbosus* in Poland. Recently, Shukerova and Kirin (2008) reported *S. petruschewskii* from *Scardinius erythrophthalmus* in Bulgaria.

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