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First Record of Gordius sp. (Nematomorpha: Gordioidea) from Balıkesir Province, Türkiye

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Abstract

The nematode phylum Nematomorpha contains organisms which are also known as horsehair worms or Gordian worms. We report here a male specimen of Gordian worm from a horse farm in Balıkesir province, Turkey. The body of the specimen was brown in color and the length was about 38 cm. After fixed in ethyl alcohol (80%) scanning electron microscopic (SEM) observations were carried out. Based on macroscopic and SEM findings the specimen was identified as Gordius sp. As merely little data is available on these organisms in Turkey, our finding will contribute to the existing knowledge in terms of the local diversity of this taxon.

Keywords: Gordian worm, scanning electron microscopy, Turkey

Introduction

Phylum Nematomorpha is known as "horsehair worms" or "Gordian worms". The phylum is divided into two classes: Nectonematida, which lives in the sea, and Gordiida, which lives in freshwater.[1] One of the common genera belonging to this phylum is Gordius. Gordius sp. have four developmental stages (egg, pre-parasitic larva, parasitic juvenile and free-living aquatic adult) in their life cycle. About 50 µm long ovoid eggs are deposited in freshwater covered with gelatinous material by female Gordius sp. Pre-parasitic larvae develop in the eggs in about one month. The hatching larvae swim freely in the water are ingested by various aquatic paratenic hosts and encysted in their tissue. After paratenic hosts are ingested by final hosts such as crickets, cockroaches, beetles, mantids, and grasshoppers development continues until mature adults leave their host. Normally after leaving the insect host, they became adults in water.[2,3]

Adult Gordius spp. possess a round body like nematodes, are very long in size (usually 30 to 40 cm, sometimes 120 cm in length) and quite narrow (generally 1 mm). The female and male are separate. Determination of species in the genus Gordius is difficult because of comparatively poor diagnostic characters. Although 119 species have been identified so far, only 79 of them are regarded as valid. The important characters use to distinguish are color, size, shape of the anterior and posterior end, structures in the male posterior end and cuticle. Especially, to observe the structures in the male posterior end and the cuticle it is recommended to use scanning electron microscope (SEM).[4] Gordius spp. and also the other species belonging to Nematomorpha are neglected organisms by researchers in Turkey. There are no sufficient data on these species except a few reports in this country. The aim of the present study was (i) to contribute to the available data on this phylum and (ii) to draw attention to these rarely reported organisms.

Material and Methods

The horsehair worm specimen was obtained from a horse

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farm in Balıkesir province, Turkey. It is found on the ground outside a horse paddock. The live specimen was put into a glass beaker containing tap water and stored at room temperature for 10 days. Thereafter, the worm was fixed in ethyl alcohol (80%) for SEM observations. For this aim, the posterior end and midbody of the worm were excised. These parts were dehydrated gradually alcohol series, critically point dried and sputtered with gold in a sputter coater (Leica). Observation took place with a LEO SEM 1524, and then digital images were taken.

Results

The body of the specimen was brown, whereas the anterior end was white. Body length was about 38 cm (Fig. 1A, B).

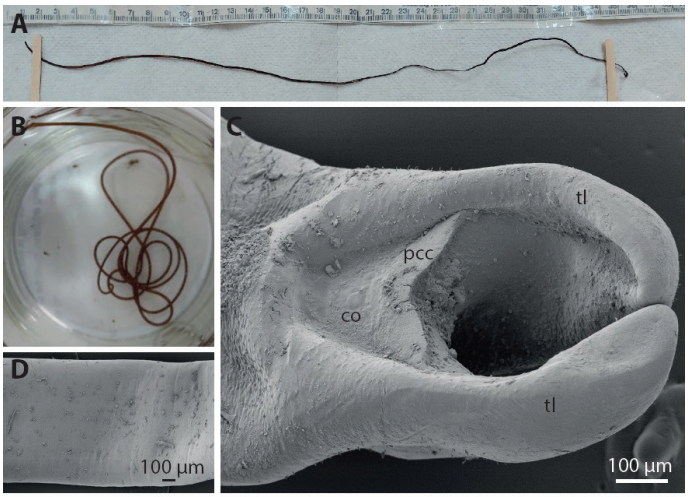

Fig. 1: Gordius sp. A. Outstretched specimen, anterior is to the left. B. Live specimen in tap water. C. Scanning electron microscopical (SEM) image from the ventral side of the posterior end, with tail lobes (tl), post-cloacal crescent (pcc) and the position of the cloacal opening (co), which in this case is covered and not visible. D. Smooth surface of the cuticle (by SEM).

The anterior end was slightly thinner than the midbody region and cylindrical. As the posterior end was found to be divided into two lobes the specimen was identified as a male one. According to scanning electron microscopic observations, a crescent-like structure called as the post-cloacal crescent was observed between the two lobes (Fig. 1C). Due to the fact that this structure is a distinctive feature for the genus Gordius, the current specimen was identified as Gordius sp. Anterior of the post-cloacal crescent was a round structure. The cuticle was smooth and any substructure was not present in the midbody section (Fig. 1D).

Discussion

Species in the genus Gordius are extremely hard to distinguish from each other[4], because very few diagnostic characters are present. In this study, the newly reported male has a smooth cuticle without any substructure. The cloacal opening is not visible. The post-cloacal crescent, a structure characteristic for the genus Gordius, is slightly angled, directly bordering the point of bifurcation of the two tail lobes and it does not extend onto the tail lobes. Very few bristles were observed in the posterior end lateral of the post-cloacal crescent and on the tail lobes. With these characters it is slightly different from the characters reported for Gordius pioltii, because here the parabolic post-cloacal crescent extends onto the tail lobes (see only available figure in Janda [5]). However, Konsuloff [6] reports the species just briefly, without any further description or figure. A smooth cuticle and almost no additional structures in the posterior end can point our specimen to be Gordius aquaticus which is the oldest scientific name for any horsehair worm and has also become the most popular one.[4] But these features are also seen in some other Gordius species. Therefore, the worm was identified only at genus level; species identification was not possible.

The previously reported species are known from Turkey definitely underestimate the real local diversity of this taxon. These include several males of G. pioltii Camerano, 1886 from Edirne [6], one male of Gordionus turkensis from Cayorenguney [7], one male of G. aquaticus from Isparta [8] and Istanbul [9] and one female from Aydın [10]. To the best of authors' knowledge, Gordius sp. is recorded for the first time from Balıkesir province.

Horsehair worms occur in different types of water such as seas, rivers, streams or puddles. In the vicinity of humans, they may appear in watering tanks of livestock from where the insect hosts come from.[11] Additionally, the worms have also been obtained from distinct materials or sources such as pork meat[12], anal aperture of an Aegean chub[10], vomitus of a child [13] or faeces of a dog.[14] In our case, the live Gordius sp. was noticed by farm workers on the ground without any water contact and they did not know where the worm came from. The question remains open whether the adult specimen has moved actively from a watery habitat to the place where it has been found or whether it emerged indeed in a non-watery area. From this point of view, which (additional) factors contribute to / may play a role in the emergence of adult nematodes from their hosts need further research.

In conclusion, the phylum Nematomorpha has gained little attention by researchers in Turkey, and very few records are available from this country. It is suggested to carry out more comprehensive studies in order to get further data on the distribution patterns of these nematodes.

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