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Research Article

Detection of a pathogenic nematode from tire track eel, *Mastacembelus armatus* captured in the Indus River, Sindh, Pakistan

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Abstract

A pathogenic nematode was detected from buccal cavity and intestine of a fish, tire track eel, *Mastacembelus armatus* sampled from Indus River. The parasite was identified as member of genus *Eustrongylides* (larval stage) and was observed from some twelve individual hosts. The parasite is reported for the first time from present sampling locality. This study would add locality extension of the pathogenic nematode from the Indus River.

Keywords: *Eustrongylides* sp; *Mastacembelus armatus*; Pakistan; The Indus River

Introduction

Parasites are significant part of biodiversity and ecological processes. They depend on host for nutritional and metabolic requirements. They also indicate host feeding habit and geography. They infect invertebrates as well as vertebrates. Some parasites use both invertebrates and vertebrates in completion of life cycle. The fishes are major intermediate and definite host for parasites.

Mastacembelus armatus Lacepede, 1800 is known as tire track eel and locally called Bam. It is a popular indigenous freshwater fish of Pakistan Bangladesh, India, and Sri Lanka **[1, 2]**. It is considered as highly proteinaceous food consumed in diet and used for medicinal purpose and manufacturing poultry feed. *Mastacembelus armatus* being an important fish therefore, it is essential to investigate the helminth parasites inhabiting in it. This host has been examined thoroughly for helminths in some countries of south Asian subcontinent except Pakistan. This report focuses on presence of genus *Eustrongylides* Jagerskold, 1909 in *Mastacembelus armatus* from Guddu and Sukkur Barrages of the Indus River in Sindh Pakistan.

The genus *Eustrongylides* (Nematoda: Dictophymatidae) is distributed almost in all continents of world including North and

South America, Europe, Africa and Asia [3, 4]. It is an important zoonotic nematodes and its tendency to infect its host has become increased due to consuming raw and less cooked fish meat [5]. *Eustrongylides* being giant in size deprives host from digested food. It also damages tissue and causes Eustrongylidosis in human. Paperna [3] reported gastritis and perforation in intestine of human. It is reason that enough attention has been given in different countries in studying *Eustrongylides*. No such attempt was made in Pakistan to assess taxonomy and pathogenic aspect of genus *Eustrongylides* in fishes and birds. This report also indicates probability of infection of this nematodes in other fishes especially edible and ornamental fishes of the Indus River. It will help in maximizing productivity and reducing fish mortality.

Materials and methods

During this study, twelve individuals of *Mastacembelus armatus*, were caught from Guddu (n=5), 28°25'60" N and 69°43'60" E and Sukkur (n=7), 27°40′50″N and 68°50′43″E barrages of the Indus River. They were caught with help of fishermen and transported immediately to Parasitology Laboratory in ice box at Department of Zoology, Sindh University Jamshoro. They were identified by having slender, elongated and compressed body; long dorsal and anal fin; without pelvic fin; trilobed snout tip. minute scale; scaled head spine commenced from middle of pectoral fin. A row of black spots found along base of soft dorsal fin. Moreover, taxonomic features and fin were compared with Rahman [2] and Talwar and Jhingran [6].

M. armatus were kept on dissecting tray and opened with scissors from posterior region towards gills. The exposed organs were removed separately in peteri plates. They were teased and shaked properly. While removing organs from buccal cavity and teasing intestine some coiled nematodes were found embedded in wall of intestine and body cavity. They were quite large and placed in cavity glass and observed on Amscope, Dual Lit 6w LED Trinocular stereo Zoom microscope.

Later on, they were mounted semi permanently in glycerol-lactophenol solution and coated with wax. Photographs were captured with OMAX Digital Trinocular Compound Microscope with 14 MP camera and the drawing was drawn with Olympus BH2-DA drawing tube attached microscope. Measurement is given in millimeter otherwise stated properly.

Taxonomic summary

Family:	Dictophymatidae Railliet, 1915
Genus:	*Eustrogylides* Jagerskold 1909
Species:	*Eustrongylides* sp.
Host:	*Mastacembelus armatus*
Site of infection:	Intestine and Body cavity
No. Specimen collected:	9
Status:	New locality record

Results

A total of twelve specimens of *Mastacembalus armatus* were examined and five were harboring nine specimens of nematodes. The rate of prevalence was recorded 41.66% and intensity and abundance were 1.8 and 0.75 noted respectively. The specimens were determined as *Eustrogyloides* sp (Fig. 1). They have large, elongated body 48.78-56.48 long and 0.54-0.59 wide, cuticle thin, transparent and transversely striated. Anterior extremity

conical having slit like mouth and 12 cephalic papillae arranged in two circle of row with 6 papillae each. Outer circle papillae larger then inner circle papillae having spike like apex and broad base, 0.013-0.026 long. Specimen contain somatic papillae arranged in lateral and submedian fields. Slit like mouth enter into buccal cavity which is narrow and short enter into esophagus, esophagus long with posterior muscular valve projecting into intestine, nerve ring prominent found in first part of esophagus in anterior extremity. Posterior extremity expanded into muscular sucker, bursa bell shaped, bosses present into muscular sucker and having indebted or cleft ventral edge of sucker, single long spicule.

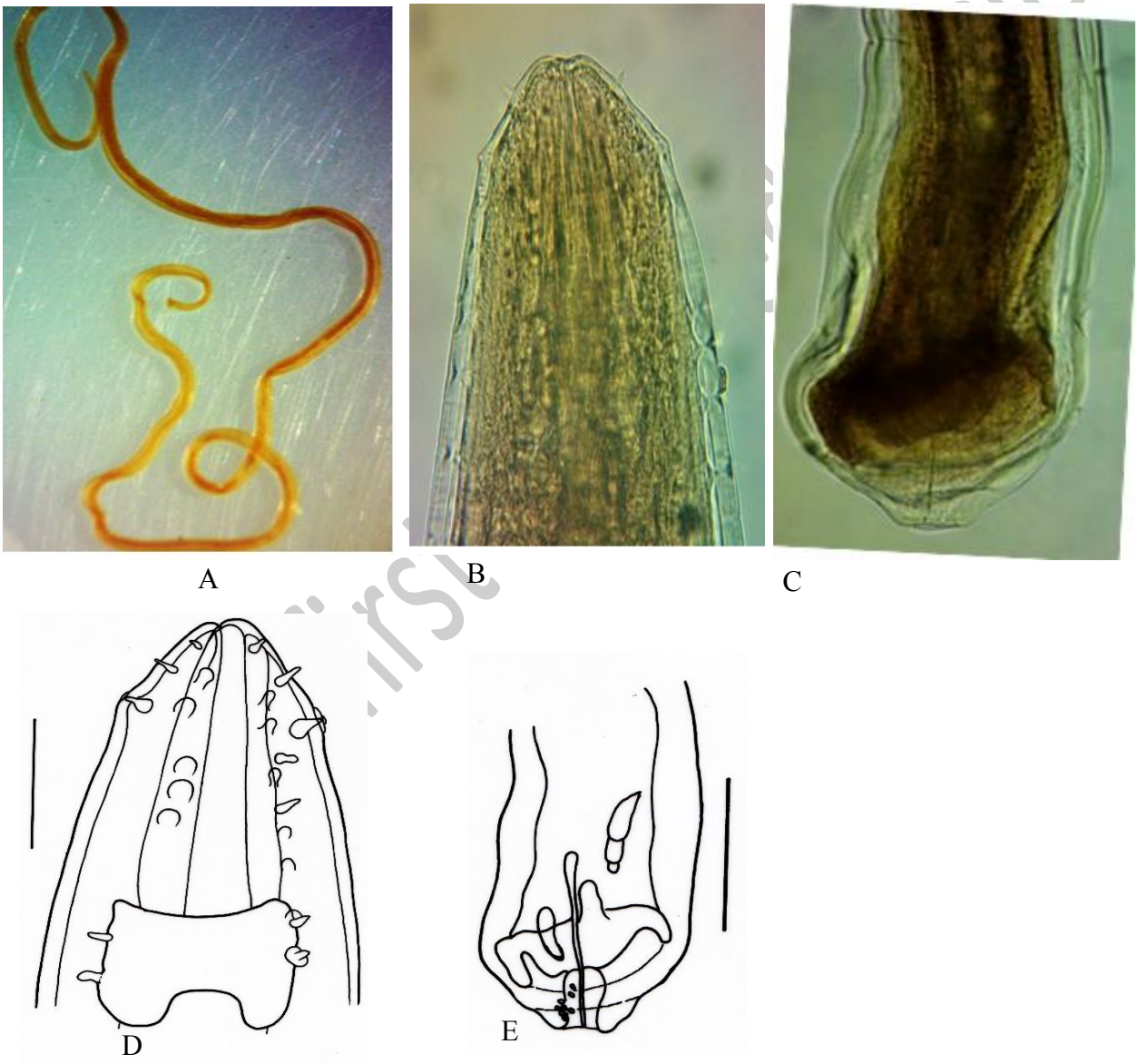

Figure 1. Structure and body parts of *Eustrongylides* sp. A. Entire worm B. Anterior extremity; C. Posterior extremity; D. Line Drawing of anterior extremity with prominent papillae and Nerve ring; E. Posterior extremity showing spicule and bosses

Discussion

The genus *Eustrongylides* is one of the four genera of the family Dioctophymatidae Railliet, 1915, and considered as highly pathogenic nematodes. It has cosmopolitan distribution [7, 8]. The adults of genus *Eustrongylides* found in stomach of aquatic birds and larva live in marine and freshwater fishes, whereas infective larvae recorded in amphibian and reptiles [9, 10]. The adult of genus *Eustrongylides* commonly found in the birds of Ciconiiformes, Pelecaniformes, Gaviiformes, Anseriformes and Podicipediformes [11-13].

The type species of this genus is *E. tubifex* Rudolphi, 1819 and genus contain 20 nominal species. Measures [10] believed that only three species should be considered valid namely *E. ignotus* Jagerskiold, 1909, *E. excisus* Jagerskiold, 1909 and *E. tubifex* Rudolphi, 1819. The *E. ignotus* Jagerskiold, 1909 and *E. tubifex* Rudolphi, 1819 are known to occur in the New World; while *E. excisus* Jagerskiold, 1909 is common in Asia [13-15].

The description of present specimen is compared with features of valid species, *E. tubifex*, *E. ignotus* and *E. exicsus*. The morphometric features of present specimen resemble *E. tubifex* in having large papillae of outer circle and small papillae of inner circle while these specimen differ from it in posterior extremity features. whereas, the posterior extremity resembles with *E. excisus*. Moreover, geographical discourse of *E. tubifex* being in new world and *E. excisus* being old world is noted worthy. Therefore, present specimens are kept at generic level as *Eustronglides* sp.

The genus *Eustrongylides* has been reported in south Asian subcontinent. Ali [16] reported a new species, *E. indicus* from an Indian bird. However, Kalyankar [17] for the first time described the larval stage of the worm in the body cavity of *Macrones seenghala*. Jaiswal et al. [18] reported the ecological dynamics of *E. tubifex* in *Sillago sihama* from the central west coast of India and Gupta studied scanning electron microscopy but her manuscript is mislabeled with *E. tubifix* and *E. excisus* [5]. This genus is reported in fishes host Such as *Heteropneustus fossils*, *Ompok bimaculatus*, *Ompok pabda. Wallago attu*, *Mystus seenghala* and *Mastacembelus armatus* from India and Bengladesh [19, 20]. No detail report about *Eustrongylides* in *Mastacembelus armatus* has been published in Pakistan prior to this study. The infection of *Eustrongylides* in present host and other recorded fishes is attributed to feeding habit of hosts, and their trophic linkage and efficient mode of transmission [21]. The genus *Eustronglides* is recovered from first *M. armatus* is being reported for the first time from present sampling locality (the Indus River).

Authors' contributions

Conceived and designed the experiments: MM Abro & NA Birmani, Performed the experiments: MM Abro & GH Brohi, Contributed reagents/ materials/ analysis tools: NA Birmani & M Rajper, Wrote the paper: MM Abro & NA Birmani..

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