

**A NEW SPECIES OF *NEOECHINORHYNCHUS* (EOACANTHOCEPHALA: NEOECHINORHYNCHIDAE) FROM MARINE FISH (*MUGIL CEPHALUS* LINN., 1758) FROM KARACHI COAST, PAKISTAN**

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**ABSTRACT**

This work describes a new species of genus *Neoechinorhynchus* Stiles and Hassall, 1905, a parasite found in turtles, marine and freshwater fish. This species reported from the fish (*Mugil cephalus* Linn., 1758) is different from all the previously described species in a combination of characters such as having a bilobed anterior testis, besides body size, hooks, and reproductive system. This species is most closely related to *N. nematolosi* Tripathi, 1956 in having testes unequal, body size and shape similar to present species but differs from the present species in having smaller proboscis receptacle, very long lemnisci with swollen ends and has posterior testis larger as compared to anterior testis. The present work contributes to increase in knowledge of the biodiversity of fish parasites in marine fish *Mugil cephalus* (Linn., 1758).

**Keywords:** Fish parasite, *Neoechinorhynchus mohiuddini* n. sp., marine fish, Karachi coast.

**INTRODUCTION**

The acanthocephala is a small group of important phylum of endoparasites helminths of different animals and humans (Huys and Bodin, 1997; Berenji *et al.*, 2007). Taxonomic studies of *Neoechinorhynchus* Hamann, 1892 were list by a number of workers including Nickol and Thatcher, 1971; Amin and Heckmann, 1992; Golvan, 1994; Amin, 1985; Amin, 2002; Shil, 2004; Garcia-Varela and Nadler, 2005; Smith *et al.*, 2005; Pinacho-Pinacho *et al.*, 2017 and Amin *et al.*, 2018. The previous species of the genus reported from Pakistan are *N. johnii* (Yamaguti, 1939) Bilqees, 1972; *N. karachiensis* Bilqees, 1972; *N. formosanum* (Harada, 1938) Bilqees, 1972; *N. gibsoni* Khan and Bilqees, 1989; *N. nickoli* Khan *et al.*, 1999; *N. longiorchis* Khatoon and Bilqees, 2007; *N. brayi* Bilqees *et al.*, 2011; *N. macrorchis* Shaikh *et al.*, 2011; *N. nawazi* Naqvi *et al.*, 2012 and *N. cribbi* Ibrahim *et al.*, 2020.

During the course of a survey of marine fish *Mugil cephalus* from Karachi coast, Pakistan, fourteen acanthocephala were recovered from the small intestine of two fish. This material is described herein as a new species of the genus *Neoechinorhynchus* Stiles and Hassall, 1905.

**MATERIALS AND METHODS**

Fish *Mugil cephalus* (Linn., 1758) collected from Karachi coast (24° 94' 46.218" N, 67° 00'56.15" E) Pakistan were brought to the laboratory for thorough parasitological examination. Two fish were found to be infected with fourteen acanthocephala. The worms were carefully collected in Petri dishes with distill water, refrigerated and fixed in AFA for 24 hours for later storage in alcohol 70%. The acanthocephala were stained with Mayer's carmalum, dehydrated in alcohol series, and cleared in xylol and clove oil and finally mounted in canada balsam and examined for internal details. Diagrams were prepared using camera Lucida attached to a light microscope. Nikon photomicroscope was used to prepare photographs. All measurements are given in millimeters. Holotype and Paratype slides are deposited in Reference Museum of Department of Zoology, University of Karachi, Karachi-75270.

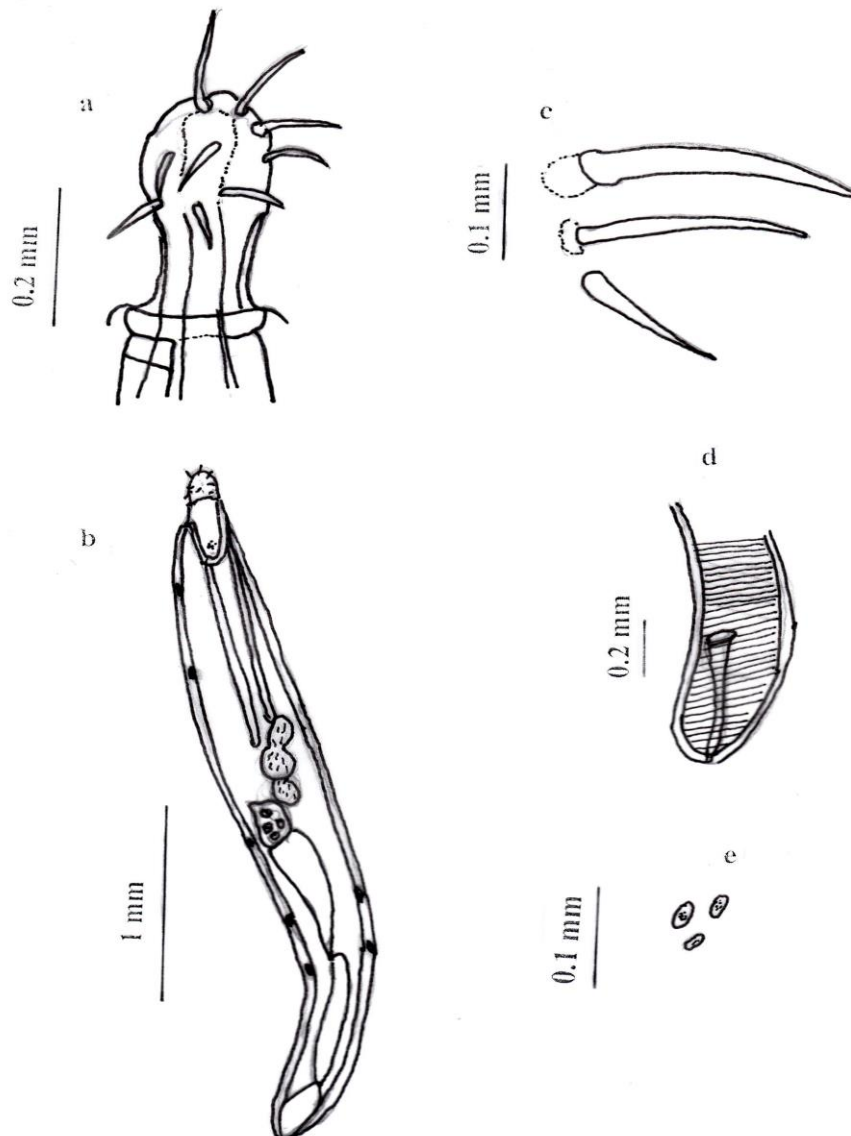
*Neoechinorhynchus mohiuddini* n. sp.  
(Figs. 1-4)

Host:	Marine fish ( <i>Mugil cephalus</i> Linn., 1758)
Locality:	Karachi coast, Pakistan
Location:	Small intestine
No. of hosts examined:	14

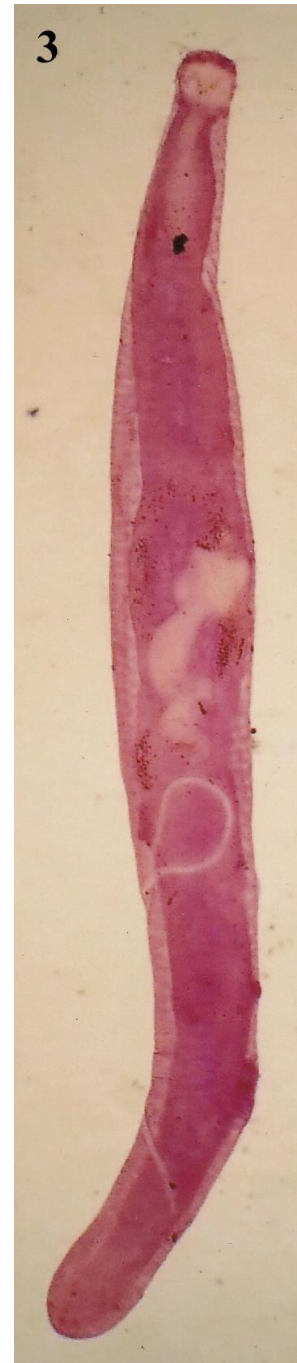
No. of specimens recovered: 8 (♂), 2 (♀) and 2 juveniles

### DESCRIPTION

The body of the worm was aspinoe, long, cylindrical with thick folds of tegument broadest at the level of the testes in males. The proboscis was small round to cylindrical with eighteen hooks arranged in 3 spiral rows, with six in each row. The first row of hooks was largest. The proboscis was followed by well developed neck region. The proboscis receptacle was single walled much larger as compared to proboscis. Lemnisci slightly subequal ending a little anterior to testis. Male reproductive system occupies almost entire second half of the body. Anterior testis bilobed while posterior round to oval, cement reservoir elongated, bursa small, hypodermic nuclei 5-6 dorsal 2-3 ventral, terminal sphincter, simple uterine bell, eggs small, oval and few.



**Fig. 1.** *Neoechinorhynchus mohiuddini* n. sp. **a.** Proboscis enlarged, **b.** Entire male, **c.** Hooks of the three rows, **d.** Female posterior end, **e.** eggs.



**Fig. 2.** Photomicrograph showing proboscis with hooks (x 40).

**Fig. 3.** Photomicrograph showing entire male specimen (x 4).

**Fig. 4.** Photomicrograph showing posterior end (x 10).

## DISCUSSION

The new species presents morphological characters which allowed us to include the present species in the genus *Neoechinorhynchus*.

Naidu (2012) included ninety-three species of the genus *Neoechinorhynchus* including 32 from the subcontinent.

The body size in the present specimens is smaller as compared to *N. argentatus* Chandra *et al.*, 1987; *N. bangoni* Tripathi, 1956; *N. chilkaensis* Podder, 1937; *N. elongatus* Tripathi, 1956; *N. formosanus* (Harada, 1938) Kaw, 1951; *N. gibsoni* Khan and Bilqees, 1989; *N. glyptosternami* Fotedar and Dhar, 1977; *N. hutchinsoni* Datta, 1936; *N. johnii* Yamaguti, 1939; *N. oreini* Fotedar, 1968; *N. topseyi* Podder, 1937; *N. tylosuri* Yamaguti, 1939; *N. buttnerae* Golvan 1956; *N. coiliae* Yamaguti, 1939; *N. distractum* Van Cleave, 1949; *N. longilemniscus* Yamaguti, 1934; *N. proluxus* Van Cleave et Timmons, 1952 and *N. yalei* (Datta, 1936) Kaw, 1951.

The proboscis hooks are smaller in size as compared to the present species in *N. aminulhaquei* Chandra, 1983; *N. bangoni* Tripathi, 1956; *N. chilkaensis* Podder, 1937; *N. cirrhinae* Gupta and Jain, 1979; *N. cynophylcytis* Kaw, 1951; *N. gibsoni* Khan and Bilqees, 1989; *N. glyptosternumi* Fotedar and Dhar, 1977; *N. hutchinsoni* Datta, 1936; *N. karachiensis* Bilqees, 1972; *N. nickoli* Khan *et al.*, 1999; *N. ovalis* Tripathi, 1956 and *N. roonwali* Datta and Soota, 1963.

The lemnisci in the present species is sub-equal while equal in *N. aminulhaquei* Chandra, 1983; *N. argentatus* Chandra *et al.*, 1987; *N. elongatus* Tripathi, 1956; *N. formosanus* (Harada, 1938) Kaw, 1951; *N. gibsoni* Khan and Bilqees, 1989; *N. glyptosternumi* Fotedar and Dhar, 1977; *N. johnii* (Yamaguti, 1939) Bilqees, 1972; *N. karachiensis* Bilqees, 1972 and *N. sootai* Bhattacharya, 1999.

Furthermore the species *N. zabensis* Amin *et al.*, 2003; *N. limi* Muzzall and Buckner, 1982; *N. rutili* (Müller, 1780) Stiles and Hassall, 1905; *N. salmonis* Ching, 1984 and *N. roseus* Salgado-Maldonado, 1978 which have lemnisci ending well above the testes. The hypodermic nuclei are greater in number in *N. zabensis* Amin *et al.*, 2003 and fewer in *N. golvani* Salgado-Maldonado, 1978; *N. hutchinsoni* Datta, 1936; *N. ichthyobori* Saoud *et al.*, 1974; *N. ovalis* Tripathi, 1956; *N. proluxus* Van Cleave et Timmons, 1952; *N. quinghaiensis* Liu *et al.*, 1981; *N. simansularis* Roitman, 1961 and *N. tylosuri* Yamaguti, 1939. The number of hypodermic nuclei is considered to be important character while describing a new species, as observed earlier by Amin *et al.*, 2003. It was noticed that the number of hypodermic nuclei in males, females and juveniles were same in number although there was some variation in position in the present specimens.

The above-mentioned differences in morphological features of the present and previously described species of the genus *Neoechinorhynchus* substantiate the statement that the present specimens are new to Science and named as *Neoechinorhynchus mohiuddini*. The species is named in honour of Late Dr. Ahmed Mohiuddin, Professor of Zoology, University of Sindh, Jamshoro, Pakistan.

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