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A NEW ACANTHOCEPHALA, *NEOECHINORHYNCHUS NAWAZI* SP. NOV. (NEOECHINORHYNCHIDAE), FROM A FRESH-WATER FISH (*CIRRHINUS MRIGALA* (HAM.)

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ABSTRACT

Eight acnthocephalon worms were collected from the intestine of freshwater fish (*Cirrhinus mrigala* (Ham.) from Kalri Lake, Sindh, Pakistan. This worm was identified as a new species, *Neoechinorhynchus nawazi* characterized by having medium size stout body, small proboscis with 3 rows of hooks each having 6 hooks; anterior row hooks larger as compared to the other two rows; proboscis receptacle single layered; lemnisci slightly unequal, testes two, cement gland elongated, saefftigen's gland prominent, bursa well developed and eggs oval, small and numerous.

Keywords: Acanthocephala, *Neoechinorhynchus nawazi* sp. nov., freshwater fish, Sindh, Pakistan

INTRODUCTION

During February 2006 sixteen specimens of fish (*Cirrhinus mrigala* (Hamilton) were collected from Kalri Lake for investigation of helminth infection. Eight specimens were recovered from the intestine of a single fish. These are described as a new species to science.

MATERIALS AND METHODS

Acanthocephala recovered were fixed in F.A.A. (a solution of formalin, acetic acid and 50% alcohol in the ratio 5:3:92) under slight cover glass pressure for 48 hours, washed several times with 70% alcohol, stained with Mayer's carmalum, dehydrated in graded series of alcohols, cleared in clove oil and xylene and mounted permanently in Canada balsam. Measurements are given length by width in millimeters. Drawings were made with the help of camera Lucida. Specimens are in collection of the first author.

***Neoechinorhynchus nawazi* n.sp.**

(Figs. 1a–e)

Host:	Fish (*Cirrhinus mrigala* (Ham.)
Location:	Intestine
Locality:	Kalri Lake, Sindh, Pakistan
No. of specimens recovered:	Six females and 2 males from a single host
No. of hosts examined:	16

Male:

Description is based on two mature specimens. Medium sized, stout worms, flattered and wider in the middle, narrower anteriorly and posteriorly. Lacunar system with anastomoses. Body 4.70–4.80 by 1.00–1.18. Proboscis small measuring 0.15–0.16 by 0.10–0.12 with three circles of hooks, 6 in each circle, anterior largest 0.041–0.045 by 0.0076; middle 0.036–0.039 by 0.0045–0.0049; the posterior row hooks are the smallest 0.030–0.032 by 0.0041–0.0045. Proboscis receptacle single layered longer than the proboscis measuring 0.17–0.19 by 0.009 with a large ganglion. Lemnisci two, slightly unequal, the left measuring 1.02 by 0.74–0.075 and the right measuring 1.12 by 0.025. Body has 44 row of spines each row has 14 to 16 spines. Testes two oval almost equal in size the anterior measuring 0.76 by 0.046–0.048 while the posterior measuring 0.76 by 0.44. Cement gland elongated 0.58–0.62 by 0.30–0.32; somewhat overlapping posterior testis. Cement reservoir measuring 0.74–0.76 by 0.17–0.18. Saefftigen's pouch elongated 0.42–0.44 by 0.24. Bursa with sub-terminal pore 0.44–0.48 by 0.20–0.28.

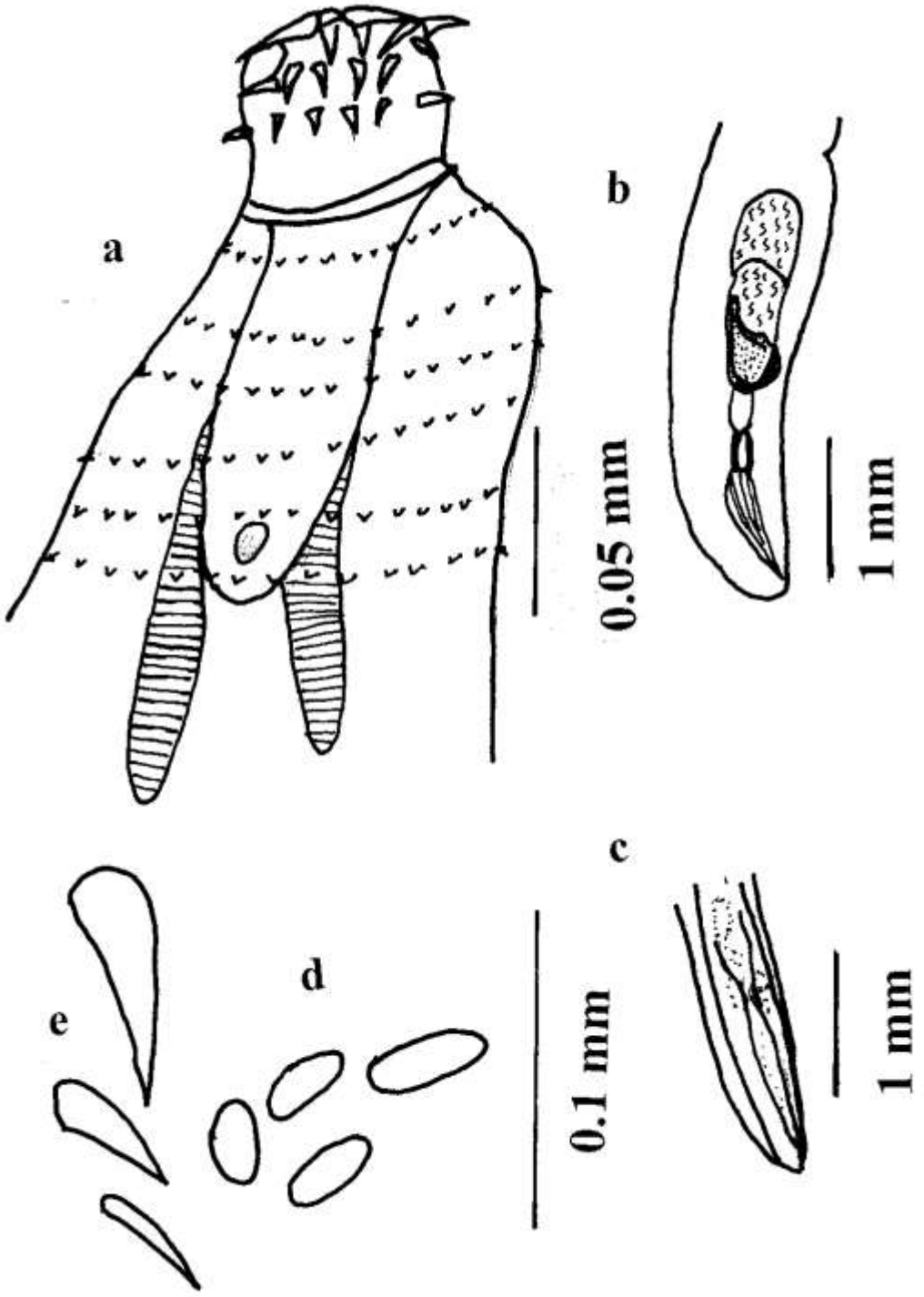

Fig.1. *Neoechinorhynchus nawazi* n.sp. (1a–f); a**.** Proboscis enlarged; b. Posterior end of male showing genital organs; c. Posterior end of female; d. Eggs enlarged; e. Hooks enlarged.

Female:

Description is based on six female specimens. Body medium sized, larger as compared to male, measuring 5.60–6.56 by 1.28–2.00; proboscis small measuring 0.16–0.18 by 0.11–0.13. Proboscis armature similar to male. Proboscis receptacle measuring 0.18–0.21 by 0.09–1.00; with a prominent ganglion at its base. Leminisci the left

measuring 1.17–1.20 by 0.075– and the right measuring 1.19–1.25 by 0.075. Body has 44 rows of spines each row has 12 to 14 spines. Eggs oval, numerous, measuring 0.0121–0.0159 by 0.0049–0.0076.

DISCUSSION

Hamann (1892) erected the genus *Neoechinorhynchus* with *N. rutili* (Müller, 1780) as its type species in the host *Leuciscus rutilus*. Later, a number of species are added from different countries including Pakistan in marine and freshwater fish.

The species of the genus reported from Pakistan are *N. karachiensis* Bilqees, 1972; *N. formosanum* (Harada, 1938) Bilqees, 1972; *N. nickoli* Khan *et al.*, 1999; *N. gibsoni* Khan and Bilqees, 1989; *N. longiorchis* Shahina and Bilqees, 2007; *N. macrorchis* Shaikh *et al.*, 2009 and *N. brayi* Bilqees *et al.*, 2011.

The male in the present species (4.70–4.80 by 1.00–1.18) are smaller in size as compared to *N. agile* (Rud, 1819) (7.13 by 0.913); *N. bangoni* Tripathi, 1959 (9–12); *N. buttnerae* Golvan, 1956 (22); *N. coiliae* Yamaguti, 1939 (6–9); *N. distractum* Van Cleave, 1949 (5.9–7.3); *N. elongatum* Tripathi, 1959 (5.3–7.1); *N. formosanum* (Harada, 1938); *N. hutchinsoni* Datta, 1936 (8.5–10.4); *N. longilemniscus* Yamaguti, 1954 (5–9); *M. macronucleatum* Machado Filho, 1954 (5–7); *N. prolixum* Van Cleave *et* Timmons, 1952 (5.5–11.9); *M. tylosuri* Yamaguti, 1939 (16–42); *M. yalei* (Datta, 1936) Kaw, 1951 (5.39); *N. glyptosternumi* Dhar and Kharoo, 1984 (5.05 by 0.82); *N. oreini* Fotedar, 1968 (8.0–11.75 by 0.9–1.45) and *N. argentatus* Chandra *et al.*, 1987 (19.2 by 0.31). The female (5.60–6.56) are smaller in length compared to *N. gibsoni* (13.4–13.6 by 2.25–2.28); *N. elongatum* Tripathi, 1959 (9.00–13.2); *N. hutchinsoni* (18.0); *N. oreini* (11.5–16.8); *N. topseyi* (7.0); *N. tylosuri* (21.00–29.43); *N. bangoni* (15.0–20.0); *N. buttnerae* (30); *N. coiliae* (14–15.3); *N. distractum* (8.4–19.6); *N. formosanum* (12.5–13.0); *N. johnii* (40–63); *N. longilemniscus* (12); *N. magnum* (90); *N. octonucleatum* (9); *N. prolixum* (7–16); *N. saginatum* (up to 20 mm); *N. strigosum* (9–14.1), and *N. venustum* (7.75–12.75).

The hooks in the present specimens in the anterior and middle rows differ in size as compared to *N. agilis* (Rudolphi, 1819) Petrotschenko, 1956 (anterior row 0.087–0.095 by 0.0125; middle row 0.0625–0.07 by 0.0125); in all the three rows of *N. dattai* Golvan, 1994 (anterior row 0.080; middle row 0.040; posterior row 0.037); *N. devdevi* (Datta, 1936) Kaw, 1951 (anterior row 0.045; middle row 0.045; posterior row 0.040); *N. glytosternumi* Dhar and Kharoo, 1984 (anterior row 0.07; middle row 0.06); *N. johnii* Yamaguti, 1939 (anterior row 0.089–0.093); *N. kallarensis* George *et al.*, 1978 (anterior row 0.060–0.100 by 0.015–0.030); *N. manasbalensis* Kaw, 1951 (anterior row 0.046–0.060); *N. nematolusi* Tripathi, 1959 (anterior row 0.076–0.083; middle row 0.038–0.044); *N. oreini* Fotedar, 1968 (anterior row 0.075–0.088; middle row 0.073–0.085; posterior row 0.048–0.053); *N. ovalis* Tripathi, 1959 (anterior row 0.060–0.068; middle 0.053 and posterior row 0.053); *N. topseyi* Podder, 1937 (anterior row 0.095); *N. tylosuri* Yamaguti, 1939 (anterior row 0.065–0.10); *N. longiorchis* Shahina and Bilqees, 2007 (anterior row 0.17–0.18 by 0.01–0.02); *N. gibsoni* Khan and Bilqees, 1989 (anterior row 0.056 by 0.012; middle row 0.048 by 0.0096 and posterior row 0.046 by 0.0073); *N. karachiensis* Bilqees, 1972 (anterior row 0.05–0.06; middle 0.039–0.04 and posterior row 0.38–0.39); *N. nickoli* Khan *et al.*, 1999 (anterior row 0.025–0.027 by 0.0061–0.0068; middle row 0.0176–021 by 0.0034–0.0040 and posterior row 0.00153–0.020 by 0.0030–0.0034); *N. macrorchis* Shaikh *et al.*, 2011 (anterior row 0.014–0.016 by 0.004–0.005; middle row 0.013–0.014 by 0.0020–0.0021 and posterior row 0.012–0.013 by 0.0018–0.0020).

The eggs in the present specimens (0.0121–0.0159 by 0.0049–0.0076) are smaller as compared to *N. dattai* (0.50 by 0.013); *N. devdevi* (0.020 by 0.005); *N. elongatum* (0.11 by 0.0266); *N. johnii* (0.033–0.038 by 0.020–0.022); *N. kallarensis* (0.70–0.85 by 0.024–0.032); *N. manasbalensis* (0.023–0.027 by 0.009–0.01); *N. nematolusi* (0.019–0.026 by 0.0057); *N. oreini* (0.030–0.042 by 0.012–0.015); *N. tylosuri* (0.045 by 0.018); *N. bangoni* (0.034–0.038 by 0.007–0.013); *N. nickoli* (0.039–0.042 by 0.014–0.015); *N. gibsoni* (0.021–0.022 by 0.010–0.013); *N. agile* (0.035–0.042 by 0.009–0.012); *N. coiliae* (0.033 by 0.012); *N. crassum* (0.032–0.043 by 0.015–0.018); *N. cristatum* (0.055–0.69 by 0.025–0.036); *N. cylindratum* (0.051–0.061 by 0.017–0.028); *N. doryphorum* (0.048–0.055 by 0.014–0.016); *N. macronucleatum* (0.042 by 0.012); *N. manasbalense* (0.023–0.027 by 0.009); *N. prolixum* (0.026–0.032 by 0.010–0.015); *N. saginatum* (0.044–0.046 by 0.016–0.020); *N. strigosum* (0.053–0.072 by 0.026–0.031); *N. tenellum* (0.037–0.045 by 0.012–0.016); *N. tsintaoense* (0.043 by 0.023), and *N. tumidium* (0.036–0.040 by 0.016–0.019).

As compared to the species reported from Pakistan the present species differs from *N. longiorchis* in size of proboscis hooks and shape of lemnisci; from *N. gibsoni* in size of proboscis hooks; size of proboscis receptacle and testes, length of lemnisci and size of bursa and eggs; from *N. nickoli* in size of proboscis; size of proboscis receptacle; length of lemnisci; size of testes and egg size; from *N. brayi* in size of proboscis; size of testes and bursa and cement reservoir and shape of lemnisci; *N. macrorchis* in size of proboscis hooks, size of proboscis and testes and in not possessing bursal gland; from *N. formosanum* in body size; from *N. karachiensis* in size of cement glands and testes.

The present specimens are compared with the description of previously known (available and accessible) literature and appears to be unmatched therefore, a new species *Neoechinorhynchus nawazi* is proposed. The species is named in honour of Dr. Mohd. Nawaz Khan, Dean of Life Sciences, University of Balochistan, Quetta.

REFERENCES

Amin, O.M. and R.A. Heckmann (1992). Description and pathology of *Neoechinorhynchus idahoensis* n.sp. (Acanthocephala:
Neoechinorhynchidae) in *Catostomus columbianus* from Idaho. *Idaho J. Parasit.*, 78: 34–39.

Bhattacharya, S.B. (2007). *Handbook of Indian Acanthocephala*. Zoological Society of India. Kolkata. Pgs. 225.

Bilqees, F.M. (1972). Description of two acanthocephala, including a new species *Neoechinorhynchus karachiensis* (Neoechinorhynchinae: Neoechinorhynchidae) from marine fishes of Karachi. *Sind Univ. Res. J.* 6: 93–100.

Bilqees, F.M. and A. Khan (1987). *Acanthocephala of fishes of Pakistan*. Biological Society of Pakistan, Lahore. Biological laboratories. Monograph No. 13, Pgs. 57.

Bilqees, F.M. and A. Khan (1993). *Checklist of acanthocephalan parasites from freshwater and marine fishes of Pakistan and India*. Special Publication of University Day January 18, 1993. M.A.H. Qadri Biological Research Centre. Pgs. 25.

Chandra, K.J., K.H. Rao and K. Shyamsundhari (1987). On *Neoechinorhynchus argentatus* n.sp., an Acanthocephalan parasite from marine fish of Waltair. *Revta. iber. Parasit.*, 45: 49–52.

Datta, M.W. (1936). Scientific results of the Yale North Indian Expedition Biological Report No. 20. Helminth parasites of fishes from north India, with special reference to acanthocephalans. *Rec. Ind. Mus.*, 38: 211–229.

Dhar, R.L. and V.K. Kharoo (1984). A new species of Acanthocephala *Neoechinorhynchus glytosternumi* n.sp. from the intestine of a Kashmir fish, *Glyptosternum* sp. *Indian J. Helminth.*, 36: 36–39.

Fotedar, D.N. (1968). New species of *Neoechinorhynchus* Hamann, 1892 from *Oreinus sinuatus*, freshwater fish of Kashmir. *Kashmir Sci.*, 5: 147–152.

George, P.V. and A.M. Nadakal (1978). Four new species of Acanthocephala from brackish and freshwater fishes of Kerala. *Aquatic Biology*, 3:79–90.

Golvan, Y.J. (1956). Nomenclature of Acanthocephala. *Research and Review in Parasitology*, 54: 135–205.

Golvan, Y.J. (1958). Acanthocephales d'Amazonie. Redescription of *Oligacanthorhynchus iheringi* Travassos, 1916 et description de *Neoechinorhynchus butnerae* n.sp. (Neoacanthocephala: Neoechinorhynchidae). *Ann. Par.*, 31(5-6): 500–524.

Harada, I. (1938). Acanthocephalen aus Formosa 1. *Annot. Zool. Jap.*, 17: 419–427.

Kaw, B.I. (1951). Studies in helminthology. Helminth parasites of Kashmir. Part ii. Acanthocephala. *Ind. J. Helm.*, 3: 117–132.

Khan, A. and F.M. Bilqees (1989). On a new acanthocephala, *Neoechinorhynchus gibsoni*, new species from a freshwater fish, *Labeo rohita* (Ham.). *Proc. Pakistan Congr. Zool.*, 9: 259–264.

Khan, A., F.M. Bilqees, Noor-un-Nisa, R.R. Ghazi and A.U. Rahim (1999). *Neoechinorhynchus nickoli*, new species (Acanthocephala: Neoechinorhynchidae) from *Labeo boga* (Ham.) of Punjab, Pakistan. *Pakistan J. Zool.*, 31: 241–243.

Khatoon, S., F.M. Bilqees and A. Khan (2007). Checklist of acanthocephalan parasites of vertebrates from Pakistan. *Proceedings of Parasitology*, 43: 72–88.

Machado Filho, D.A. (1954). *Neoechinorhynchus spectabilis* sp.n. (Neoechinorhynchidae, Acanthocephala). *Rev. Brazil. Biol.*, 11: 29–31.

Petrotschenko, V.I. (1956). Acanthocephala of domestic and wild animals. Acad. Sci. USSR, Vol. II: 1–420.

Pichelin, S. and T.H. Cribb (2011). *Neoechinorhynchus ningalooensis* sp.nov. (Acanthocephala: Neoechinorhynchidae) from *Scarus globban* and *S. psittacus* (Scaridae) from western Australia. *Trans. Royal Soc. of South Australia*, 125: 51–55.

Podder, T.N. (1937). On a new species of *Neoechinorhynchus* parasitic in *Mugil cephalus* Linn. from Chika lake. *Rec. Ind. Mus.*, 39: 129–131.

Rudolphi, C .A. (1819). Entozoorum synopsis, cui accedunt mantissa deplex et indices locaupletissimi X-81 pp. Berolini.

Shahina, K. and F.M. Bilqees (2007). Description of a new acanthocephalan species *Neoechinorhynchus longiorchis* n.sp. (Neoechinorhynchidae) from the fish *Otolithus argenteus* (Sciaenidae) from Karachi coast, Pakistan. *Int. J. Biol. Biotech.*, 4: 307–310.

Shaikh, G.S., A. Khan and F.M. Bilqees (2001). On a new Acanthocephala *Neoechinorhynchus macrorchis* sp. nov. (Neoechinorhynchidae) from a freshwater fish of Haleji Lake, Sindh, Pakistan. *Int. J. Biol. Biotech.*, 8: 333–336.

Tripathi, Y.R. (1959). Studies on parasites of Indian fishes. V. Acanthocephala. *Rec. Ind. Mus.*, 54: 61-99.

Van Cleave, H.J. (1928). Two new genera and species of Acanthocephala from fishes of India. *Rec. Indian Mus.*, 30: 147-149.

Van Cleave, H.J. (1949). The acanthocephalan genus *Neoechinorhynchus* in the catostomid fishes of North America, with description of two new species. *J. Parasit.*, 35: 500-512.

Van Cleave, H.J. and H.F. Timmons (1952). An additional new species of the acanthocephalan genus *Neoechinorhynchus. J. parasit.*, 38: 53-56.

Yamaguti, S. (1939). Studies on the helminth fauna of Japan. Pt. 29. Acanthocephala ii. *Japan J. Zool.*, 13: 317-351.

Yamaguti, S. (1963). *Systema Helminthum. Vol. 5*: Acanthocephala. Interscience Publish. New York, London, 1-423.

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