

A new species of genus *Centrorhynchus fahmidae* (Acanthocephalan: Centrorhynchidae) in common myna *Acridotheres tristis* (Passeriformes: Sturnidae) of district Larkana, Sindh, Pakistan

* Bakhtawar Soomro, Dr. Ghulam Sarwar Ghachal, Dr. Yousuf Shaikh, Dr. Naeem Narejo

Department of Zoology, University of Sindh, Jamshoro, Pakistan.

Abstract

During current studies on helminth parasites of different feeding habits, 5 acanthocephalan (5 (♂♂) recovered, (♀♀) not recovered) belonging to the genus *Centrorhynchus* Luhe, 1911 [6] were recovered, from the intestine of Common myna (*Acridotheres tristis*) (Passeriformes: Sturnidae) of District Larkana, Sindh, Pakistan. On the basis of different diagnostic characteristics including body shape, size, proboscis size, number of longitudinal rows of hooks, number of hooks per row, a new species *Centrorhynchus fahmidae* is proposed. The name of new species is dedicated in the name of my honourable most loving mother Mst. Fahmida Soomro as first author.

Keywords: Avain Acanthocephalan, *Centrorhynchus fahmidae* N.sp. Common myna (*Acridotheres tristis*) of District Larkana, Sindh, Pakistan

Introduction

The genus *Centrorhynchus* was proposed by the Luhe, 1911 [6] belonging to family Centrorhynchidae Van Cleave, 1916. Glovan, 1956 divided the genus *Centrorhynchus* into two subgenera. 52 birds were collected from District Larkana, Sindh, Pakistan, and were examined for the acanthocephalan

infestation. Limited work has been done in Pakistan on the various species of genus *Centrorhynchus* and huge work has been done in various countries. This present paper deals with a new species: *Centrorhynchus fahmidae* obtained from the intestine of Common myna *Acridotheres tristis*.

Table 1: Comparative data on the basis of No: of longitudinal rows, No: of hooks per row in various species of genus *Centrorhynchus* Luhe, 1911 [6]

Species	No: of longitudinal rows	No: of hooks per row
<i>C.bilqeesae</i> , R. R. Ghazi <i>et al.</i> , 2005 [1]	13	10
<i>C.elongatum</i> Machida and Fujimaki, 1935	28-29	14-15
<i>C.fasciatum</i> Bilqees, 1821	12-13	6-18
<i>C.falconis</i> Das, 1911 [4]	28-30	12-14
<i>C.macrorchis</i> Das, 1911 [4]	24-28	9
<i>C.brevicaudaus</i> Das, 1911 [4]	24-26	23-24
<i>C.amphibius</i> Dimitrova, 1997	32	20
<i>C.bramae</i> Rengaraju and Das, 1980 [6]	28	10
<i>C.aluconis</i> Lisitsyna and Greben, 2015	13-17	15-15
<i>C.conspectus</i> Listsyna and Greben, 2015	30-31	16-17
<i>C.globocaudatus</i> Lisitsyna and Greben, 2015	30-34	19-21
<i>C.spinous</i> Listsyna and Greben, 2015	34-36	20-22
<i>C.polissiensis</i> Listsyna and Greben, 2015	28-30	19-20
<i>C.indicus</i> Glovan, 1956	28-30	21-23
<i>C.simplex</i> Meyer, 1933	22-24	24
<i>C.longicephalus</i> Das, 1950	24-26	21-23
<i>C.albidus</i> Meyer, 1933	28-30	20
<i>C.bramae</i> , Rengaraju and Das, 1980 [6]	28	20
<i>Centrorhynchus</i> sp. Santos and Amato, 2010	28-30	8-11
<i>Centrorhynchus</i> sp. Amato <i>et al.</i> , 2003	28	9
<i>C.tumidulus</i> Travassus, 1926	26	13
<i>C.giganteus</i> Travassos, 1926	26	16-17
<i>C.polymorphus</i> Travassos, 1971	14-16	10
<i>C.buteonis</i> Schrank, 1788	30-32	12-16
<i>C.horridus</i> Vonlinstow, 1897	26-28	15-16
<i>C.turdi</i> Yamaguti, 1935	26-34	11-13
<i>C.elongatus</i> Yamaguti, 1935	26-31	13-19
Present species <i>C.fahmidae</i>	13	11-13

2. Material and Method

Live 52 hosts of birds belonging to family Sturnidae collected from different location of District Larkana, Sindh, Pakistan and there autopsy was done in Laboratory. Live 5 Acanthocephalan (05 ♂♂) were recovered, no (♀♀) were recorded from intestine of Common myna *Acridotheres tristis*. The collected species were put into Petri dish containing 2% normal saline solution, and were dehydrated in graded series of ethanol. Specimens were in stained in borax carmine, cleared in xylol and passed through clove oil for shining and was permanently mounted on slide with the help of Canada balsam. Diagrams were made with the help of camera Lucida (Garcia and Ash, 1979). Identification was done with the help of International key. Photographs were taken with the help of digital camera. All the parameters were measured in micromilimeters (mm).

3. Taxonomic position

Host: Common myna, *Acridotheres tristis*
 Locality: District Larkana, Sindh, Pakistan
 Site of infestation: Intestine

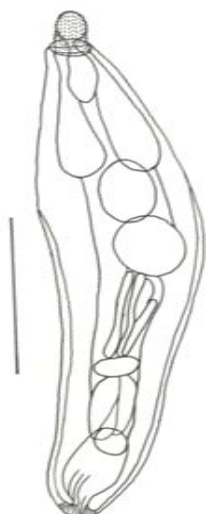


Fig 1: *Centrorhynchus fahmidae*. *N. sp.*
 Lateral view, male

No: of host examined: 52

No: of host infected: 03

No: of specimen recorded: (only 05 ♂♂).

4. Result

Description

Body elongated, tapering at both ends, measuring 1.493-1.38 × 0.041 -0.03mm (Table: 2). Maximum width at the level of testes; proboscis cylindrical measuring 0.123-0.012mm in size (Table: 2). Proboscis armed with 13 longitudinal rows of hooks and each row contains 11-13 hooks (Table: 1). Proboscis receptacle elongated, measuring 0.50-0.30 × 0.068-0.054mm in size (Table: 2). Lemnisci equal and longer than proboscis receptacle, over lapping anterior testis, measuring 0.212-0.110 × 0.109-0.105mm (Table: 2). Neck very short measuring 0.061-0.05 × 0.095-0.08mm (Table: 2). Testes tanded, pre-equatorial slightly overlapped, oval in shape, anterior testis smaller measuring 0.205-0.202×0.130-0.127mm (Table: 2), and posterior testis is 0.198-0.197×0.157-0.155mm in size (Table: 2). Cement glands tubular 04 in number. Bursa situated at posterior end of the body.

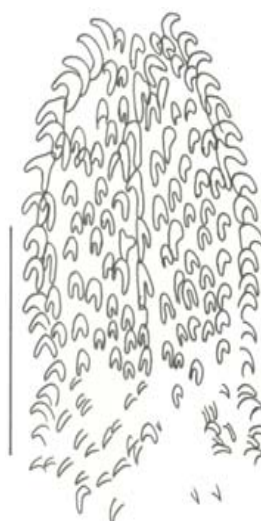


Fig 2: Enlarged proboscis



Fig 3: *Centrorhynchus fahmidae*.
N. sp. photographic view



Fig 4: *Centrorhynchus fahmidae*.
N. sp. photographic view



Fig 5: *Centrorhynchus fahmidae*.
N. sp. photographic view

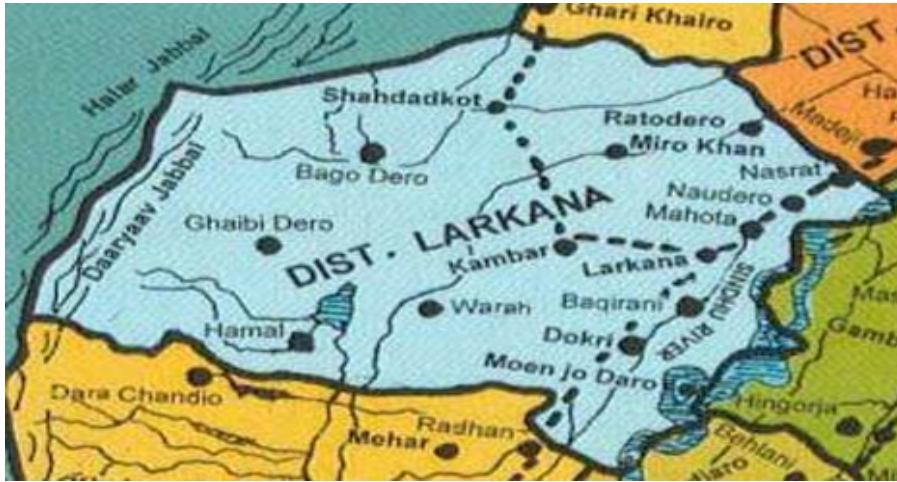


Fig 6: Study area

5. Discussion

Species of genus *Centrorhynchus* (Luhe, 1911) [6] reported from Pakistan such as; *C.nickoli* Khan *et al.*, 2001, *C.sindhensis* Khan *et al.*, 2002, *C.fasciatum* Bilqees and Khan, 2005 [3], *C.bilqeesae* Ghazi and Khan, 2005 [1], various species of genus *Centrorhynchus* reported from different countries *C.albidum* Meyer, 1932, *C.areolatum* Rud, 1819, *C.asturinum* Johnst, 1913, *C.bancroftii* Johnston *et al.* Best, 1943, *C.bazaleticum* Kuraschvili, 1955, *C.bengalense* Data *et* Soota, 1955, *C.bipartitum* Solowjew, 1912, *C.brevicanthus* Das, 1949, *C.buteonis* (Schrank, 1788) Kostylew, 1914, *C.bubonis* Yamaguti, 1939, *C.chabaudi* Glovan, 1958, *C.conspectus* Listsyna and Greben, 2015, *C.corvi* Fukui, 1929, *C.elongatum* Yamaguti, 1935, *C.embae* Kostylew, 1916, *C.falconis* Johnston *et al.* Best, 1943), *C.fasciatum* (westrumb, 1821), *C.freundi* (Hartwich, 1953), *C.galliardi* Glovan, 1956, *C.giganteum* Travassos, 1921, *C.globocaudatum* (Zeder, 1800), *C.horridum* (Linstow, 1897) *C.hylae* (Johnston, 1941), *C.indicum* Golvan, 1956, *C.insulare* Tubanguui, 1933, *C.knowlessi* Data *et* Soota, 1955, *C.lancea* (Westrumb, 1821), *C.lanceoides* Petrotschenko, 1949, *C.leguminosum* Solowjew, 1912, *C.macrorchis* Das, 1950, *C.madagascariense* Glovan, 1957, *C.magnum* Fukui, 1929, *C.maryasis* Data, 1933, *C.microcephalus* Bravo Hollis, 1947, *C.microrchis* Fukui, 1929, *C.milvus* Ward, 1956, *C.narcissae* Florescu, 1942, *C.olssoni* Lundstrom, 1942, *C.opimum* Travassos, 1919, *C.petrotschenko* Kuraschvili, 1955, *C.physocoracis* (Porta, 1913), *C.picae* Dollfus, 1953, *C.pinguis* Van Cleave, 1918, *C.polyacanthus* (Creplin, 1852), *C.polymorphus* Travassos, 1926, *C.renardi* (Lindemann, 1865), *C.scanense* Lundstrom, 1942, *C.skrjabini* Petrotschenko, 1949, *C.spinoseum* (Kaiser, 1893), *C.tenuicaudatum* Marotel, 1899, *C.teres* (Westrumb, 1821), *C.tumidulum* (Rud, 1819), *C.turdi* Yamaguti, 1939, *C.undalatum* Dollfus, 1951, *C.amphibium* Das, 1950, *C.batrachus* Das, 1952, *C.californicum* Millzner, 1924, *C.cinctum* (Rud, 1819) Meyer, 1933, *C.crocidurus* Das, 1950, *C.dipsadis* (Linstow, 1888), *C.leptorhynchus* Meyer, 1932, *C.lesiniforme* (Molin, 1859), *C.longicephalus* Das, 1950, *C.mabuia* (Linstow, 1908), *C.microcerviacanthus* Das, 1950, *C.plyasus* Gupta, 1950, *C.reptans* Bhalerao, 1931, *C.serpenticola* (Linstow, 1908), *C.simplex* Meyer, 1933, *C.appendiculatum* (Westrumb, 1821), *C.erraticum* Chandler, 1925, *C.itatsinis* Fukui, 1929, *C.ninnii* (Stoss, 1891),

C.wardae Holloway, 1958, *C.bilqeesae* Ghazi, 2005 [1] in Frog (*Rana tigrina* Daudin) of Karachi differs from body size longer, proboscis divided by a slight insertion into two regions. Proboscis longer in size and broader in width having 13 longitudinal rows of hooks, each row contains 10 spines, neck short. Proboscis receptacle is double walled. Testes smaller in size far away from lemnisci. Both testes are found in tandem position having little distance between them.

C.elongatum Machida, 1935 in *Sorex unguiculatus* of Japan, differs from body size smaller; proboscis is sub-globular, and larger in size. Proboscis subjected with 28-29 longitudinal rows and each row contains 14-15 hooks. Lemnisci club shaped. Testes lie tandem behind the proboscis receptacle both testes contain little distance, digitiform rays of bursal cap 14-16 in number.

C.fasciatum Bilqees, 1821 in Eagle (*Butastur teesa franklin*) of Karachi differs from proboscis armed with 12-13 longitudinal rows of hooks each row contains 6-18 hooks. Lemnisci about 3-4 times longer than the length of proboscis receptacle, extending wall beyond it but reaching the posterior end of the body.

C.falconis Das, 1911 [4, 6] in *Palaemonetes macrourus* of Amritsar (East Punjab) India differs from proboscis armed with 28 -30 longitudinal rows of hooks and each row contain 12-14 hooks and 9 rows on the neck, the testes are smaller and held in position by the genital ligament in the body cavity. The anterior testis is placed at the distance from posterior testis. The cement glands are 2 in number and are elongated. The bursa is stout and consists of several muscular rays.

C.macrorchis Das, 1911 [4, 6] in *Cerchneis tinunculus tinunculus* of Amraoti, Berar, India differs in length and is enlarged. Proboscis longer having 24-28 longitudinal rows of hooks, each row consisting of 9 hooks on the knob like head and 10 hooks on the neck. Proboscis sheath double walled and longer. Testes situated near the lemnisci, anterior testis larger, posterior testis larger, cement glands in two pairs; anterior pair is longer than the posterior one. Bursa thick and muscular studded with plate like structure at its roots.

C.brevicaudatus Das 1911 [4, 6], in *Ophiocephalus* of Nagpur, Central Province, India differs from larger body size, anterior ends is fusiform and posterior end tail-like structure. Middle portion is broadest. The proboscis is larger in length, consisting of 24-26 longitudinal rows of hooks and each row

contains 23-24 hooks. The hooks of proboscis are slightly larger than the hooks present on the neck. The proboscis sheath is double walled. The retractor muscles of the proboscis seem to come down and bend over themselves for some distance and finally attach to musculature of the body on each side. Lemnisci are coiled and longer. The genital ligament arises from the posterior end of the proboscis and proceeds backwards in the body cavity enclosing the single cement gland which seems to be a big coiled mass filling completely the posterior half of the body. The ejaculatory duct and the bursa are supported by muscular bands which are attached to the body wall.

C. amphibius Dimitrova, 1977 ^[5] in *Buteo buteo* of Bulgaria differs from body size larger, wide at the level of anterior part. Proboscis larger, consisting of two parts, separated by the constriction at the level of proboscis receptacle attachment. Proboscis arment consist of 32 longitudinal rows of hooks, 20 hooks in each row; 8 (9) hooks with strong roots directed posteriorly. Neck smaller. Proboscis receptacle double walled attached at the level of proboscis constriction in between 11th-12th hooks. Genital bursa invaginated.

C. brahmae Rengaraju and Das, 1980 ^[6] in *Athene brama* of Scholapur, Maharashtra, India differs in proboscis which is larger and armed with 28 longitudinal rows of hooks and each row contain 10 hooks. Proboscis receptacle double walled. Testes are larger and cement glands 2 in number.

C. aluconis Lisitsyna and Greben, 2015 in *Strix aluco* of Ukraine differs from proboscis maximum width at anterior part. Proboscis with longitudinal rows of 13-17 of 15-15 hooks.

C. conspectus Lisitsyna and Greben, 2015 in *Bubo bubo* of Ukraine differs from proboscis with maximum width at anterior part. Proboscis with 30-31 longitudinal rows of 16-17 hooks.

C. globocaudatus Lisitsyna and Greben, 2015 in *Falco tinnunculus* of Ukraine differs from proboscis which is maximum longer at anterior part, up to the level of attachment of proboscis receptacle. Proboscis with 30-34 longitudinal rows of with 19-21 hooks.

C. spinosus Lisitsyna and Greben, 2015 in *Falco tinnunculus* of Ukraine differs in proboscis which is long with maximum width at the level of attachment of proboscis receptacle, and armed with 34-36 longitudinal rows of 20-22 hooks.

C. polissiensis Lisitsyna and Greben, 2015 in common Buzzard *buteo buteo* of Zazimye, Brovary District, Kiev region, Ukraine differs in proboscis, maximum width at anterior part, having 28-30 longitudinal rows of 19-20 hooks.

C. globirostris Omar M. Amin, Richard A. Heckman, Eric Wilson, Brianna Keele and Aly Khan in pheasant crow differs in having globular proboscis not divided anteriorly having rooted hooks. Posterior proboscis with rootless spines and hooks emerge at the level of receptacle insertion and are uniquely fully rooted.

C. spilornea Gerald D. Schmidt and Robert E. Kuntz, 1969 ^[7] in Serpent eagle (*Spilornia cheela hoyi*) of far East differs in body length and width; neck longer; proboscis sheath longer; testes elongated and oval with conspicuous vacuole. Two tubular cement glands arise immediately behind the posterior testis; bursa with 20 rays and genital pore is terminal.

C. robust Dennis J Richardson and Brent B. Nickol, 1955 ^[8], in Spotted owl (*Saccidentalis*) of Doughes country, Oregon, differs in having two elliptical testes, approximately differ in

size, longitudinal rows 16-19, 17-18 hooks and spines in each row.

C. microcephalus Dennis J Richardson, Scottmonk, Martin Garcia-varela and Griselda Pulido-Flores in *Quiscalus mexicanus* great tailed grackle (*syn.cassioides mexicanus*) of Mexico differs in having lengthy and wide body; two elliptoid testes and rarely broadly orbicular. Proboscis armed with 30-37 (usually) 30-33 longitudinal rows of 13- 18 (usually) 16-17) of hooks and spines.

C. skrjabini Petrochenko V.I, 1949 in *Corvus corone orientalis*, *Turdus merula intemedous*, *T. viscivorous* and *Pica pica* differs *C. fahmidae* in having 36 to 38 longitudinal rows of rostellar hooks with 12 to 13 hooks per row.

C. lanceoide Petrochenko.V.I, 1949 in *T. merula intemedius* of Central Asia differs from *C. fahmidae* in having different shape of rostellum with 16 longitudinal rows of hooks, each row with 9 to 10 hooks.

C. mariauxi Lesley R. Smales in Cote d'Ivoire of Africa differs from *C. fahmidae* in having proboscis armed with 38-40 rows each row with 15-19 hooks. Anterior 2-3 hooks with large simple roots, thorns 20-25.5. Cerebral ganglion located at mid region of proboscis receptacle, just posterior to neck. Canal of lacunar system lateral, connected by transverse anastomoses.

C. halcyoicola Lesley R. Smales in Cote d'Ivoire of Africa differs from *C. fahmidae* in having proboscis armed with 38-40 rows each row with 14-17 hooks.

C. clitorideus Zlatka M. Dimitrova and David I. Gibson, 2005 ^[11], in *Athene brama* of India differs from *C. fahmidae* in having longer body; proboscis larger and genital bursa funnel-shaped.

C. crotophagicola Zlatka M. Dimitrova and David I. Gibson, 2005 ^[11], in *Anolis lineatopus lineatopus* of Jamaica differs from *C. fahmidae* in having body smaller; proboscis larger and armed with 32-35 longitudinal rows and each row contain 16-17 hooks per row. Lemnisci not observed. Proboscis receptacle double walled.

6. Conclusion

On the basis of different diagnostic characteristics including body shape, size, proboscis size, number of longitudinal rows of hooks, number of hooks per row, a new species *Centrorhynchus fahmidae* is proposed. This species is new addition to the taxonomy.

The name of new species is dedicated in the honor of loving mother Mst Fahmida soomro of first author.

7. References

1. Ghazi RR, Khan A, Nisa N. Two new species of helminth parasites from frog (*Rana tigrina Daudan*), Pakistan Journal Zool. 2005; 37(2):107-111.
2. Machida M, Fujmaki Y. The juvenile form of *C. elongatum* Yamaguti, Department of Parasitology Faculty of Veterinary Medicine Hokkaido University, Sapporo, Japan, 1965, 13(3).
3. Bilqees FM, Khan A. Two new Helminth parasites from Pakistan, with redescription of the acanthocephalan *centrorhynchus fasciatum* (westrum, 1821), Pakistan J Zool. 2005; 37(4):257-263
4. Das EN. On some new species of the genus *centrorhynchus* Luhe, India museum 1911; 11(12):50-400.

5. Dimitrova ZM, Georgier BB, Genov T. Acanthocephalan of the family centrorynchidae (palaecanthocephala) from Bulgaria, Folia Parasitology 1977; 44:224-232.
6. Rengaraju V, Das EN. A new species of the genus centrorynchus Luhe, 1911 (acanthocephalan) from India, Rec, Zoo, surv. India 1980; 76:83-85.
7. Sechmid GD, Kuntz RE. (Acanthocephala) other centrorynchidae from Far East, The journal of parasitology. 1969; 55(2):329-334
8. Richardson DJ, Nickol BB. The genus Centrorynchus (Acanthocephalan) in North America with description of Centrorynchus robustus n.sp, The Journal of Parasitology. 1955; 81(5):767-772
9. Recharadson DJ, Monks S, Varela MG, Flores GP. Redescription of Centrorynchus microcephalus (Bravo-Hollis, 1947) Glovan, 1956 (Acanthocephalan: Centrorynchidae) from Groove-billed Ani (Crotophaga Sulcirostris) in Veracruz, Mexico, comp, parasitol 2010; 77(2):164-171.
10. Smales LR. Centrorynchidae (Acanthocephala) including the description of new species of Centrorynchus from the Cote'Ivoire, Africa, Revue Suisse de Zoologie 2011; 118(2):307-318
11. Dimitrova ZM, Gibson DI. Some species of Centrorynchus Luhe, 1911 (Acanthocephala: Centroryncheadae) from the collection of the Natural History Museum, London, Systematic Parasitology 2005; 62:117-134.