

***PARAMPHISTOMUM ALYKHANI N.SP.* (TREMATODA:PARAMPHISTOMIDAE) IN GOATS OF KARACHI, SINDH, PAKISTAN**

**GUL-E-LALA¹, NASIRA KHATOON^{2*}, RAFIA REHANA GHAZI³,
SANJOTA NIRMAL DAS⁴ AND SAMINA WAHEED¹**

¹Department of Zoology, University of Karachi, Karachi-75270, Pakistan

²Department of Zoology, University of Karachi, Karachi-75270, Pakistan

³VPCI, Southern Zone Agriculture Research Council, University of Karachi, Karachi-75270, Pakistan

⁴Department of Zoology, University of Sindh, Jamshoro, Sindh, Pakistan

*Corresponding author e-mail: nasiraparvez.uok@gmail.com

خلاصہ

Paramphistomum Alykhani ایک نئی نوع ہے جو کراچی میں بکری کی انکھ سے دریافت کی گئی ہے۔ یہ نئی نوع جسم کے گول ہونے، oral sucker کے چھوٹا ہونے، ventral sucker کے بڑا ہونے، غذائی نالی میں posterior کے ناہونے، caeca کی لمبائی، بڑی ادوری، گول ٹیسٹس اور انڈوں کے بیضوی ہونے کی وجہ سے اسے پہلے سے دریافت شدہ انواع سے مختلف بنا دیتی ہے۔

Abstract

The genus *Paramphistomum* Fishoedar, 1901 resides in the rumen of the ruminants where they cause clinical and subclinical diseases and leading to heavy losses to the stockholders. The present species of *Paramphistomum* is recognized as a new species by its morphological diagnostic features and named as *Paramphistomum alykhani* n.sp. in having rounded body with smaller sub-terminal oral sucker and a large ventral sucker, no posterior bulb is found in esophagus, a long caeca extending from oral sucker to acetabulum. Testes rounded and ovary large. Eggs oval, measuring 0.048-0.052 by 0.039-0.044mm.

Keywords: Key Words: *Paramphistomum alykhani* n.sp., trematode, goat, Karachi, Pakistan

Introduction

The family Paramphistomidae Fishoedar, 1901 is closely related to Fasciolidae in the life cycle pattern as the second intermediate host is not needed, but unlike in morphology of adult. Paramphistomidae cercariae are pigmented, oculate, simple tailed, amphistomate, developing in sporocyst except Schizamphistominae metacercariae encysting on vegetation or even on the skin of adult and tadpole frogs. The species of genus *Paramphistomum* cause gastrointestinal parasitic disease in domesticated animals which are responsible for heavy economical losses (Ozidal *et al.*, 2010). The disease which they cause is Paramphistomosis in domesticated animals. Animal after infection have serious changes causing reduced fertility, slower growth, lighter kids at weaning, poor hides and replacement stocks that reach long to mature (Horak, 1967). The liver tissue is damaged extensively, indicating hemorrhage, swelling, necrosis, discoloration, fibrosis and bile duct hyperplasia (Bilqees *et al.*, 2011). The distribution of Paramphistomosis is worldwide with most cases in Africa, Asia, Eastern Europe and Australia (Datton and Pole, 1978; Melaka and Addis, 2012 and Ayaz *et al.*, 2013). The species identification of *Paramphistomum* Fishoedar, 1900 is still neglected and difficult to detect through proper morphological point of view and need large number of specimens for correct identification (Mage *et al.*, 2005; Chaudhary *et al.*, 2015). Olsen (1974) observed fetid diarrhea as an obvious indication of fluke infection. Drugs which are effective are ivermectin, oxydozanide, niclosamide and levamisole (Browman and Georgi, 2008).

The aim of the present study was to describe a new species of *Paramphistomum* from goats of Karachi, Sindh, Pakistan.

Materials and Methods

Out of all the 130 specimens recovered from goats of Karachi, Sindh, Pakistan 36 flukes were randomly picked and were washed in tap water. After washing flukes were flattened between two glass slides for 48 hours and fixed in F.A.A (Formaldehyde acetic acid). After that these specimens were stained in Mayer's carmalum and subsequently destained in 1% hydrochloric acid until pink color was observed. Water was used to thoroughly wash out the acid. Thereafter, the specimens were washed with tap water and subsequently dehydrated through graded series of alcohol for 50-60 minutes each, and cleared by xylene for 30 minutes. The cleared specimens were mounted using Candabalsam and covered with a coverslip. The mounted slides were

allowed to air dry and observed under the compound microscope. Line drawings were prepared with the aid of camera Lucida. Sizes were presented in millimeters (mm). The photomicrographs were prepared with the help of Nikon microscope. Identification was done with related literature. The slides are in possession of the senior author.

Results and Discussion

Paramphistomum alykhani n.sp.

(Fig: 1-2)

Host:	<i>Capra hircus</i>
Site of infection:	Intestine
No. of hosts examined:	10
No. of specimens recovered:	130 from 2 hosts
Locality:	Karachi, Sindh, Pakistan.

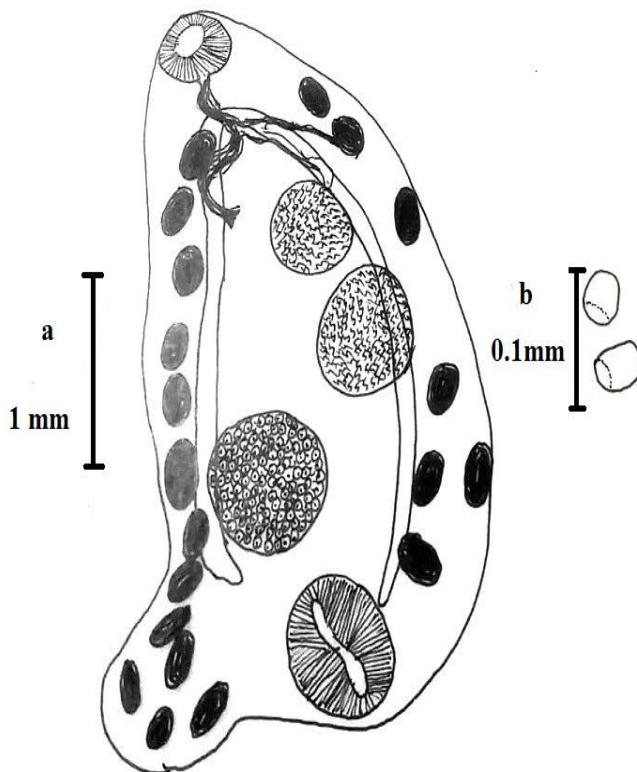


Fig.1. *Paramphistomum alykhani* n.sp.
a. Holotype, Entire
b. Eggs of the same



Fig. 2. Photomicrograph of *Paramphistomum alykhani* n.sp.

Description

Description is based on 36 flattened specimens. Live adults are pinkish in colour. Body round in cross section measuring 3.3-4.0 by 1.85-2.26. Oral sucker sub terminal, smaller as compared to ventral sucker without diverticules, esophagus without posterior bulb. Caeca long at a distance of 0.20-0.26 from the oral sucker reaching to acetabulum zone at a distance of 0.7-1.5 from posterior end. Acetabulum ventro terminal larger than oral sucker or practically ventral measuring 0.64-0.69 by 0.54-0.59. Testes rounded the anterior smaller as compared to posterior touching the caeca measuring 0.52-0.54 by 0.47-0.53. Posterior testis overlapping caeca measuring 0.80-0.83 by 0.52-0.56. The distance between two testis is 1.1 to 2.2. The distance between posterior testis and ovary 0.22-0.36. Ovary post testicular submedian in posterior half of the body, large, round, 0.57-0.66. Uterus winding in median field dorsal to testes. Laurer's canal crossing excretory vesicle. Vitellaria extending in lateral field from caecal bifurcation to posterior end. Eggs oval measuring 0.048 -0.052 by 0.039-0.044.

Fischoeder (1901) created the genus *Paramphistomum* syn. *Gigantocotyle* Näsmark, 1937 with significant characters such as body conical pyriform, nearly round in cross section, without ventral pouch, acetabulum ventro terminal or practically ventral, acetabular index very variable, ovary post testicular, vitellaria extending in lateral fields, testes rounded or lobate, tandem somewhat diagonal, genital calyx, genital sucker and pars muscosa poorly developed or absent and parasites in bile duct, stomach or intestine of mammals. Their life cycle is indirect requiring a definitive host such as ruminants, an intermediate host such as snail, and a free-living external phases in water and vegetation. Eggs are released with mammal faeces, they later hatch into miracidia which enter the body of intermediate host, which are snail, then the miracidia lose their cilia to become sporocysts. After a couple of days they develop into 8 rediae which are rapidly liberated. Each rediae contain 15-30 cercariae. Mature cercariae attach to aquatic plants and encyst to become metacercaria. The mammals ingest infective larvae which penetrate intestinal wall by destroying mucosa and then migrate to the rumen where they grow into adult (Kranenburg, 1977; Sanabria and Romero, 2008).

Later Yamaguti (1971) described the following species *P. bothriophoron* Braun (1892) in *Bosindicus*; *P. clavula* Nasmark (1937) syn. of *P. cervi* Stunkard (1929) in Sudan cattle; *P. epiclitum* Fischoeder (1904) syn. of *P. cervi* Maplestone (1923), Fukui (1929), Stunkard (1929), Sprehn (1932), Travasso (1934), Nasmark (1937) in *Bubalus bubalis*; *P. gotoi* Fukui (1922) in *Bostaurus*; *P. gracile* Fischoeder (1901) syn. of *P. cervi* Maplestone (1923) in *Bubalus bubalis*, *Boselaphus tragocamelus*, *Bostaurus indicus*; *P. hibernae* Willmott (1950) in *Bostaurus*; *P. ichikawai* Fukui (1922) in *Bostaurus*; *P. leydeni* Nasmark (1937) in *Bostaurus*, Eduardo, 1982; *P. liorchis* Fischoeder (1901) syn. *Amphistomum conicum* in *Mazamas implicicornis*, *M. americana*, *M. nana nimbi*, *Blastocerus bezoarticus*, *B. dichotomus*, *Odocoileus maxicanus*, *P. microbothrium* Fischoeder (1901) syn. *P. cervi* Stunkard (1929) in *Gazelladorcas*, *Bostaurus*, *Bubalus bubalis*; *P. microbothrioides* Price et McIntosh (1944) pro *Cotylophoroncotylophorum* Kurl (1934) in cattle, sheep; *P. papilligerum* Stiles et Goldberger (1910) syn. of *P. cervi* Maplestone (1923) in *Rucervuselidi*; *P. scotiae* Willmott (1950) in *Bostaurus*; *P. skrjabini* Popowa (1937) in cattles and buffalo; *P. sukari* Dinnik (1954) in cattle; *P. anisocotyle* Faust (1920) in *Bubalus bubalis* and *Bostaurus*; *P. bathycotyle* Fischoeder (1901) syn. *P. cervi* Maplestone (1923), Stunkard (1929), Fukui (1929), Sprehn (1932), Travasso (1934), Dawes (1936) in *Bubalus bubalis* and *Bostaurus indicus*; *P. birmense* Railliet (1924) syn. *P. explanatum* Dawes (1936) in *Bostaurus*; *P. dulpicitestorum* Nasmark (1937) syn. *Gigantocotyle d.* in *Hippopotamus amphibius*; *P. explanatum* Creplin (1847) in *Bos Taurus indicus* and *Bubalusbulalis*; *P. formosanum* Fukui (1929) syn. of *P. explanatum* Dawes (1936) in *Bostaurus*; *P. fraternum* Stiles et Goldberger (1910) syn. *P. explanatum* Maplestone (1923) in *Bubalus bubalis*; *P. gigantocotyle* Brandes (1896) syn. of *P. explanatum* Dawes (1936) in *Hippopotamus amphibius*; *P. siamense* Stiles et Goldberger (1910) syn. *P. explanatum* Maplestone (1923), Stunkard (1929), Fukui (1929), Sprehn (1932), Travasso (1934) in *Bostaurus indicus*; *P. symmeri* Namark (1937); *P. gigantopharynx* Schad, Kuntz, Anteson et Webster (1964) syn. *P. gotoi* Dawes (1936) and Tandon (1955), Fukui (1922) in *Bubalus bubalis*, *Capra hircus*; *P. gotoi* Fukui (1922) in *Bostaurus*, Yamaguti (1937), Tandon (1960); *P. indicum* Stiles et Goldberger 1910 syn. *P. cervi* Maplestone (1923) syn. *Cotylophoron indicum* Stiles et Goldberger (1910), Skrjabin (1949) in *Bos indicus*; *P. daubneyi* Dinnik (1962); *P. malayi* Lee (1967) in Buffaloes; *P. phillerouxii* Dinnik (1961) in *Adenota kobthomasi*, *Syncerus caffer caffer* and *Bos taurus*; *P. spinicephalus* Tandon (1957) syn. *Ceylonocotyle s.* Mukherjee (1960) in *Bubalus bubalis*; *P. sukumum* Dinnik (1964) in cattle; *P. thapari* Price et McIntosh (1953) *cotylophoronindicum* Stiles et Goldberg 1910 syn. *P. epiclitum* Gupta (1963), Mukherjee and Chauhan (1967), Manter et Pritchard in *Tragelapus scriptus*; *P. tubercualatum* Cobbold (1875); *P. lerouxii* Yeh (1958) syn. *Gigantocotyle, l.* in *Onotragus leche*.

The following species are larger in size as compared to *P. alykhani* n. sp. namely *P. explanatum* Creplin, 1847; *P. microbothrium* Fischoeder, 1901; *P. gracile* Fischoeder, 1901; *P. daubneyi* Dinnik, 1962 and *P. phillerouxii*, n.sp. Dinnik 1961. While the ones smaller in body size are *P. liorchis* Fischoeder, 1901 and *P. cervi* Schrank, 1790. But all reported species differ in one or more character from the present species.

The present specimens differ from the closest species *P. cervi* (Zedar, 1790) Fischoeder, 1901 in general shape of body and testes and in having much smaller ovary also vitellaria do not reach posterior end; while *P. explanatum* Creplin, 1847 besides general shape of body has testis touching each other and are not round and has an oval ovary near to the posterior testis and vitellaria do not reach posterior end of the body. The name of the species is in honour of Dr. Aly Khan Ex- Director CDRI (Pakistan Agriculture Research Council) University of Karachi, Karachi-75270 for his contribution in the field of Parasitology.

Table 1: Measurement of *Paramphistomum alykhani* n.sp.with other species of the genus.

	<i>P. alykhani</i> n.sp. (mm)	<i>P. explanatum</i> Creplin, 1847 (mm)	<i>P. epicitum</i> Fishoeder, 1904 (mm)	<i>P. cervici</i> Zeder, 1790, Fishoeder, 1901 (mm)	<i>P. sukarin.</i> sp Dinnik, 1954 (mm)	<i>P. microbothrium</i> Fisheoder, 1901 (mm)	<i>P. phillerouxun</i> .sp. Dinnik, 1961 (mm)	<i>P. gracile</i> Fischoeder, 1901 (mm)	<i>P. ichikawai</i> Fukui, 1922 (mm)	<i>P. daubneyi</i> Dinnik, 1962 (mm)	<i>P. gracile</i> Fischoeder, 1901 (mm)	<i>P. leydenin.</i> sp. Eduardo, 1982 (mm)	<i>P. cervi</i> Schrank, 1790 (mm)	<i>P. Liorchis</i> Fischoeder, 1901 (mm)
Body length	3.3-4.0	9	5.8-8.2	4.8-7.3	6-10	14.5-1.51	7-10	7.5	4.1-8.7	7.6-9.0	7.5	4.1-6.8	3-11.5	2.6-5.6
Body breadth	1.85-2.26	3.5	0.5-1.9	1.4-2.6	1.6-2.5	5.65-0.88	1.7-3.1	3.75	1.3-2.7	2.3-3.11	3.75	2-3.35	1.5-3.0	1.1-2.6
Acetabulum	0.64-0.69 by 0.54-0.59	2.15	0.7-1.5	1.11-0.895	1.3-1.6	2.82-0.24	1.3 - 2.5	2.33	0.7-1.3	1.8-2.22	2.33	1.28-1.81	0.6-2.6	
Pharynx Length		1.07	0.5-9.2		0.55-0.80	1.04-0.15	0.7- 1.0	0.53	0.4-0.8	0.75-0.86	0.53	0.57-0.85 by 0.51-0.58	0.32-0.8	0.51 by 0.33
Oesophagus length	0.20-0.26 by 0.7-1.5	1.5			0.55-0.70	1.02-0.18		0.72	0.3-1.7		0.72	0.51-0.78	0.35-0.7	
Anterior Testis size	0.52-0.54 by 0.47-0.53	1.43-1.1	0.3-0.8 by 0.5-1.2	0.825-0.87	1.2-2.0 by 0.6-1.3	1.93-0.88 by 1.93-0.88	0.6-1.3 - 0.8 - 2.5	1.67-0.84	0.3-0.9 by 0.6-1.5	1.2-1.8 by 2.0-2.5	1.67-0.84	0.53-0.97 by 1.01-1.54	0.37-1.9 by 0.5-2.5	0.379 by 0.308
Posterior Testis size	0.80-0.83 by 0.52-0.56	1.43-1.1	0.6-1.2 by 1.1-1.4	0.66 by 1.17	1.2-2.0 by 0.6-1.3	2.21-0.94 by 2.14-0.89	0.6-1.3 - 0.8 - 2.5	1.68-0.84	0.3-1.7 by 1.1-1.8	1.2-1.8 by 2.0-2.5	1.68-0.84	0.53-0.93 by 0.83-1.96	0.37-1.9 by 0.5-2.5	0.32 by 0.408
Ovary size	0.57-0.66	0.25	0.2-0.3 by 0.2-0.3		0.27-0.46 by 0.56-0.73	0.73-0.24		0.25	0.2-0.4 by 0.4-0.5	0.2-0.6	0.25	0.28-0.55	0.14-0.5	
Eggs	0.048-0.052 by 0.039-0.044				0.137-0.165 by 0.071-0.092	0.065-0.133	0.130 -0.157 by 0.067 - 0-.085		0.1-0.12 by 0.05-0.07	0.127-0.140 by 0.059-0.075			0.126 by 0.066	0.116 by 0.06

Conclusion

Based on these characteristics, the present work describes a new species of the genus *Paramphistomum* Fishoedar, 1901 found in a goat from Karachi, Pakistan.

Acknowledgement

We sincerely acknowledge C.D.R.I. Pakistan Agriculture Research Council, University of Karachi-75270 for providing technical support and library facility.

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