

Research Article

Thaparotrema akbari new species of genus *Thaparotrema* Gupta, 1955 from host *Rita rita* (Siluriformes: Bagridae) of River Indus Sindh Pakistan

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Abstract

During current study on order Siluriformes belong to diverse group of ray-finned fishes. *Rita rita* Siluriformes catfish collected from River Indus Jamshoro, Pakistan were brought to Parasitology laboratory of zoological department. Fishes were dissected for examined of helminth parasites. Total 12 specimens of genus *Thaparotrema* were collected from gallbladder of hosts and processing through standard method. Diagram were made and identify with the help of keys and literature. The new species *Thaparotrema akbari* identified on the basis following differential characters having large body size, elongate and narrow shape, oral sucker elongate and egg shape, ventral sucker wheel shaped, pharynx oval shape, anterior testis rounded to quadrangular in shape, posterior testis pentamerous in shape with broad anterior and narrow posterior end, ovary heart shape or triangular, seminal receptacle quadrangular tube shape and vertical in position, uterine coils almost overlapped caecum and whole middle region of body, vitelline are in small follicle.

Key words: Catfish; Indus Rive; *Rita rita*; Siluriformes; Trematodes; *Thaparotrema akbari*

Introduction

Helminths of genus *Thaparotrema* are parasites of gallbladder and intestine of freshwater fishes, they cause harmful impact on fish health and nutritional value. Type species of *Thaparotrema* genus is *Thaparotrema vittalani* collected from intestine and gallbladder of fish *Rita rita* from India [1, 2]. Other species of genus

Thaparotrema recorded from world are *Thaparotrema pedicellatum* [1-4] collected from intestine and gallbladder of fishes *Rita rita*, *Hemibagrus nemurus* and *Rita buchanani* from Thailand and Pakistan; *Thaparotrema piscicola* collected from gallbladder of *Gymnarchus niloticus* from Africa [1, 2, 4]; *Thaparotrema botswanensis* collected from gallbladder of *Clarias*

gariepinus from Africa [5, 6]. Throughout the world the helminths are reported from variety of animals as well as from fishes [7]. Various form of infection cause in fishes depending upon habitat of helminth parasites [8]. Reports on helminths of Siluriformes order catfishes in Pakistan are limited [3, 8-14]. Present work on helminths of Siluriformes order catfishes in Pakistan has great importance in field of taxonomy and fishery.

Materials and Methods

Rita rita host fishes were collected from River Indus Jamshoro, Pakistan and bought to the Parasitology laboratory. Host were dissected and visceral organs examined for helminth parasites under dissecting microscope. Total 12 specimens were collected hosts, for collection and processing of trematodes standard method were followed [15, 16]. Trematodes were fixed and kept in 70% ethanol for overnight, stained with borax carmine, dehydrated in graded series of ethanol, cleared in clove oil and xylol and mounted in Canada balsam. Diagram were made by Camera Lucida and photographs were taken with the help of Olympus DP12 Camera, identification with the help of keys and literature. All measurement were taken in millimeters.

Result

***Thaparotrema akbari* n.sp.**

Family: Opisthorchiidae Braun 1901

Genus: *Thaparotrema* Gupta 1955

Type host: *Rita rita*

Site of infection: Gallbladder

Type locality: River Indus at Jamshoro, Sindh, Pakistan

Number of specimen: 12

Specimens: Deposit in Department of Zoology, University of Sindh, Jamshoro.

Etymology: The name of new species refers to the honored of author's father name Soofi Akbar.

Description

The description of specimen base on figure 1 and 2. Body of parasite elongate, narrow, curved at many regions, spindle shape measures 5.6-5.36 X 0.5-0.6, anterior region of body long and narrow, middle region long and wider, again posterior region long and narrow. Widest at post-equatorial region of body. Tegument without spines. Oral sucker small, elongate, egg shape, terminal measures 0.02-0.07 X 0.16-0.17. Ventral sucker well developed, muscular, rounded wheel shaped and pre-equatorial measures 0.26-0.29 X 0.22-0.24. Prepharynx long measures 0.18-0.18 X 0.06-0.06 and pharynx oval shape, vertical in position measures 0.04-0.05 X 0.1-0.1. Esophagus short, broad measures 0.04-0.06 X 0.08-0.09 and intestinal bifurcation near to anterior region just after the oral sucker. Caecum narrow, extended from pharynx to the ventral sucker and then overlapped by uterus. Testes two tandem, diagonal, post-equatorial, anterior testis rounded to quadrangular in shape measures 0.28-0.35 X 0.26-0.31, posterior testis pentamerous in shape measures 0.36-0.36 X 0.28-0.30. Ovary heart shape or triangular, anterolateral to seminal receptacle, right side of body measures 0.16-0.19 X 0.22-0.22. Seminal receptacle pretesticular, quadrangular tube shape, vertical in position measures 0.12-0.13 X 0.32-0.37. Uterine coils well developed, almost overlapped caecum and whole middle region, uterus from anterior end of body measures 1.26-1.27 and from posterior end of body measures 1.08-1.11. Vitelline follicle laterally fields from anterior region to ovary. Genital pore anterior to ventral sucker.

Discussion

The comparative measurement of present species with previously reported species of genus *Thaparotrema* given in table 1 and 2. Detail morphological difference given below:

Thaparotrema vittalani [1, 2, 4] collected from intestine of and gallbladder of fish *Rita rita* in India varies from new species by fusiform, pear shape body; widest at post equatorial region of body; tegument spined; oral sucker rounded; prepharynx absent; pharynx rounded; esophagus long; caeca extended from anterior region to posterior

extremity of body, not overlapped by uterus; testes separated by excretory bladder, oval to rounded in shape; ovary rounded; laurel canal present; uterine coils not much compact, intra-caecal; vitelline follicles not much compact, extra-caecal, excretory bladder Y-shape.

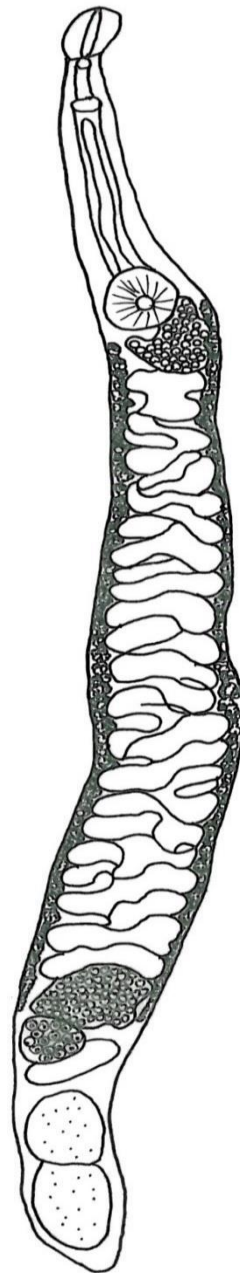


Figure 1. *Thaparotrema akbari* n.sp. Diagram of entire worm with scale bar of 1mm

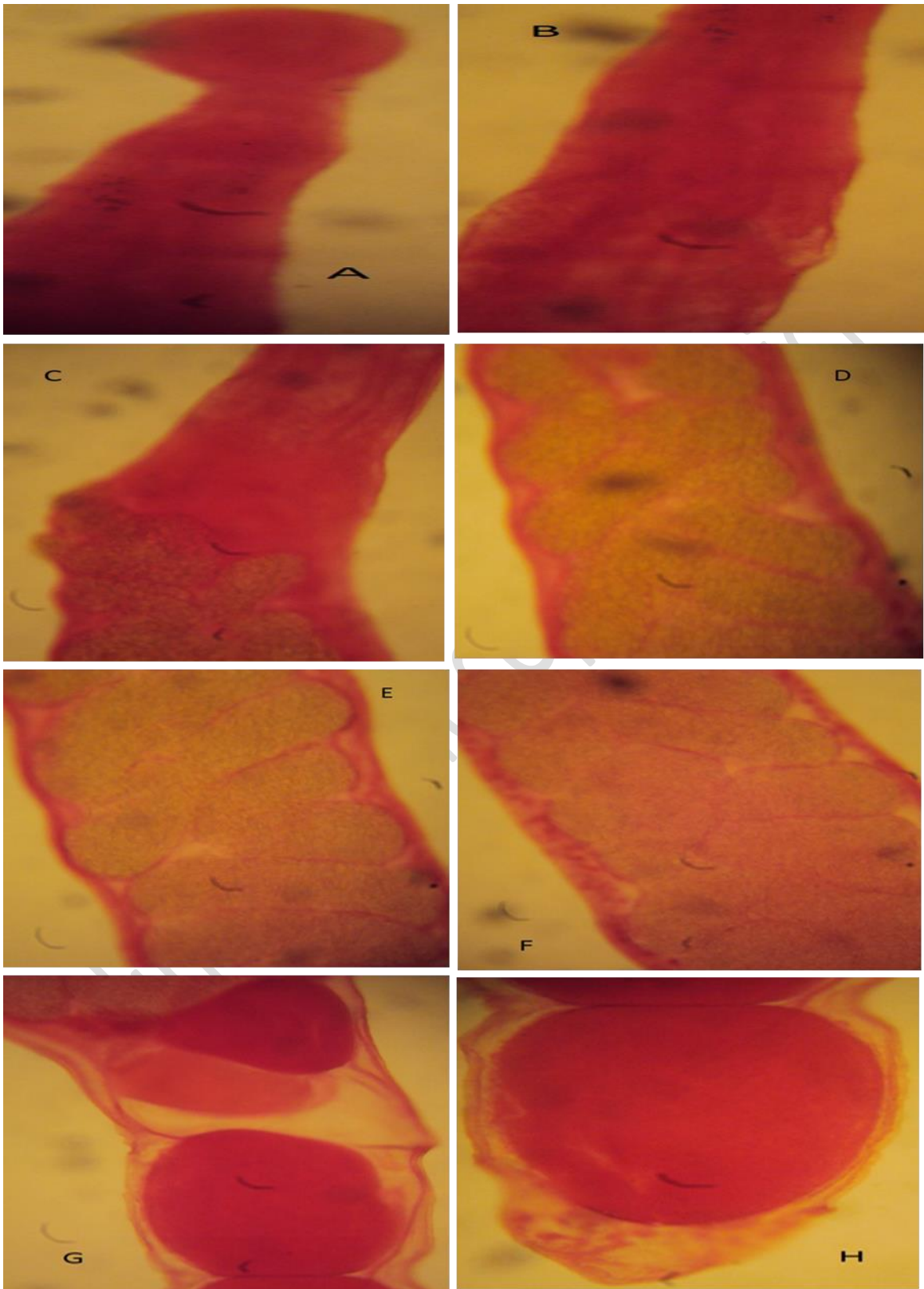


Figure 2. *Thaparotrema akbari* n.sp. A, B, C, D, E, F, G, H. Photographs of different parts of worm

Table 1. List of comparative measurement of different species of genus *Thaparotrema*

Species	<i>Thaparotrema akbari n.sp.</i>	<i>Thaparotrema vittalani</i> Gupta 1955	<i>Thaparotrema pedicellatum</i> Verma 1927 and Soofi <i>et al.</i> , 2015	<i>Thaparotrema botswanensis</i> Rensburg <i>et al.</i> , 2013
Host	<i>Rita rita</i>	<i>Rita rita</i>	<i>Rita rita</i> , <i>Hemibagrus nemurus</i> and <i>Rita buchani</i>	<i>Clarias gariepinus</i>
Locality	Pakistan	India	Pakistan, Thailand	Africa
Body	5.6-5.36	4.18	4.347-4.530	1.74-4.80
Width	0.5-0.6	0.58	0.759-0.80	0.30-0.75
Oral Sucker	0.02-0.07 X 0.16-0.17	0.18 X 0.15	0.230-0.280 X 0.138-0.150	0.17-0.44 X 0.16-0.45
Ventral Sucker	0.26-0.29 X 0.22-0.24	0.13 X 0.15	0.115-0.135 X 0.138-0.150	0.14-0.35 X 0.15-0.34
Prepharynx	0.18-0.18 X 0.06-0.06	0.018	0.046-0.050	
Pharynx	0.04-0.05 X 0.1-0.1	0.03 X 0.09	0.055-0.060	0.05-0.12
Esophagus	0.04-0.06 X 0.08-0.09		0.161-0.182	0.03-0.18
Ovary	0.16-0.19 X 0.22-0.22	0.11 X 0.09	0.230-0.260 X 0.184-0.165	0.06-0.33 X 0.06-0.34
Anterior Testis	0.28-0.35 X 0.26-0.31	0.21 X 0.17	0.368-0.390 X 0.253-0.260	0.11-0.40 X 0.13-0.34
Posterior Testis	0.36-0.36 X 0.28-0.30	0.23 X 0.18	0.322-0.328 X 0.391-0.396	0.12-0.40 X 0.11-0.36
Seminal Receptacle	0.12-0.13 X 0.32-0.37		0.92-0.98 X 0.161-0.165	
Uterus from anterior extremity	1.26-1.27		1.84-1.95	
Uterus from posterior extremity	1.08- 1.11		0.92-0.98	

Thaparotrema pedicellatum [1-4] collected from intestine of and gallbladder of fishes *Rita rita*, *Hemibagrus nemurus* and *Rita buchani* from Pakistan and Thailand varies from new species by fusiform body; widest at post-equatorial region of body; tegument spined; oral sucker rounded; pharynx rounded; testes oval to rounded in shape, anterior testis small and rounded, posterior testis large oval shape; ovary diamond shape; laurel canal present; uterine coils much compact, extending from

posterior region of ventral to the ovary; vitelline follicles not close to lateral boundary of body.

Thaparotrema piscicola [1, 2, 4] collected from gallbladder of *Gymnarchus niloticus* from Africa varies from new species by tegument spined; oral sucker rounded; ventral sucker much broad; testes diagonal, branched; laurel canal present; vitelline follicles extending between pre-equatorial region and anterior testis; excretory bladder tube shape.

Thaparotrema botswanensis [5, 6] collected from gallbladder of *Clarias gariepinus* from Africa varies from new species by widest at level of ventral sucker; tegument spined; oral sucker rounded to oval; ventral sucker smaller than oral sucker; pharynx rounded; caeca narrow, not overlapped by uterus; testes oval in shape; ovary bean shape at left

side; seminal vesicle tubular commencing post-acetabular; seminal receptacle anterior to ovary; uterus intra-caecal; vitelline follicles not much compact, extra-caecal, fields between acetabular to ovary; excretory bladder with sigmoid between testes, pore terminal.

Table 2. Comparison of present species with closely related species of genus *Thaparotrema* discovered during current study

Species	Present species	<i>Thaparotrema shamimi</i> n. sp.	<i>Thaparotrema pedicellatum</i> Verma 1927
Host	<i>Rita rita</i>	<i>Rita rita</i>	<i>Rita rita</i> and <i>Rita buchanani</i>
Locality	Pakistan	Pakistan	Pakistan, Thailand
Body	Elongate, narrow, spindle shape 5.6-5.36	Elongate, strongly curved at level of ovary 2.2-2.8	Fusiform shape, 4.347-4.530
Width	Widest at post-equatorial region 0.5-0.6	Widest at equatorial region 0.42-0.44	widest at post equatorial region 0.759-0.80
Oral Sucker	Small, egg shape, terminal 0.02-0.07 X 0.16-0.17	Terminal, rounded 0.16-0.24 X 0.15-0.17	Oval 0.230-0.280 X 0.138-0.150
Ventral Sucker	Wheel shaped and pre-equatorial 0.26-0.29 X 0.22-0.24	Oval, pre-equatorial 0.17-0.18 X 0.16-0.17	0.115-0.135 X 0.138-0.150
Prepharynx	Elongate 0.18-0.18 X 0.06-0.06		0.046-0.050
Pharynx	Oval 0.04-0.05 X 0.1-0.1	Rounded 0.07-0.08 X 0.08-0.10	Rounded to oval 0.055-0.060
Esophagus	Esophagus short, broad 0.04-0.06 X 0.08-0.09	Esophagus elongate 0.23-0.24 X 0.09-0.10	0.161-0.182
Ovary	Triangular, anterolateral to seminal receptacle 0.16-0.19 X 0.22-0.22	Heart shape, pre-seminal receptacle 0.16-0.17 X 0.17-0.20	Rounded, at right side of body 0.230-0.260 X 0.184-0.165
Anterior Testis	Quarter-angular in form 0.28-0.35 X 0.26-0.31	Square shape 0.24-0.29 X 0.19-0.21	Rounded 0.368-0.390 X 0.253-0.260
Posterior Testis	Penta-merous shape 0.36-0.36 X 0.28-0.30	Triangle shape, posteriorly 0.27-0.30 X 0.21-0.31	Oval 0.322-0.328 X 0.391-0.396
Seminal Receptacle	Pretesticular, tube shape, 0.12-0.13 X 0.32-0.37	Oval shape, pre-testicular 0.07-0.09 X 0.29-0.34	Rounded to oval 0.92-0.98 X 0.161-0.165
Seminal Vesicle		Oval shape, at lateral side of ventral sucker 0.11-0.11 X 0.05-0.07	
Vitelline follicle	Laterally fields from anterior region of ventral sucker to ovary.	Lateral fields from ventral sucker to the seminal receptacle	Extending between posterior of ventral sucker and seminal receptacle

Thaparotrema shamimi [13] collected from gallbladder of Rita rita from Pakistan varies from new form by widest body of worm elongate; oral sucker rounded with curved at posterior; pharynx rounded in shape and attached to oral sucker; ventral sucker oval, large, pre-equatorial region of body; testes two diagonal, at posterior region of body, anterior testis square in shape and posterior testis triangle in shape, broad anteriorly with narrow posteriorly; ovary heart shape, vertical in position, pre-seminal receptacle left side of body; seminal receptacle oval in shape, vertical in position, pre-testicular; uterine coils highly condense, cover whole middle region of body, extended between posterior margin of ventral sucker to ovary; seminal vesicle oval in shape, at lateral side of ventral sucker.

Conclusion

The present trematodes belong to genus *Thaparotrema* on the basis of following differential characteristics including body shape and width, tegument without spines, suckers shape and position, prepharynx long and pharynx oval shape, testes shape and size, ovary heart shape, seminal receptacle shape and position, vitelline are in the form of small follicles and identified as new species *Thaparotrema akbari*. The name of new species denotes to the father's name of research scholar, Soofi Akbar.

Authors' contributions

Conceived and designed the experiments: H Soofi & NA Birmani, Performed the experiments: H Soofi, Analyzed the data: H Soofi, NA Birmani, AM Dharejo & AR Abbasi, Contributed materials/ analysis/ tools: H Soofi & GS Ghachal, Wrote the paper: H Soofi & NA Birmani.

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