

***TETROCHETUS BALOCHISTANENSIS* N.SP. (DIGENEA:
ACCACOELIIDAE) FROM DOLPHIN FISH *CORYPHAENA HIPPURUS*
(PERCIFORMES: CORYPHAENIDAE) OF GWADAR COAST, BALOCHISTAN,
PAKISTAN.**

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خلاصہ

گوار کو سٹ بلوچستان سے تیس عام ڈولفن مچھلی کوریفنا ہیپورس (پرسیفورمس: کوریفنائیڈی) حاصل کی گئیں۔ ٹریوکیٹس اوس ۱۹۱۲ کی نسل کے ٹریوکیٹوڈس سے چار میزبان مثبت پائے گئے۔ موجودہ نوع (اپسیٹیز) میں لمبائی میں چھوٹی، عضلاتی اور مضبوط جسم رکھنے والے اس کے جینس سے مختلف ہے۔ اورل سکر اور وینٹریل سکر دونوں کا ایک ہی جماعت ہوتا ہے، اورل سکر آخری سرے پر؛ ٹیسٹس گول نما بیضہ دانی سے پہلے اور پہلو میں جسم کے وسط میں واقع ہیں۔ بیضہ دانی گول شکل کے جسم کے وسط میں پچھلی ٹیسٹس کے قریب پایا جاتا ہے؛ وٹلائن غدود ملی نما بیضہ دانی کے اگلی کنارے سے لے کر وینٹریل سکر کے درمیانی سطح تک گھنے تقسیم ہوتے ہیں۔ موجودہ نوع اور اس کے کنجینرز کے مابین ان امتیازی کرداروں کی بنیاد پر ایک نئی نوع ٹریوکیٹس بلوچستان منہر کی تجویز پیش کی گئی۔ تاہم، یہ جینس پاکستان سے پہلی بار بتایا جا رہا ہے۔

Abstract

Thirty dolphin fish *Coryphaena hippurus* Linnaeus, 1758 (Perciformes: Coryphaenidae) were collected from the Gwadar Coast, Balochistan. Four hosts were found positive with trematodes of genus *Tetrochetus* Looss, 1912. Present specimen differs from its congeners in having a smaller body, muscular and robust body; both the oral sucker and ventral suckers have same size, oral sucker terminal; testes oval-shaped, pre-ovarian and laterally positioned in middle of the body; median, oval-shaped ovary located near hind testis; vitelline glands tubular, compact, extending from anterior border of ovary up to mid-level of ventral sucker. On the basis of these varying characters between present species and its congeners, a new species *Tetrochetus balochistanensis* proposed. However, this genus is the first host recorded from Balochistan, Pakistan.

Keywords: *Tetrochetus balochistanensis*, *Coryphaena hippurus*, Gwadar, Balochistan, Pakistan.

Introduction

Genus *Coryphaena* is the only identified genus currently in the family Coryphaenidae that includes ray-finned fishes commonly known as the Dolphin fish. The host is the fastest growing fish and can reach up to about 88pound weight in six months (Massuti, 1997). Common dolphin fish *Coryphaena hippurus* Linnaeus, 1958 (Perciformes: Coryphaenidae) locally called “Aamadosk” is being eaten all over the world including Balochistan, Pakistan (Carbonell *et al.*, 1999). The host is the pelagic and found in tropical and subtropical waters. Being edible as well as commercial fish, it was therefore proposed to carry out laboratory investigations on the trematode fauna of dolphin fish *Coryphaena hippurus* in the Gwadar District, Balochistan.

The coastal District of Makran Division (370 miles), the Gwadar is famous as a business hub of China Pakistan Economic Corridor (CPEC) and the largest Seafood Export city in Pakistan. The Sea foods are being exported to China, Korea, Japan, Europe, Gulf Countries and Iran. This area is rich in marine life with wide variety of prey and predators and worldwide famous as the nesting place of big fishes (F.A.O., 2012).

Materials and Methods

Thirty live hosts of common dolphin fish *Coryphaena hippurus* were collected from Gwadar coast and packed in isothermic iceboxes and were transported to the Department of Zoology, University of Sindh, Jamshoro for further studies. After the examination of body surface for ectoparasites, the hosts were dissected from anus to the buccal cavity in a dissecting tray. All the internal organs were removed and were kept in saline water in distinct petri dishes and were examined under stereo-dissecting microscope. A total of 13 trematodes are from genus *Tetrochetus* Looss, 1912 were identified and collected from intestine of the 8 host fishes. Trematodes were fixed in AFA (Alcohol-Formalin-Acetic acid) solution under slight cover glass pressure. After fixation, specimens were stained in Borax carmine and then washed with 70% ethanol three to four times to remove excess staining. Specimens were further dehydrated, cleared with clove oil and xylene. Finally, the

specimens were mounted permanently in Canada balsam. Photographs were taken with OMAX Digital Trinocular LED Microscope with 10MP Digital USB Microscope camera and drawings were made under Olympus BH2-DA drawing tube microscope. Measurements are taken in millimeter (mm) as length and width (L X W). The studied materials were stored at the Department of Zoology, University of Sindh, Jamshoro.

Results and Discussion

Family	Accacoeliidae Odhner, 1911
Sub-family	Accacoeliinae Odhner, 1911
Genus	<i>Tetrochetus</i> Looss, 1912
Species	<i>T. balochistanensis</i> n. sp. (Fig-1) (table-1).

Description (based on 13 specimens): Body of the trematodes is larger, robust, plump, elongated, and broader at hind portion, measuring 10.027 X 0.547 in size. Oral sucker terminal, rounded, 0.438 X 0.493, almost equal to size of ventral sucker 0.438 X 0.493; oral sucker more rounded than ventral sucker; distance between oral sucker and ventral sucker is 0.575. Pharynx larger. Esophagus short, diverticulitis into intestinal ceca in front of ventral sucker. Cirrus sac pre-acetabular, 0.20 long. Prostatic duct and prostatic gland not visible. Testes two, oval-shaped, oblique, pre-ovarian in position, laterally situated, well a part from each other, disposed in mid-point of body; anterior testes 0.452 X 0.369 and posterior testes 0.506 X 0.342. Distance in between ventral sucker and anterior testes is 2.55. Ovary post-testicular, oval in shape, median, 0.246 X 0.246, close to posterior testis; distance between ventral sucker and ovary is 2.0. Vitellaria follicular, densely distributed, pre-ovarian, extending from anterior margin of ovary reaching up to post-acetabular level. Uterus densely filled with eggs and extending from post-ventral sucker to end of hind body. Eggs shelled, measuring 0.071–0.078X 0.039–0.052.

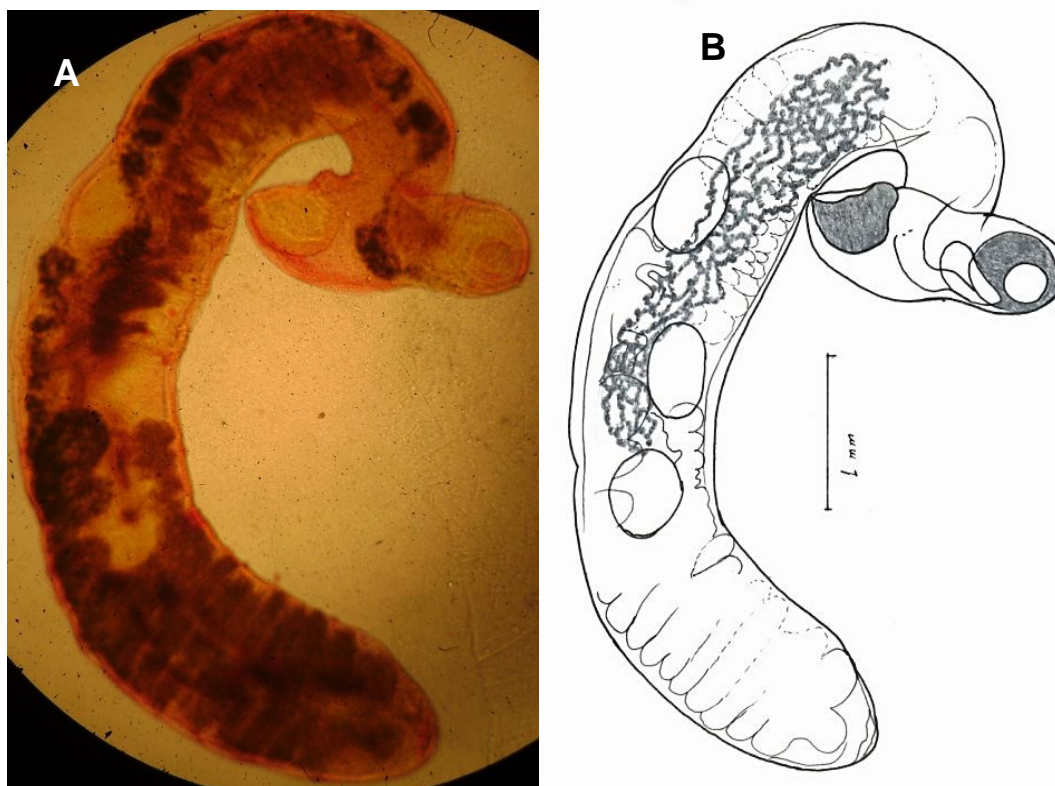


Fig. 1. *Tetrochetus balochistanensis* n.sp. A. Photograph of entire worm; B. Line drawing of entire worm.

Taxonomic Summary

Host: Common dolphin *Coryphaena hippurus* Linnaeus, 1758

Locality: Gwadar (Arabian Sea), Balochistan, Pakistan

Site of infection: Intestine

Etymology: The name of species refers to the study area “Balochistan” (a province of Pakistan) from where the hosts were collected.

Table-1. Comparison of *Tetrochetus* species.

Particulars	Present specimen	<i>T.coryphaenae</i>	<i>T.alutiae</i>	<i>T.macrorchis</i>
Body	Smaller, robust, plump, elongated, 7.506 X 1.041	Elongated, larger 10.027–0.547	Smaller, tapering anteriorly, broader posteriorly, 3.333 X 0.527	Larger, reduced from pre-gonadal level to base of acetabular peduncle, 8.167–11.0 X 1.677–1.980
Oral Sucker	Larger, 0.589 X 0.534	Smaller, muscular, 0.438-0.493	Smaller than ventral sucker, 0.148 X 0.148	Smaller, 0.459 X 0.524
Ventral Sucker	Almost equal to oral sucker	Muscular, larger than oral sucker, 1.152–1.710 X 0.810–1.296	Muscular, laterally elongated, larger than ventral sucker, 0.249 X 0.175	Larger than oral sucker, 0.622 X 0.754
Distance between oral sucker & ventral sucker	0.575	2.275	0.388	1.213
Testes	Testes two, oval shaped, pre-ovarian, submedian, equatorial; anterior testis, 0.917 X 0.452 and posterior testis, 0.602 X 0.369	Two Testes, separated, larger in size, oval in shape; anterior testis, 0.594–0.900 X 0.486–0.702 and posterior testis, 0.61-0.75 X 0.57-0.72	Diagonal, unequal, dissimilar, laterally compressed; anterior testis, 0.227–0.354 X 0.140–0.291 and posterior testis, 0.259 X 0.23	Testes two, trilobed, larger, close to each other, away from ovary; anterior testis 1.311 X 1.049 and posterior testis, 1.213 X 1.081
Distance between anterior testis & ventral sucker	2.191	7.65	0.907	1.180
Distance between both testes	0.438	0.75	0.166	0.655
Distance between testes & Ovary	0.219	1.025	0.111	1.114
Distance between ovary & posterior end	2.054	3.00	0.740	4.294
Ovary	Median, near hind testis, 0.575 X 0.465	Laterally elongated, far away from posterior testis, 0.275 X 0.35	Laterally elongated with circular lower margin, 0.105–0.242 X 0.140–0.301	Bean-shaped, sub-median, well a part from posterior testis, 0.590 X 0.852
Cirrus sac	0.20	1.2 X 0.15	0.25	-
Vitellaria	follicular, connected as tubules, densely distributed, pre-ovarian, extending from front border of ovary reaching up to post-acetabular level	Tubular in shape, located between ovary and testes	Tubular in shape, commencing from anterior margin of testes up to mid-level of acetabulum.	Thin, extending from anterior margins of ovary up to lower level of acetabulum.
Host	<i>Coryphaena hippurus</i>	<i>Coryphaena hippurus</i>	<i>Tigerfish Balistes capistratus</i> , <i>Exocoetus volitans</i>	<i>Coryphaena hippurus</i>
Locality	Pakistan	India	India	India

Common dolphin fish *Coryphaena hippurus* (Perciformes: Coryphaenidae) have been examined for the parasites from many countries by various authors (Ernest, Williams and Bunkley-Williams, 2010). Looss (1912) proposed genus *Tetrochetus*. Later on, Yamaguti reported genus *Tetrochetus* from *Coryphaena hippurus* in Pacific and Toyama Bay. Hanson (1955) reported genus *Paratetrochetus* from the intestine of *Aluterus scriptus* (Osbeck, 1765) from Hawaii. Yamaguti synonymized genus *Paratetrochetus* with genus *Tetrochetus* (Hafeezullah, 1988 and Yamaguti, 1971). Ten species of genus *Tetrochetus* were reported by Hafeezullah (1988) from *Coryphaena hippurus* from India. Among them, the two species *T. raynerii* and *T. hansonii* have larger oral sucker than ventral sucker, but *T. hamadai*, *T. coryphaenae*, *T. proctocolus*, *T. macrorchis*, *T. scomberesoxis*, *T. metnevi* and *T. lesnoyi* have smaller oral sucker than ventral sucker, whereas, oral sucker and ventral sucker are equal in *T. aluterae*. Dyer *et al.*, (1997) reported *T. coryphaenae* from dolphin fish *Coryphaena hippurus* and reported that *T. coryphaenae* and *T. aluterae* only differ in egg size.

Present species has some unifying characters to *T. aluterae* like body broader at posterior level, vitellaria arising from ovary extending to first fourth of body. It also resembles with *T. macrorchis* in body robust and round at both ends, vitellaria commencing from ovary up to ventral sucker. Present species varies from both species in having smaller and wider body, both suckers are equal in size, testes oval, distance between anterior testis and acetabulum, distance between ovary and ventral sucker, varying ovary structure and vitellaria follicular and tubular in shape (table-1).

Present species has unique characters among the Genus *Tetrochetus* including body rounded at both ends, equal sucker size, oval shape of testis, large distance from ventral sucker to anterior testis, ovary rounded, larger distance between ovary and posterior sucker and vitellaria follicular, connected as tubules.

Based on these diagnostic characteristics, a new species *Tetrochetus balochistanensis* n.sp. is proposed. The new species name refers to the study area “Balochistan” province.

Conclusion

A new species of trematode *Tetrochetus balochistanensis* sp.n. is identified and illustrated. It was collected from common dolphin fish *Coryphaena hippurus*, which was collected from Gwadar, Balochistan, Pakistan. A total of 30 live common dolphin fish *Coryphaena hippurus* were collected. Among them only ten hosts were found harboring *Tetrochetus balochistanensis* sp. n. The present species is proposed on the basis of varying characters like, smaller and wider body; sub-terminal oral sucker which is comparatively smaller in size; both oral and ventral suckers have same size; shape of testes is oval, lateral, pre-ovarian; shape of ovary is oval situated close to hind testis and follicular and tubular vitellaria.

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