



Redescription of *Huridostomum formionis* Mamaev, 1970 (Digenea: Monorchiidae) from the black pomfret, *Apolectus niger* (Carangidae), from the coast of Visakhapatnam, Bay of Bengal with a discussion on related genera and the proposal of *Pseudametrodaptus* n. gen.

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Abstract

The monorchiid trematode *Huridostomum formionis* Mamaev, 1970 originally described from the black pomfret, *Apolectus niger*, from the Gulf of Tonkin by Mamaev (1970) is redescribed based on material collected from the same host from the Visakhapatnam coast, Bay of Bengal. The redescription provides additional information on the arrangement of the enlarged spines on the anterodorsal region of the oral sucker, the structure of the terminal genitalia and the course of uterus. The most significant features typical for the genus are considered to be the combination of morphological features including the presence of enlarged spines along the anterodorsal margin of the oral sucker, a very long elliptical cirrus sac, a unipartite terminal organ with the metraterm joining it distally, and extensive uterine coils. The genus *Huridostomum* is included in the subfamily Monorchiinae, its relationship with other monorchiid genera possessing spines anterodorsal to the oral sucker is discussed, and the validity of some of these genera is examined. *Neopisthomonorchis* Varma, 1982 is synonymized with *Ametrodaptus* Bravo-Hollis, 1956 and the new combination *Ametrodaptus pristopomatis* (Varma, 1982) n. comb. is suggested. *Pseudametrodaptus* n. gen. is erected to include the Indian species of the genus *Ametrodaptus* characterized by the absence of spines in the genital atrium and the presence of a unipartite terminal organ with the metraterm joining its distal end. The following new combinations are suggested: *Pseudametrodaptus secundus* (Madhavi, 1977) n. comb., *Pseudametrodaptus bravoae* (Ahmad, 1985) n. comb., *Pseudametrodaptus caballeroi* (Ahmad, 1985) n. comb. and *Pseudametrodaptus fischthali* (Ahmad & Dhar, 1987) n. comb.

Key words: *Huridostomum formionis*, Monorchiidae, *Apolectus niger*, black pomfret, Carangidae, Bay of Bengal, *Pseudametrodaptus* n. gen.

Introduction

Huridostomum Mamaev, 1970 was erected by Mamaev (1970) with the description of *Huridostomum formionis* Mamaev, 1970 from the black pomfret, *Apolectus niger* Bloch (= *Formio niger* Bloch), from the Gulf of Tonkin as the type species. Until now the genus remained monospecific and Mamaev's was the only report of the type species. During our studies on the digenean parasites of marine fishes of Visakhapatnam coast, Bay of Bengal, several individuals of a monorchiid trematode identified as *H. formionis* were obtained from the black pomfret, *A. niger*. A detailed study of these flukes revealed that the original description, which is in Russian, is brief and lacking in some details. In this account, *H. formionis* is redescribed and the relationship of the genus *Huridostomum* with other monorchiid genera is discussed. Observations made on the morphological variations noted in the present collection of specimens are furnished. Validity of the other two monorchiid genera possessing enlarged spines along the antero-dorsal margin of oral sucker, namely *Ametrodaptus* Bravo-Hollis, 1956 and *Neopisthomonorchis* Varma, 1982 is discussed. Representative specimens were deposited in the Natural History Museum, London, UK (BMNH).

Material and methods

Black pomfrets were collected from fish landing centers at Visakhapatnam coast (Bay of Bengal). Fish were examined in as fresh a condition as possible, since the flukes were extremely delicate and tended to degenerate very quickly after the death of fish. In fact, considerable difficulty was experienced in getting intact flukes for the morphological study. Out of 118 flukes collected, only a few were intact and suitable for study. The flukes were studied both alive and as permanent preparations. For making permanent preparations, specimens were fixed in cold AFA, stained in acetic alum carmine, dehydrated in an ethanol series, cleared in creosote, and mounted in Canada balsam. Illustrations were made with a camera lucida. Measurements in the text are in micrometers.

Results

Monorchiidae Odhner, 1911

Monorchiinae Odhner, 1911

Huridostomum Mamaev, 1970

Huridostomum formionis Mamaev, 1970

(Figs. 1–8)

Host: *Apolectus niger* Bloch (Carangidae), black pomfret (Syn: *Formio niger* Bloch; *Parastromateus niger* Bloch; *Stromateus niger* Bloch; *Citula halli* Evermann & Seale).

Locality: Visakhapatnam Coast, Bay of Bengal (17°44'N, 83°23'E)

Site: Intestine

Specimens deposited: BMNH 2008.1.29.1

Prevalence and mean intensity: A total of 118 flukes were obtained from 20 of 164 black pomfrets examined during 2004–2006. Each infected fish carried 1–25 flukes and the infection was fairly common during the months November–January. The prevalence and mean intensity were respectively 12.2% and 5.9.

Description: (Based on 20 flukes, measurements on 8 flukes) (Figs 1–4)

Body elliptical, broadest at midbody, anterior part extensile, appears as narrow neck, terminating in expanded funnel-like oral sucker region; posterior region cylindrical, terminal part muscular appearing as finger like knob; total length 1248–2320, maximum width 336–480. Entire body spinose; spines triangular, prominent, arranged in regular rows over forebody, becoming sparse posteriorly. Eye-spot pigment lacking. Oral sucker cup-shaped, expanded anteriorly, rounded posteriorly, 128–224 by 192–256 in size with vertical slit-like opening. Anterior dorsal margin of oral sucker with group of 36–40 enlarged spines; spines rhomboidal, of uniform size measuring 16 by 8, arranged in two alternating rows. Ventral sucker in second quarter of body, poorly developed, much smaller than oral sucker, 66–72 in diameter, protrusible. Sucker ratio 1: 0.35–0.38. Forebody 560–992 long, size varies with degree of contraction. Mouth subterminal, prepharynx small, 16–20 long; pharynx globular, 60–88 by 44–80 in size; esophagus 192–416 long, narrow, bifurcates well anterior to ventral sucker, ceca long, narrow, terminate just short of posterior extremity.

Genital pore median, anterior to ventral sucker. Testis single, elliptical with irregular outline, 640–960 by 64–112, occupies major part of intercaecal region of posterior half of hindbody. Post-testicular space 320–650 long with numerous circular muscles. Cirrus sac long, narrow, sinuous, 640–920 long, 80–128 wide, extends well posterior to ventral sucker to almost midlevel of testis. Seminal vesicle elliptical, occupies major part of cirrus sac; prostate cells few; cirrus very long, eversible, armed with numerous triangular spines, everted in most specimens.

Ovary entire or lobed, anterolateral to testis, overlapping anterior part of testis. Receptaculum seminis uterine. Laurer's canal not visible. Uterine coils quite extensive, occupy entire hindbody except for muscular knob-like part at posterior region, overlapping all organs obscuring testis, terminal organ, ovary; consist mainly of three vertical loops, one on left and two on right side. Distal part of uterus modified into short thick-walled muscular metraterm. Eggs numerous, nearly rounded, thick-shelled, operculate, 14–16 by 10–12 in size. Terminal organ lies dorsal to anterior part of cirrus sac, small, oval to elliptical, thick-walled, spined along its entire length; spines triangular, similar in size and shape to cirrus spines. Metraterm joins distal part of terminal organ. Vitelline follicles in two lateral groups in front of ventral sucker, each group with numerous small follicles, commence from bifurcation point or a little anteriorly; extend slightly posterior to ventral sucker, confluent at level of bifurcation. Vitelline ducts originate from vitelline follicles as wide ducts, converge towards ovary. Excretory pore terminal, vesicle not observed.

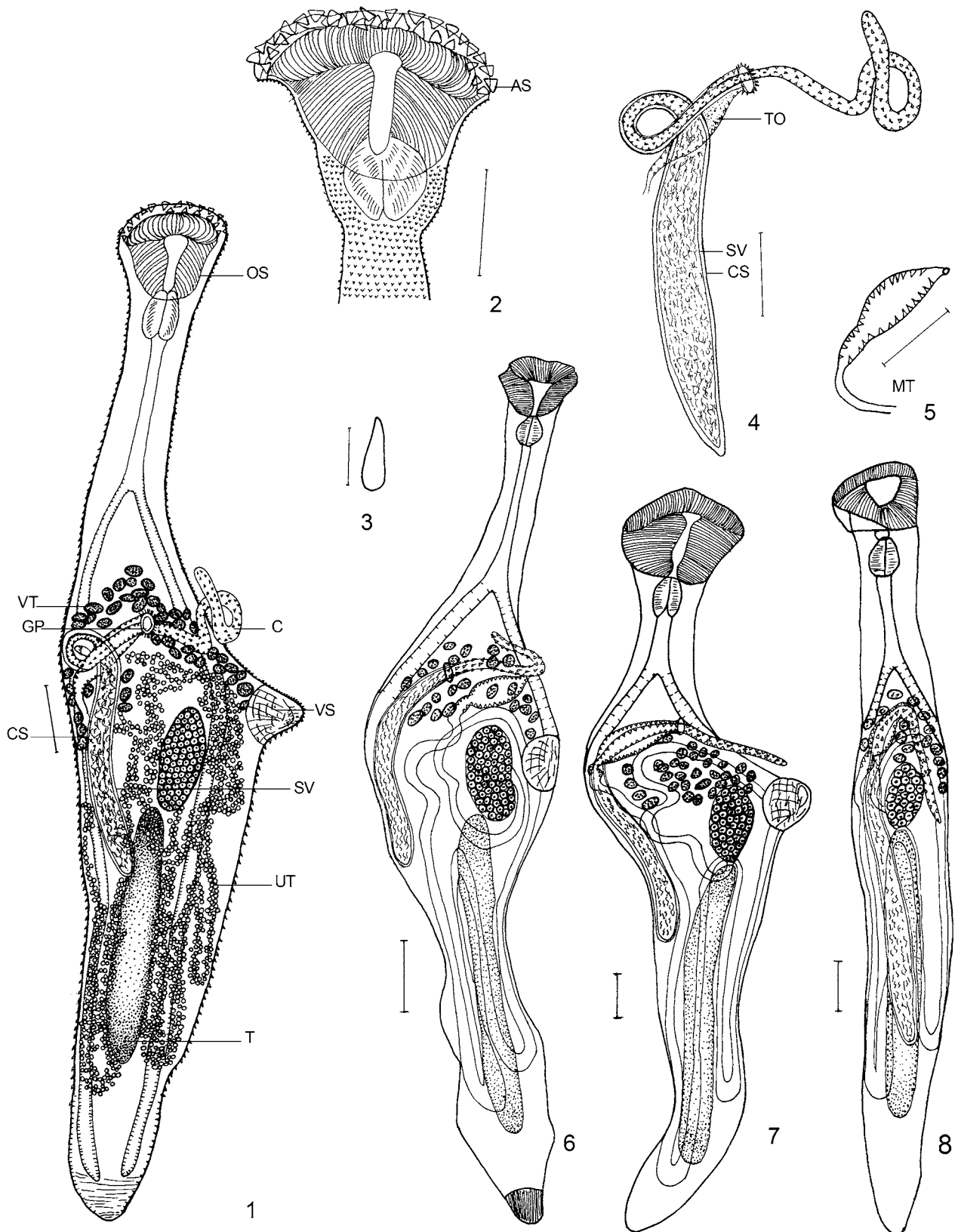
Morphological variations: (Figs 6–8). Our specimens exhibited considerable morphological variations especially in the body shape, and the size of neck and posterior knob-like region. The body shape varied from the typical form described above to a cylindrical shape without a distinct neck (Fig. 8). In some flukes, the knob-like structure at posterior end had contracted totally appearing indistinct and the uterus extended almost to the posterior end of the body. The neck region was highly extensile and variable in size. Some of the flukes had a peculiar shape, with a bloated middle part, narrow anterior region and the knob-like posterior part appearing as an appendage (Fig. 6). Further, the body spines and anterior group of spines were lost in most individuals probably due to post mortem effects and the tegument appeared smooth and the anterior part naked. The posterior extent of cirrus sac also varied from near the anterior margin of testis to its mid-level.

***Pseudametrodaptus* n. gen.**

Type species: *Pseudametrodaptus secundus* (Madhavi, 1977) n. comb. (Syn. *Ametrodaptus secundus* Madhavi, 1977).

Other species: *Pseudametrodaptus bravoae* (Ahmad, 1985) n. comb. (syn. *Ametrodaptus bravoae* Ahmad, 1985); *Pseudametrodaptus caballeroi* (Ahmad, 1985) n. comb. (syn. *Ametrodaptus caballeroi* Ahmad, 1985); *Pseudametrodaptus fischthali* (Ahmad & Dhar, 1987) n. comb. (syn. *Ametrodaptus fischthali* Ahmad & Dhar, 1987).

Diagnosis: Monorchiiinae. Body elongate without eyespot pigment. Tegument spined. Oral sucker funnel-shaped with ring of enlarged spines, ventral sucker in anterior third of body. Prepharynx long, esophagus short, intestinal bifurcation immediately anterior to ventral sucker. Ceca long, end near posterior extremity of body. Testis single, elliptical, equatorial or postequatorial. Cirrus sac slender, extends well into hindbody, encloses bipartite or saccular seminal vesicle, well developed prostatic complex and spined cirrus. Genital atrium tubular, thin-walled, unarmed. Genital pore median, in forebody. Ovary spherical or indented, pretesticular. Uterus fills most of hindbody; eggs small, oval. Terminal organ unipartite, armed with triangular spines, metraterm joins its distal end. Vitelline follicles on lateral fields of ovario-testicular zone or extend little anteriorly. Excretory vesicle not observed. In marine teleosts.



FIGURES 1–7. *Huridostomum formionis*. **1.** Whole adult parasite, ventral view. **2.** Anterior portion showing pattern of spination. **3.** Rhomboidal spine of anterior region. **4.** Terminal genitalia. **5.** Terminal organ. **6, 7, 8.** Morphotypes, note morphological variations in body shape and extent of cirrus sac. Abbreviations: AS, anterior spine; C, cirrus; CS, cirrus sac; GP, genital pore; MT, metraterm; OS, oral sucker; OV, ovary; SV, seminal vesicle; T, testis; TO, terminal organ; UT, uterus; VS, ventral sucker; VT, vitellarium. Scale-bars: 1,4,5 = 200µm; 3 = 15µm; 2,6,7,8 = 100µm.

Discussion

The present forms are identical in structure to *H. formionis* described by Mamaev (1970) from pomfrets of the Gulf of Tonkin. This identity is further strengthened by the fact that they share the same host species. The redescription furnished here, adds information on the arrangement of the enlarged spines along the dorsal margin of the oral sucker, details of the terminal genitalia and the course of uterine coils, as well as morphological variations exhibited by the flukes in their body shape, the extent of the cirrus sac, and the size of knob like appendage at the posterior region of body. There are, however, a few discrepancies in the original description, which need to be rectified. For instance, the egg size given in the original description as 90–100 by 14–15 is apparently an error. In the present forms, the eggs measured 14–16 by 10–12 and the scale given by Mamaev for the egg drawing indicates a similar size. In the original description, the terminal organ was described as unipartite with the uterus joining its middle region. In contrast, in all the present forms where details of the terminal genitalia could be seen clearly, the short thick-walled metraterm joined the distal part of the terminal organ. In accordance with the present observation, the generic diagnosis of *Huridostomum* is amended to state “terminal organ oval or elliptical, unipartite, armed with triangular spines, metraterm joins its distal end”.

Huridostomum can be accommodated under the subfamily Monorchiinae as defined by Manter and Pritchard (1961). Two other genera of monorchiids *Ametrodaptus* Bravo-Hollis, 1956 and *Neopisthomonorchis* Varma, 1982 also possess enlarged spines near the oral sucker region. Varma (1982) considered *Neopisthomonorchis* as having close affinities to Opisthomonorchiinae and erected a new subfamily Neopisthomonorchiinae to include the genus. This genus is very similar to *Ametrodaptus* except there are slight differences in the location of the gonads, position of the genital pore and the distribution of vitelline follicles. The position of the genital pore, which is described as postacetabular in *Neopisthomonorchis*, needs verification since in monorchiids the thin walled genital atrium could be overlooked making the genital pore appear as postacetabular (Madhavi 1977; Hafeezullah 1984). Pending verification of the position of the genital pore, we regard *Neopisthomonorchis* as a synonym of *Ametrodaptus* and the subfamily Neopisthomonorchiinae as a synonym of Monorchiinae. The single species *Neopisthomonorchis pristipomatis* Varma, 1982 becomes *Ametrodaptus pristipomatis* (Varma, 1982) n. comb. Five more species are known in the genus *Ametrodaptus*, namely the type species, *Ametrodaptus mexicanus* Bravo-Hollis, 1956 and the four Indian species *Ametrodaptus secundus* Madhavi, 1977, *Ametrodaptus bravoae* Ahmad, 1985, *Ametrodaptus caballeroi* Ahmad, 1985 and *Ametrodaptus fischthali* Ahmad & Dhar, 1987. However, the four Indian species differ from the type species in the structure of the terminal genital complex; such as the absence of spines in the genital atrium, the unipartite rather than bipartite terminal organ, and the uterus joining the distal part rather than the proximal part of the terminal organ. Given the importance to the opinion expressed by earlier workers regarding the importance of the structure of terminal genitalia in the separation of monorchiid genera (Nahhas & Powell 1965; Sey & Nahhas 1997; Dove & Cribb 1998), we propose to include the four Indian species of *Ametrodaptus* in the new genus *Pseudametrodaptus* n. gen.

Huridostomum differs from *Ametrodaptus* by having the vitelline follicles distributed in the region of the ventral sucker rather than in the region of the gonads, the long sinuous cirrus sac that almost reaches to the level of the ovary, and the unipartite rather than bipartite terminal organ. The genus also shows close similarity to *Pseudametrodaptus*, but differs from it in having a very long sinuous cirrus sac and the vitelline follicles distributed in the anterolateral fields rather than in the posterolateral fields of the ventral sucker. The shape of body, size and shape of the testis and ovary, and the extent of uterus also are different when comparing these two genera.

Huridostomum formionis showed specificity towards *A. niger*. The specificity is absolute in the sense that other species of pomfrets, *Pampus argentous* (Euphrasen) and *P. chinensis* (Euphrasen), that co-occurred with *A. niger* along the coast, were not infected with this fluke. *Apolectus niger* has a wide distribution in the

Indopacific region. Although this fish was originally included under Stromateidae as *Parastromateus niger*, it was subsequently transferred to Carangidae (Fischer & Bianchi, 1984). It possesses carangid features like a protrusible lower jaw, keeled lateral line, scutes on caudal stump, and the presence of pharyngeal teeth; however, unlike carangids it lacks a distinct dorsal fin. Further, it is like Stromateidae by having a laterally compressed body and lacking pelvic fins. A detailed study of the parasite fauna of this fish would prove useful in determining its affinities to Stromateidae versus Carangidae.

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