

## A new digenetic nematode *Epinephalus marini* n. g., n. sp. from marine water fish *Epinephalus malabaricus* (Reef cord) from Bay of Bengal, Puri Coast Orissa, India

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### Abstract

In fishes, parasitic diseases are very common and worldwide. The fish -parasite specificity depends on several internal and external factors including the environmental ones. The fish -parasite study is thus an important tool for assessing both the fish and environmental health. Bay of Bengal, Puri Coast Orissa, India is one of the important hotspots for pollution studies as it receives major rivers like the Ganga, the Brahmaputra, the Mahanadi, the Godavari and Krishna and the Kaveri. At site, various fish were analysed for the parasites using standard protocols. In present research paper, *Epinephalus marini* n. g., n. sp is described from the intestine of a marine fish *Epinephalus malabaricus*. The new form belongs to the family Allocreadiidae (Looss, 1903) and differs from nearest genus *Orientocreadium* (Tubangui, 1931) in having aspinose body, terminal oral sucker, pre-pharynx absent, ceca simple terminating in the hind body, acetabulum sub-median extracecal situated in left part of the body at the level of cecal bifurcation and bilobed ovary and absence of Laurer's canal. The infection to marine fish *Epinephalus malabaricus* (reef cord) with parasite *Epinephalus marini* n. g. n. sp may be due to pollution especially due to hydrocarbon pollution in Bay of Bengal, Puri Coast Orissa, India.

**Keywords:** *Epinephalus marini*; *Epinephalus malabaricus*; Digenetic; Trematodes; Marine fish

### 1. Introduction

The parasites are the important organisms which reside inside or on the surface of body of the host organisms. To survive, the parasites develop several structural and physiological adaptations and hence easily cope up the changes that occur in the host organisms. According to studies, the parasites always try to remain in equilibrium with the host organisms [1] In certain conditions they however become very harmful and cause several diseases that may lead to mortalities in the host animals. In any aquatic reservoir, fishes are the most important organisms for the parasites as they (fishes) live for longer time than any other host organisms. Fishes are also very important for the humans as they are very rich in nutrients especially the proteins [2]. Fishes infected with the parasites directly or indirectly affect the human health [3, 4, 5].

The anthropogenic activities are now the main culprits for environmental pollution and climate change including the change in coastal marine environment [6]. The pollutants via rivers, ultimately reach to the oceans where they become available to the aquatic organisms including the fishes. The polluted ocean water not only causes toxicity in fishes but also makes them (fishes) more susceptible for parasitic infection [7, 8, 9]. The parasites sometimes become more helpful for the fishes as they may eliminate the chemical pollutants from body of fishes through the process of biomagnification.

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During survey of digenetic trematode parasites of marine fishes of Bay of Bengal, Puri Coast Orissa, the authors collected a large number of parasites and the present paper focuses on one of them which belong to the family Allocreadiidae [10]

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## 2. Material and methods

For collection of parasites, the visceral organs of fish were dissected in 0.7% saline. The parasites were i) fixed on glass slide using slight cover glass pressure to prevent curling, ii) kept in 70% alcohol, iii) stained with acetic-alum carmine, iv) dehydrated in ascending grades (90% and absolute alcohol) of ethyl alcohol, cleared in xylene and finally mounted using Canada balsam. The figure was drawn with the help of Camera Lucida and measurements were taken in millimeters and length followed widths.

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## 3. Results

Body small, aspinose, 2.22 x 0.61 mm. Oral sucker simple, terminal 0.09 x 0.13 mm. Pharynx comparatively large, 0.09 x 0.08 mm. Oesophagus large, 0.09 mm. Ceca simple extended up to posterior extremity. Ventral sucker sub-median anteriorly, disc shaped, larger than oral sucker, 0.16 x 0.22 mm. Intestinal bifurcation postacetabular.

Excretory vesicle 'Y' shaped, excretory arms reaching to testicular region. Genital pore median to intestinal bifurcation at 0.32 mm from anterior extremity.

Testes post equatorial elongated, tandem intercecal in posterior half of the body. Anterior testis (T1), 0.45 x 0.21 mm at 0.26 mm from anterior extremity and posterior testis (T2) 0.46 x 0.21 mm. Distance between T1, and T2 was 0.01 mm. Cirrus pouch was elevated and remains enclosed in seminal vesicle. The seminal vesicle was post-acetabular, bipartite and curved. External seminal vesicle pre-equatorial inverted 'U' shaped, tubular, and long, 0.55 x 0.11 mm. Internal seminal vesicle unipartite, 0.23 x 0.06 mm.

Prostatic complex genital pore median extending to post intestinal bifurcating region. Hermaphroditic duct close to genital pore. Parasprostatica narrow tubular 0.20 mm. long surrounded by prostate gland cells. Ovary bilobed post acetabular, 0.24 x 0.12 mm. Uterus short, extended up to anterior margin of the testes. Vitellaria follicular in lateral field of hind body up to seminal vesicular region. Eggs small and operculated, 0.07x 0.02 mm.

Host: *Epinephalus malabaricus* (reef cord)

Location: Intestine

Locality: Bay of Bengal, Puri Coast Orissa.

Prevalence: One specimen from one host out of 18 examined.

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## 4. Discussion

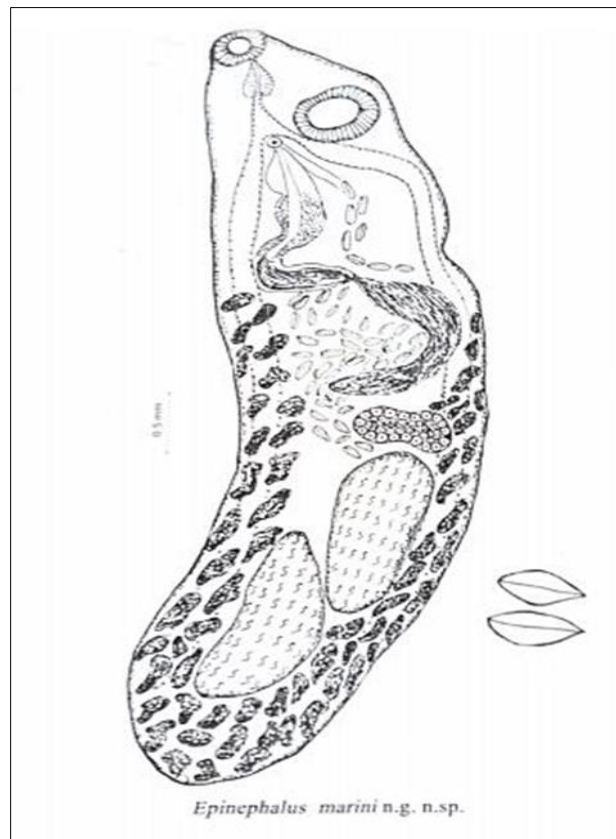
The new form belongs to the family Allocreadiidae [10, 11] and subfamily Orientocreadiinae [12]. The new form closely resembles with genus Orientocreadium [13] for having external seminal vesicle, follicular vitellaria, cirrus pouch clavate enclosed in internal seminal vesicle, extension of ceca, well developed metraterm, pre-testicular ovary and eggs small and numerous. However it differs from the nearest genus Orientocreadium [13] in having aspinose body, oral sucker terminal instead of spinose body and subterminal oral sucker. Prepharynx absent. Oesophagus generally large instead of small.

Ceca simple and terminates in the hind body. Acetabulum extra cecal and is situated in left part of the body at the level of cecal bifurcation instead of median and intercecal. Testes post equatorial, elongated, tandem instead of spherical and intercecal. Ovary bilobed instead of lobed. Hermaphroditic duct well developed instead of enclosed in seminal vesicle and again differs from the genus orientocreadium in having the extension of vitelline follicle which extends anteriorly from cirrus sac to entire hind body. Laurer's canal absent. Excretory vesicle 'Y' shaped instead of tubular. Genital pore median in post intestinal bifurcation region instead of preacetabular. Accordingly it is regarded as a new genus *Epinephalus* and is being proposed for reception of new form *Epinephalus marini* n. g. n. sp. as its genotype. The name of the genus and the species are after the name of fish host *Epinephalus malabaricus* (reef cord) and its occurrence is in a marine host.

#### 4.1. *Epinephalus marini* n. g.

##### 4.1.1. Generic diagnosis

Allocreadiidae: Orientocreadiinae - Body small and aspinose. Oral sucker terminal. Pre-pharynx absent. Pharynx large directly followed by oral sucker. Cecasimple extending upto posterior extremity. Ventral sucker larger than oral sucker, sub-median in extra cecal at the level of cecal bifurcation. Testis post equatorial intercecal, elongated, tandem. Ovary bilobed pre-testicular. Excretory vesicle 'Y' shaped reaching up to posterior margin of testes. Genitalpore median at post cecal bifurcating region. Laurer's canal absent. Vitellaria follicular extending anterior from cirrus sac up to entire hind of body.



**Figure 1** *Epinephalus marini* n. g. n. sp

#### 4.2. Genotype

*Epinephalus marini* n. g. n. sp. in marine fish *Epinephalus malabaricus* reef cord from Bay of Bengal, Puri Coast Orissa, India.

In studies, it has been revealed that the marine parasites are the potential indicators for pollution in the sea. According to the study [14], *Dictidophora merlangi* and *Dictyocotyle coeliaca* are the potential indicators for hydrocarbon pollution in the North sea. The infection to marine fish *Epinephalus malabaricus* (reef cord) with parasite *Epinephalus marini* n. g. n. sp may be due pollution especially due to hydrocarbon pollution in Bay of Bengal, Puri Coast Orissa, India. The prevalence (One specimen from one host out of 18 examined) however indicates low concentration of pollutants in sea water.

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#### 5. Conclusion

The nematode parasite, *Epinephalus marini* n. g. n. sp. was investigated in a marine fish *Epinephalus malabaricus* found in the region, Bay of Bengal, Puri Coast Orissa, India. The prevalence of this parasite in fish is however very low (one specimen from one host out of 18 examined). Present study will help the fishery scientists in general and fish parasitologists in particular to know more about this parasite and to establish the significance between the occurrence and the environment including aquatic environment change.

## Compliance with ethical standards

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### *Disclosure of conflict of interest*

The authors have declared that no conflicts of interest exist.

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