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# On First Record of a Trematode Parasite of Genus *Pleorchis* Railliet, 1896 (Digenea: Pleorchiidae Poche, 1926) From Intestine of a Fish, *Psettodes erumei* (Pleuronectiformes: Psettodidae) From Indian Ocean

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**Abstract.-** The genus *Pleorchis* Railliet, 1896 is designated to rare digenetic distomes living as parasite in the intestine of marine fishes, having numerous testes arranged in four longitudinal rows in hindbody. A total of 14 species have been attributed to the genus, while another 4 species are no longer considered the member of *Pleorchis*. In this study a new form is described and we critically overviewed the genus. Collection of two ovigerous specimens was recovered live at Deegha, West Bengal, India (Indian Ocean) from the intestine of a marine fish, *Psettodes erumei* (Bloch & Schneider) out of 40 examined. The present form differs from all nominal species of the *Pleorchis* in having 48 testes, unequal anterior intestinal caeca, vitellaria extending from a little anterior of ovary up to hind end of body and an entire unlobed ovary. In view of unique morphoanatomical characters it seems that the present form deserves the status of a new species with a specific name *Pleorchis srivastavai* n. sp. All known species of genus seems to be rare digeneans as evident by their respective studies and these are important link of marine ecosystem.

**Keywords:** Digenea, *Pleorchis*, *Psettodes erumei* (Bloch & Schneider), trematode parasite.

## INTRODUCTION

A species of the genus *Pleorchis* is described on the basis of specimens recovered from the intestine of marine fish *Psettodes erumei* (Bloch & Schneider) from sea coast of Deegha (latitude 21°37′2″N and longitude 87°30′9″E), West Bengal, India (Indian Ocean). Considering the facts of recent studies the new form is described with utmost care. According to Madhavi and Narasimhulu (1985) wide variation in the number of testes and anterior extent of vitelline follicles are the only features dependable for species separation in this genus. Bartoli *et al.* (2004) also considered that the vitellarium and the shape of intestinal caeca are the key characters in distinguishing the species of *Pleorchis*. The aim of this study was to evaluate a *Pleorchis* species on above basis and overview the genus.

## MATERIALS AND METHODS

Two ovigerous specimens of the present form were collected live from the intestine of *Psettodes erumei* out of 40 fishes examined (Prevalence: 0.025; Mean intensity: 2), fixed under a slight pressure of coverglass in AFA fixative (50% alcohol, formaline and acetic acid in ratio of 100**:**6**:**2.5). The parasites were stained in aqueous acetoalum carmine, differentiated in acid water, dehydrated through ascending series of ethanol, cleared in xylol and mounted in Canada balsam. The diagrams were made with the aid of camera lucida.

The measurements of two ovigerous specimens are given in millimeter (mm). In the present work distance between anterior extremity of the body and anterior margin of the ventral sucker is referred as 'forebody' and the distance between posterior margin of the ventral sucker and posterior extremity of the body is referred as 'hindbody'. The voucher specimens have been submitted to Depository of the Helminthological Society of India of Late Prof. S.P. Gupta, University of Lucknow, India.

## RESULTS

Family: Pleorchiidae Poche, 1926
***Pleorchis srivastavai,*** new species
(Fig. 1)

*Description*

Body elongated; aspinose with rounded anterior end and more or less truncated posterior

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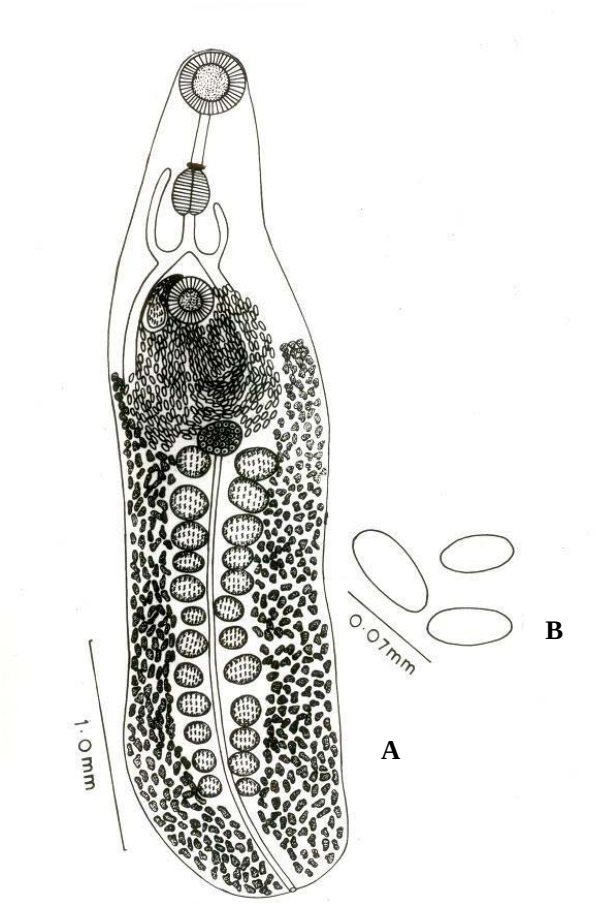


Fig 1. *Pleorchis srivastavai*, new species; A, entire specimen (Ventral view); B, eggs.

extremity, 3.95-5.0 mm long, and 0.73-1.91 mm wide. Forebody 1.04-1.16 mm and hindbody 2.71-3.61 mm long. Oral sucker sub-spherical, terminal, 0.26-0.27 mm long, and 0.29-0.32 mm wide. Pre-pharynx is 0.27-0.35 mm long, and 0.07-0.08 mm wide. Pharynx ovoid, muscular, 0.21-0.23 mm long, and 0.16-0.18 mm wide with conspicuous anterior circular muscle ring. Oesophagus short, distinct, 0.15-0.17 mm long. Caeca extending up to posterior extremity. A pair of unequal caecal diverticula of which right is extending anteriorly to a little infront of pharynx and left up to a little anterior to hind end of pharynx. Ventral sucker nearly spherical, pre-equatorial, smaller than oral sucker and close to caecal bifurcation, 0.20-0.23 mm long, and 0.20-0.26 mm wide at 1.04-1.16 mm from anterior extremity.

Excretory bladder tubular, excretory pore terminal. Genital pore immediately pre-acetabular, close to anterior margin of ventral sucker, 1.02-1.15 mm from anterior extremity. Testes 48 in number, in intercaecal space on each side of excretory bladder, in two ventral and two dorsal longitudinal rows, 0.12-0.22 mm long, and 0.10-0.15 mm wide. Cirrus sac claviform, 0.28-0.40 mm long, and 0.08-0.14 mm wide, extending laterally on left side of ventral sucker up to little posterior to ventral sucker. Seminal vesicle bipartite, parsprostatica long, cirrus sac muscular, surrounded by a large number of prostate gland cells. Ovary median, ovoid, entire, unlobed, pre-testicular, 0.17-0.23 mm long, and 0.20-0.25 mm wide at 1.72-1.89 mm from anterior extremity. Vitellaria follicular, extending from a little anterior of ovary up to hind end of body and never reach ventral sucker. Uterine coils lie between ovarian region and ventral sucker. Eggs ovoid, operculated, 0.059-0.065 mm long, and 0.030-0.040 mm wide.

## DISCUSSION

The present form is referred to the genus *Pleorchis* Railliet, 1896, of which the following species *viz. P. polyorchis* (Stossich, 1889); *P. americanus* Lühe, 1906; *P. sciaenae* Yamaguti, 1938; *P. californiensis* Manter & Van Cleave, 1951; *P. magnaporus* Arai, 1963; *P. ghanensis* (Fischthal and Thomas, 1968; Bilqees, 1981); *P. uku* Yamaguti, 1970; *P. mamaevi* Parukhin, 1974; *P. psettodesai* Gupta and Gupta, 1976; *P. puriensis* Gupta and Ahmad, 1976; *P. indicum* Gupta and Puri, 1979; *P. arabicus* Al-Yamani and Nahhas, 1981; *P. nibeae* Shen, 1983 and *P. hainanensis* Shen, 1983 are known so far.

Another four following species are no longer considered member of *Pleorchis*. *P. cygnoides* (Zeder, 1800) Stossich, 1898 was an early name for *Gorgodera cygnoides* Zeder, 1800; *P. mollis* (Leidy, 1856) Stiles, 1896 was an early name for heronimid *Heronimus mollis*; *P. oligorchis* Johnston, 1913 is a synonym of *Schistorchis carneus* Lühe, 1906 and *P. urocotyle* Parona, 1899 was wrongly assigned to this genus. Odhner (1905) formed new combination *Derogenes urocotyle* for it.

The present form and other members of the

genus seem to be rare digeneans as evident by Stossich (1889), who found his specimens in only one of 100 hosts. In recent past 14 species have been described and still fall within the concept of genus; of them, four species have more than 48 testes and ten others are known to possess less than 48 testes. According to the above description, the present form differs from all known four species of genus possessing 48 testes and ten species with less than 48 testes.

Species possessing more than 48 testes

1. *P. americanus* Lühe, 1906, from *Cynoscion regalis* (Bl. and Schn.) from off Woods Hole, U.S.A., with a total of nearly 60 testes was recognized by Lühe (1906). Same species was described with 56 testes, rarely 54 by Amato (1983).

2. *P. californiensis* Manter and Van Cleave, 1951, from *Atractoscion nobilis* (Ayres) off the US Pacific coast, was described with 92-108 testes.

3. *P. uku* Yamaguti, 1970, from *Aprion virescens* Valenciennes (Lutjanidae) from off Hawaii, was described with 50-54 testes.

4. *P. mamaevi* Parukhin, 1974, from *Johnius* sp. in Red sea and Indian Ocean, has 56 testes.

Species possessing less than 48 testes

1. *P. polyorchis* (Stossich, 1889) Stiles, 1896, from *Sciaena umbra* Linn. Off Corsica, France was redescribed by Bartoli *et al.* (2004). It differs from the present form in having only 44 testes, entire body surface spined, oesophagus broad and sometime indistinct, and ovary 6-9 lobed. Vitelline field extending into the forebody and reach the pharynx.

2. *P. sciaenae* Yamaguti, 1938, from *Nibea albiflora* (Richardson) from the East China sea was described with 44-48 testes. It differs from the present form in the extension of anterior limit of its vitelline field, a much longer hindbody in relation to the size of forebody, anterior caeca broad and equal, oesophagus indistinct and ovary multilobed.

3. *P. magnaporus* Arai, 1963, from *Cynoscion parvipinnis* (Ayres) in Baja California, on the Mexican Pacific coast, is different from the present form in having 44 testes, relatively shorter caeca which terminate well short of posterior extremity and pharynx devoid of an anterior circular muscle ring.

4. *P. ghanensis (*Fischthal and Thomas, 1968; Bilqees, 1981), from *Cynoscion macrognathus* (Bleeker) and *Pomadasys jubelini* (Cuvier) off Ghana, and later reported by Bilqees (1981) from the fishes namely *Pseudosciaena diacanthus; Otolithus argenteus* and *Pomadasys olivaceus* off Karachi coast can be distinguished from the present form in having 44 testes, rarely 46, its grater measurements, anterior extention of vitelline fields, a relatively much longer hindbody in comparison with size of forebody. Madhavi & Narasimhulu (1985) synonymised *P. ghanensis* with *P. sciaenae* whereas Bray (1986) considered that *P. ghanensis* and many other species with about 44 testes, as probable synonym of *P. sciaenae*.

5. *P. psettodesai* Gupta and Gupta, 1976, from *Psettodes erumei* (Bl. & Schn.) from the Arabian Sea, at Quilon, Kerala, India was described. The present form is also described from the same host at Bay of Bengal, Deegha, India, but *P. psettodesai* can be distinguished from the present form in having spines all over the body, testes 40-44 in number, intestinal bifurcation well anterior to the ventral sucker, anterior caecal diverticula equal, and ovary deeply multilobed. Vitellaria extending from anterior margin of ventral sucker up to hind end of body.

6. *P. puriensis* Gupta and Ahmad, 1976, described from *Sciaena vogleri* (Bleeker) off Bay of Bengal, India. It can be distinguished from the present form in having body spines, 44 testes, lack of anterior caeca, vitellarium reaching as far as posterior margin of the pharynx and vitelline field confluent in the forebody. Madhavi & Narasimhulu (1985) considered *P. puriensis* to be a synonym of *P. sciaenae*.

7. *P. indicum* Gupta and Puri, 1979, from *Epinephelus diacanthus* (Valenciennes) from the India, is different from the present form in having 44 testes, extension of vitellaria from middle of ventral sucker up to hind end of body.

8. *P. arabicus* Al-Yamani and Nahhas, 1981, from *Otolithus ruber* (Bl. & Schn.) from the Arabian Gulf off Kuwait, is different from the present form in particular 44 testes and an

**Table I.** **Morphometeric comparison of *Pleorchis srivastavai,* new species with some other species of *Pleorchis*.**

| **Species** | ***P. srivastavai,* new species** | ***P. polyorchis*[+]** | ***P. sciaenae*[+]** | ***P. hainanensis*[+]** | ***P. psettodesai*** | ***P. puriensis*** | ***P. indicum*** | ***P. ghanensis*[+]** |
|---|---|---|---|---|---|---|---|---|
| **Source** | **Present study** | **Bartoli *et al.* (2004)** | **Yamaguti (1938)** | **Shen (1983)** | **Gupta and Gupta (1976)** | **Gupta and Ahmad (1976)** | **Gupta and Puri (1979)** | **Fischthal and Thomas (1968), Bilqees (1981)** |
| **No of Specimens** | **2** | **10 (Redescription)** | **4** | **1** | **4** | **1** | **1** | **8** |
| Length | 3.95-5.0 | 2.244-4.076 | 2.70-3.10 | 6.379 | 2.53-2.54 | 4.43 | 2.53 | 4.1-4.9 |
| Width | 0.73-1.91 | 0.68-1.138 | 0.75-0.85 | 1.069 | 0.72-0.77 | 0.97 | 0.96 | 1.10-1.40 |
| Forebody | 1.04-1.16 | 0.533-1.074 | 0.588[§] | 1.65[§] | 0.80-0.82[§] | 1.18 | 0.64[§] | 1.307[§] |
| Hindbody | 2.71-3.61 | 1.438-2.749 | 2.20[§] | 4.69[§] | 1.56-1.59[§] | 2.99 | 1.74[§] | 3.269[§] |
| Oral sucker | 0.26-0.27 × 0.29-0.32 | 0.216-0.412 × 0.276-0.412 | 0.17-0.188 × 0.21-0.25 | 0.351 | 0.17-0.22 | 0.292 | 0.185 × 0.21 | 0.29-0.31 |
| Ventral sucker | 0.20-0.23 × 0.20-0.26 | 0.184-0.317 × 0.203-0.343 | 0.185-0.210 | 0.217 | 0.14-0.16 | 0.26 | 0.15 × 0.12 | 0.20-0.22 |
| Prepharynx | 0.27-0.35 × 0.07-0.08 | 0.013-0.203 | 0.075-0.130 | 0.367 | 0.18-0.28 | 0.30 | 0.07 | 0.40-0.61 |
| Pharynx | 0.21-0.23 × 0.16-0.18 | 0.184-0.292 × 0.210-0.349 | 0.15-0.175 × 0.15-0.16 | 0.184 × 0.20 | 0.14-0.16 × 0.14-0.185 | 0.192 × 0.180 | 0.135 × 0.16 | 0.17-0.19 × 0.21-0.28 |
| Oesophagus | 0.15-0.17 | | | | | 0.12 | 0.07 | |
| Cirrus-sac | 0.28-0.40 × 0.08-0.14 | 0.330-0.608 × 0.083-0.170 | 0.40-0.55 × 0.10-0.12 | 0.618 × 0.084 | 0.40-0.42 × 0.80-0.10 | 0.72 × 0.149 | 0.65 × 0.29 | 0.89-1.20 |
| Testes | 0.12-0.22 × 0.10-0.15 | | | | 0.05-0.15 × 0.06-0.12 | 0.15-0.21 × 0.16-0.22 | 0.06-0.09 × 0.08-0.095 | 0.10-0.15 × 0.10-0.16 |
| Ovary | 0.17-0.23 × 0.20-0.25 | 0.115-0.330 × 0.240-0.543 | 0.18-0.25 × 0.25-0.40 | 0.367 × 0.468 | 0.13-0.14 × 0.24-0.34 | 0.225 × 0.381 | 0.16 × 0.38 | 0.19-0.21 × 0.60-0.70 |
| Eggs | 0.059-0.065 × 0.03-0.04 | 0.063-0.073 × 0.027-0.036 | 0.069-0.072 × 0.033 | 0.060-0.069 × 0.030-0.036 | 0.068-0.072 × 0.022-0.03 | 0.074-0.80 × 0.036-0.036 | 0.06-0.07 × 0.02-0.03 | 0.052-0.069 × 0.032-0.049 |

[+]All measurements converted in millimeter (mm) from micrometer (µm).

[§]Calculated from figures of respective publications.

inconspicuous muscle ring on the anterior margin of Pharynx. It was considered synonym of *P. sciaenae* by Nahhas *et al.* (1998).

9. *P. nibeae* Shen, 1983, from *Nibea albiflora* (Richardson) off Hebei, China, is different from the present form in having only 29-40 testes and a long hindbody in relation to the size of the forebody.

10. *P. hainanensis* Shen, 1983, from *Pennahia anea* (Bloch.) from off Guangdong, China differs from the present form in 44 testes, and a relatively much longer hind body.

The best possible morphometeric comparison of the present form with some *Pleorchis* species has also been made (Table I). In view of specific characters of 48 testes, an entire unlobed ovary, anterior caecal diverticula unequal, and extension of vitellaria from a little anterior of ovary up to hind end of body, the present form deserves the status of new species. Accordingly, it is regarded as a new species with the specific name proposed *Pleorchis srivastavai* new species.

The new species is named in honour of Late Dr. H.D. Srivastava, Emeritus Scientist of Veterinary Sciences, Allahabad University, Allahabad, India.

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