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Re-description of genus *Tenuiproboscis keralensis* Kaur *et al.*, 2017 from marine fish *Scatophagus argus* at fort Kochi (Kerala), India

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Abstract
Fish plays an important role in the development of a nation. Besides being a cheap source of highly nutritive protein, it also contains essential nutrients required by the human body. Fish forms an important item in the food of the Kerala and the floating population of boatmen depend for a considerable part of their sustenance on the prey of their nets or lines. Kerala has enormous potential resources in the inland sector teeming with fish. The spotted scat (*Scatophagus argus*) belonging to the family Scatophagidae is an euryhaline teleost found in freshwater, brackish water and marine habitats. This species is widely distributed throughout Indo-Pacific Ocean. Because of their attractive pattern, this species is quite common as an aquarium fish and is also an important food fish in Southeast Asia. In Taiwan, this fish has traditionally been kept in ponds to prevent overgrowth of algae. In the present paper, an account of the *Tenuiproboscis keralensis* species of Acanthocephalan parasites recovered from intestine of marine fishes *Scatophagus argus* from Fort Kochi, Kerala.

Keywords: marine fishes, acanthocephalan, overgrowth, *Scatophagus argus*, parasites

1. Introduction
Acanthocephalans of genus *Tenuiproboscis* (Yamaguti, 1935) [1] belonging to the family Pomphorhynchidae is a common intestinal parasite of fish *Scatophagus argus.* Parasite disease poses great problems in the culture and captive maintenance of brackish water fishes (Malhotra and Banerjee 1990) [2]. Among them, acanthocephalans are 'thorny-headed' or 'spiny-headed' worms with aquatic life cycles; fish as final or paratenic hosts and crustaceans as intermediate hosts (Mehlhorn and Bunnag 1988) [3]. These helminthes lack alimentary tract and are characterized by presence of a proboscis armed with recurred hook, a syncytial epidermis and a lacunas system with circulatory channels that promotes direct absorption of nutrients through the intestinal walls (Amin 1985) [4] of vertebrates, especially freshwater and marine fishes (George and Nadakkal 1978) [5]. They are often encountered in culture system as the majority of the broodstock fishes are sourced from the wild. Acanthocephalan are dioecious endoparasites; males usually smaller than females (Gupta and Fatma 1987) [6]. The parasites are normally in a complex dynamic equilibrium with their host. Acanthocephalan parasites are responsible for high mortality rate, particularly in younger stages (Kabata 1985) [7]. Destruction of hosts tissues is one of the most common effects of parasitism. This may be a mechanical action when parasites or their larvae migrate or multiply in tissues or organs, or when various organs of attachment of parasites are inserted into fish tissues as anchors (Williams *et al.*, 1992) [8]. Destruction may also be due to pressure as a result of increase in parasite size, multiplication or blockage of ducts. Parasitisation of the intestinal tract (Williams *et al.*, 1970) [9] with even a few acanthocephalids leads to acute inflammation and apparently is capable of influencing the growth rate of small fishes. The pathogenicity of parasitism has been reported to cause extensive damage to the host leading to the lower production of the fish (Rai 1970) [10]. The affected fish intestine were irreversible mechanical damage caused by the attachment of the armed proboscis affects the architecture of the intestinal tissues leading to pathological changes (Sanil *et al.*, 2010) [11]. Damage of the intestinal villi, the formation of the granular tissues and capsules formation associated with host immune responses which seriously affect the digestive and absorptive efficiency of the animals (Bullock 1963) [12]. The eating of raw or inadequately cooked, pickled or fermented fish is a cultural practice instilled in populations throughout the world (Mwita, and Lamtane 2014) [13]. It is difficult to change eating habits which have been practised for generations. However, without a change in dietary habits, marine helminthic parasites will continue to infect humans. The need to assess the parasitic infection arises because the fish suffering from parasitic infection and or disease result into severe damage to fishery industry and also dangerous for human health (Paperna 1996) [14]. The present study describes the morphology, taxonomy of acanthocephalan parasites (Bhattacharya 2007) [15].

2. Materials and Methods
The present investigation is concerned with a survey of acanthocephalan parasites of *Scatophagus argus* (Cuv. & Val.) Collected from the sea coast of Fort Kochi, Kerala and examined during the year 2017. The collected Fishes were sacrificed, dissected and thorough examination of the alimentary canal. Acanthocephalan parasites were recovered from their intestine, after proper washing, the parasites were

kept in the refrigerator. This facilitated the complete eversion of the proboscis. After it, the parasites were flattened under the slight pressure of the cover-glass and fixed A.F.A. Fixative (50% alcohol, formalin and acetic acid in a ratio of 100**:**6**:**2.5) and stored in 70% ethanol for 24 to 48 hours. The parasites were stained with Acetoalum carmine. Dehydrated through a graded series of alcohol, cleared in Xylol and mounted in DPX. The Diagrams were made with the help of Camera Lucida. Microphotographs were taken with the help of Nikon compound microscope (Eclipse E200, Japan) inappropriate magnification. The whole body organs were measured by calibrated ocular micrometer. All measurements are given in millimetre (mm). The taxonomical part of work was done with the help of Handbook on Indian Acanthocephala by S.B. Bhattacharya (2007) and Systema Helminthum, Vol V, Acanthocephala Yamaguti, 1971. In this study, the re-description of species is based on male specimens.

Tenuiproboscis keralensis

Body is elongated, cylindrical, bulbous anteriorly and gradually tapering towards posterior and characterised by yellow to orange colouration. Proboscis long, cylindrical, claviform and cover with numerous hooks, arranged longitudinally in 14-15 rows, each row equipped with 14-15 hooks (Fig **1**. 2). Hooks curved in shape and variable in size; roots of hooks 1 to 3 rod - shaped, 4 to 5 with slightly bifid posterior tips, 6 to 13 with pointed posterior tip and 14 with a bifurcated posterior tip. Size of hooks decreases progressively from second to fourth row, remains almost uniform from 5th to 13th rows, while hooks on 15th row appeared straight and large (Fig **1**. 3). The neck is very long and cylindrical, devoid of hooks. The trunk is broad at anterior end, tapering towards posterior end. Proboscis receptacle long, bulbous and double walled. Lemnisci two equal, digitiform and equal to proboscis receptacle in length (Fig **1**. 1). Genital pore is terminal in both sexes.

Male

Body is 6.10-7.12 mm long, 0.78-0.82 mm wide. Proboscis is 0.65-0.80 mm long, 0.24- 0.38 mm wide. Neck 1.65-1.80 mm long, 0.30-0.42 mm wide. The trunk is 3.51-4.72 mm long, 0.78-0.82 mm wide. Proboscis hooks 0.048-0.052 long. Proboscis receptacle is 2.24-2.38 mm long, 0.21-0.25 mm wide. Lemnisci two and equal size 0.48-0.58 mm long. Testes oval in shape, tandem, pre-equatorial, both united by a genital ligament in anterior half of the trunk. Anterior testis is 0.35-0.40 mm long, 0.24-0.28 mm wide. The posterior testis is larger than anterior testis, 0.40-0.44 mm long, 0.25-0.29 mm wide. Cement glands six in number, pyriform, bunched together in the posterior half of the trunk. Saefftigen's pouch is pyriform, located below the cement glands, 0.35-0.46 mm long, 0.14-0.20 mm wide. Copulatory bursa ventral, 0.44-0.54 mm long, 0.22-0.35 mm wide.

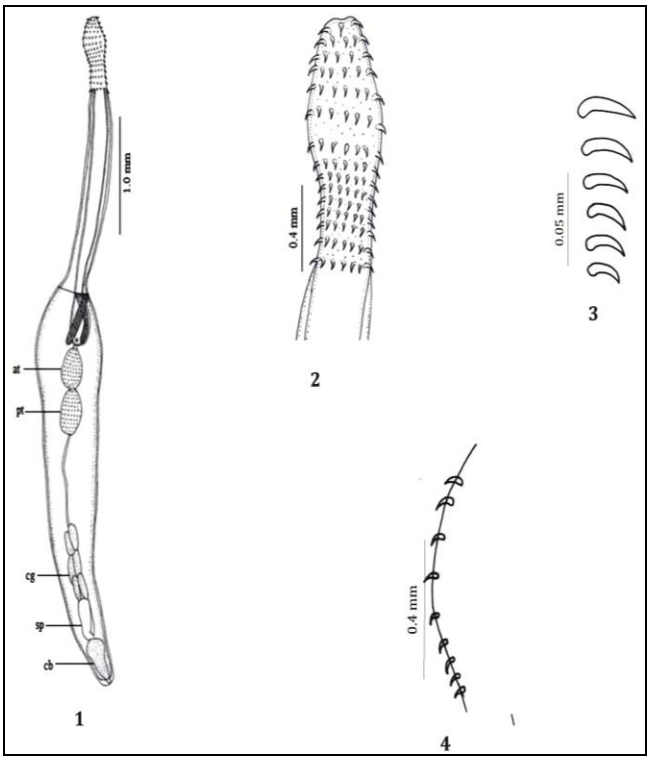

Fig 1: T*enuiproboscis keralensis* 1. Entire Male (Ventral view); 2. Male proboscis enlarged (Ventral view); 3. Proboscis Hooks enlarged; 4. Single row of proboscis Hooks of male (at anterior testis; pt posterior testis; cg cement glands; sp saefftigen's pouch; cb copulatory bursa)

Female

The body of the female is larger than male is 6.58-7.78 mm long 1.60-1.88 mm wide. Proboscis is 0.87-0.90 mm long, 0.26-0.30 mm wide. Proboscis hooks 0.056- 0.060 mm long. The neck is 1.50-1.81 mm long, 0.26-0.36 mm wide. The trunk is 4.16-4.97 mm long, 1.00-1.15 mm wide. Proboscis receptacle is 2.30-2.46 mm long, 0.16-0.26 mm wide. Lemnisci two and equal size 0.52-0.58 mm long. Ovarian

balls numerous, round to elliptical in shape (Fig.2). Uterine bell elongated, broad when filled with ovarian balls and eggs. Uterus conical in shape, followed by vagina with a well-developed sphincter (Fig.2). Mature eggs spindle shaped, possessed inner, middle and outer shells with the middle shell having polar prolongations, have a smooth surface at the centre while reticulations/striations were observed towards the polar ends. Immature eggs at various stages of development and enclosed an embryonic nuclear mass, while fully mature eggs harboured acanthor larvae.

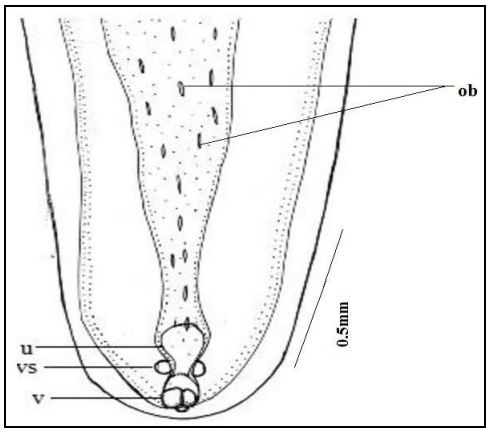

Fig 2: Female posterior end (Dorsal view). (ob ovarine balls; u uterus; vs vaginal sphincter; v vagina)

Host

Host: *Scatophagus argus* (Cuv. & Val.)
Location: Intestine
Locality: Fort Kochi, Kerala, India
Environment: Marine
Family: Scatophagidae
Order: Perciformes
Class: Actinopterygii
Common Name: Scat Fish
Distribution: Indo-Pacific
Total dorsal spine: 10-11; Total dorsal soft rays: 16-18; Anal spines: 4; Anal soft rays: 13-15; Body with a few large rounded blotches. Body is quadrangular, highly compressed. The eye is moderately large and its diameter smaller than snout length. Snout rounded. Mouth is small, horizontal. Teeth are villiform, in several rows on jaws.

Fig 3: *Scatophagus argus*

3. Results and Discussion

The present form is referred to the genus *Tenuiproboscis* Yamaguti, 1935. Member of the genus is characterised by filiform to claviform proboscis with several longitudinal rows of hooks, long neck without bulbous swelling, 4-6 cement glands and eggs with polar prolongations. Presently, this includes seven valid species, *T. misgurni* (Yamaguti 1935), *T. sergenti* (Choquette and Gayot 1952), *T. guptai* (Gupta and Sinha 1990), *T. clupei* (Gupta and Sinha, 1991), *T. bilqueesae* (Gupta and Naqvi 1992), *T. ernakulensis* (Gupta and Naqvi, 1992), *T. edmondi* (Gupta and Naqvi 1992) and *T. meyeri* (Saxena and Gupta 2007).

Golvan (1969) reassigned *T. sergenti* (Choquette and Gayot 1952) as *L. sergenti* and Amin *et al.* (1991) further created a new genus *Paralongicollum* and redescribed it as *P. sergenti*. Gupta and Naqvi (1992) reported *T. sergenti* from the marine fish, *Pristipoma gouraka*, overlooking the fact that *T. sergenti* is no longer included under genus *Tenuiproboscis*. Morphological characters place the present acanthocephalan under the genus *Tenuiproboscis*. But, the present form differs from other member of the genus in the number, shape and arrangement of hooks, in the number of cement glands and in morphometrics.

In the number and arrangement of hooks, the present species (14-15 longitudinal rows of proboscis hooks with 14-15 hooks) differ from *T. misgurni* (9 rows with 18-19 hooks), *T. gupti* (16-17 rows), *T. clupei* (14-16 rows with 10 hooks), *T. bilqeesae* (11-12 rows with 13-14 hook), *T. ernakulensis* in having (13-14 rows with 15-16 hooks), *T. edmondi* (18 rows with 17 hooks) and *T. meyeri* (12-14 rows with 14-15 hooks). It also differ from all other species except *T. guptai* in the size of hooks. Though *T. misgurni*, *T. meyeri* and *T. clupei* have six cement glands each, the present form can be differentiated from them based on the size and shape of the glands.

4. Conclusion

The present study can be concluded that a Re-description of acanthocephalan parasites (Genus *Tenuiproboscis keralensis*) from a marine water fish *Scatophagus argus* were carried during February 2017. The hosts fishes were collected from Fort Kochi, Kerala, India.

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6. References

1. Yamaguti S. Studies on the helminth fauna of Japan. Pt. 9. Nematodes of fishes. Jap. J Zool. 1935; 6(2):337-386.
2. Malhotra SK, Banerjee S. Ecology, pathology and biochemical correlates to parasitic diseases of Indian freshwater fishes. Ad. Bios. 1990; 9:19-44.
3. Mehlhorn H, Bunnag D. Parasitology in focus: facts and trend. Berlin: Springer Verlag, 1988.
4. Amin OM. Classification. In: Crompton DWT, Nickle B, editors. Biology of the Acanthocephala. Cambridge University Press, 1985, 27-72.

5. George PV, Nadakkal AM. Four new species of Acanthocephala from brackish and fresh water fishes of Kerala. Aqua. Biol. 1978; 3:79-90.
6. Gupta V, Fatma S. On some Acanthocephalan parasites (Rhadinorhynchidae) from marine fishes of Kerala, Puri and Tamil Nadu. Indian J Helminthol. 1987; 39(1):1-26.
7. Kabata Z. Parasites and diseases of fish cultured in the tropics. Parasitology. 1985; 91(03):648.
8. Williams HH, MacKenzie K, McCarthy AM. Parasites as biological indicators of the population biology, migrations, diet, and phylogenetics of fish. Reviews in Fish Biology and Fisheries. 1992; 2:144-176.
9. Williams HH, McVicar AH, Ralph R. The alimentary canal of fish as an environment for helminth parasites. In: Aspects of fish parasitology ed. Taylor AER *et al*. 1970; 8:43-77.
10. Rai P. On the pathogenic significance of the tapeworms Hithero reported from some of the freshwater fishes. Agra University J. Res. 1970; 15(2):23-30.
11. Sanil NK, Asokan PK, John L, Vijayan KK. Pathological manifestations of the acanthocephalan parasite, *Tenuiproboscis* sp. in the mangrovered snapper (*Lutjanus argentimaculatus*) (Forsskål, 1775), a candidate species for aquaculture from Southern India. Aqua, 2010, 1-8.
12. Bullock WL. Intestinal histology of some salmonid fishes with particular reference to the histopathology of acanthocephalan infections. J Morph. 1963; 112:23-44.
13. Mwita CJ, Lamtane H. Population Biology of the Metazoan Parasites Infecting Fishes from Lakes Uba and Ruwe, Lower Rufiji Floodplain, Tanzania. Nat. Sci. 2014; 6:700-708.
14. Paperna I. Parasites, infections and diseases of fishes in Africa: an update FAO/CIFA Technical Paper No.31Rome, FAO, 1996.
15. Bhattacharya SB. Handbook on Indian Acanthocephala. Zoological Survey of India, Kolkata, 2007, 1-255.