

**FIRST REPORT ON THE OCCURRENCE OF PARASITIC COPEPOD, *CLAVELLISA Ilishae* PILLAI 1962, PARASITIZING *Tenualosa ilisha* (HAMILTON, 1822) CAUGHT FROM PAKISTAN**

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**ABSTRACT**

A copepod parasite, *Clavellisa ilishae* Pillai, 1962 was recorded first time from Pakistan. The parasite was collected from the gill filaments of its host *Tenualosa ilisha* Hamilton- Buchanan, 1822. *Clavellisa ilishae* is a host specific species and was known to only infect clupeidaen fishes. The present specimen differs from earlier reported specimens in having two segmented antennules and five spines on maxilla.

**Key-words:** Copepod parasite, fish parasites, gill parasites, *Clavellisa hilsae*, Arabian Sea

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**INTRODUCTION**

The information and taxonomy of parasitic copepods is neglected in the past and only few papers on the taxonomy of parasitic crustaceans were available from Pakistan. The family Lernaeopodidae (Siphonostomatoida) is represented by 48 genera and the genus *Clavellisa* is represented by 12 species (Walter and Boxshall, 2019). This family contains the diverse parasitic copepods which shows variations with respect to environment (Kabata, 1986). The typical Lernaeopodidae member possesses modified and fused second maxillae which formed the bulla, this is the unique feature of this family. The fish parasites belonged to this family were reported to infect different species of clupeidean fishes. Only limited information about the occurrence of this family is available from Pakistan. This paper provides the description of *Clavellisa ilishae* which is collected first time from Pakistan.

**MATERIAL AND METHODS**

The specimens of *Clavellisa ilishae* were collected from the hilsa shad *Tenualosa ilisha*. A total of 10 host fishes were captured during 2002 to 2004. The 10 female parasites were separated from the gills of the host under the dissecting binocular and were preserved in the 70% alcohol. The specimens were cleaned in the lactic acid for 4-5 minutes and were observed in microscope for detail examination. The figures were made with the help of camera lucida and the measurements were taken with the help of an ocular micrometer. The species was identified with the help of the description given by Tripathi (1962), Pillai (1962) and Pillai (1985).

**RESULTS**

**Systematic account:**

Order: Siphonostomatoida Thorell, 1859

Family: Lernaeopodidae Edwards, 1840

Genus: *Clavellisa* Wilson, 1915

*Clavella hilsae* Tripathi, 1962 (synonym)

*Clavellisa ilishae* Pillai, 1962

**Material examined:**

10 ♀ specimens removed from gill filaments.

Host: *Tenualosa ilisha*

**Description of female**

**Prosoma**

Body is divided into head, cephalothorax and trunk regions. Head is prominent, slightly swollen and covered dorsally by a squarish carapace. Bulla is present. Cephalothorax is long, slender, without carapace and about three times longer than the trunk. Cephalothorax is 1.03 — 1.04 mm in length and 0.20 — 0.21 mm in width (Fig. 1A).

#### Antennule and Antenna

Antennule is uniramous and indistinctly two segmented. It contains two spines and three blades on the terminal end (Fig. 1B). Antenna is biramous and two segmented. The basal segment is without spine and rami bent at the right angles to the basal segment. Two spines are present on the exopod and one on the endopod (Fig. 1C).

#### Mandible, Maxilla and Maxilliped

Mandible contains three to four small teeth (Fig. 1D). First maxilla is broad at the distal end than the basal region. It has three spines on the exopod and two on the endopod (Fig. 1E). Second maxilla is transformed into a vine glass-shaped bulla which is an attachment organ (Fig. 1F). First maxilliped is short, externally swollen and narrow spine like structure at the proximal end. Second maxilliped has two segments. The basal segment consists of an inner spine. The distal segment is internally serrated and has an outer spine (Fig. 1G).

#### Thoracic Appendages

Thoracic appendages are absent.

#### Trunk

Trunk is laterally expanded and about one and a half times broader than long. Trunk is 0.30 — 0.31 mm long and 0.47 — 0.48 mm wide. Anterior border of the trunk with a pair of setae on either side of the maxillae. It has shallow median longitudinal depression in the middle of the trunk where the cephalothorax is attached with it. Posterior border with a pair of anal laminae and a pair of a cylindrical processes carrying a spine, representing the vestigial appendages (Fig. 1).

#### Urosome

Posterior part of the trunk has bilobed genital process and an apical spine is present on each lobe. Eggs sacs are large and oval shaped (Fig. 1 H).

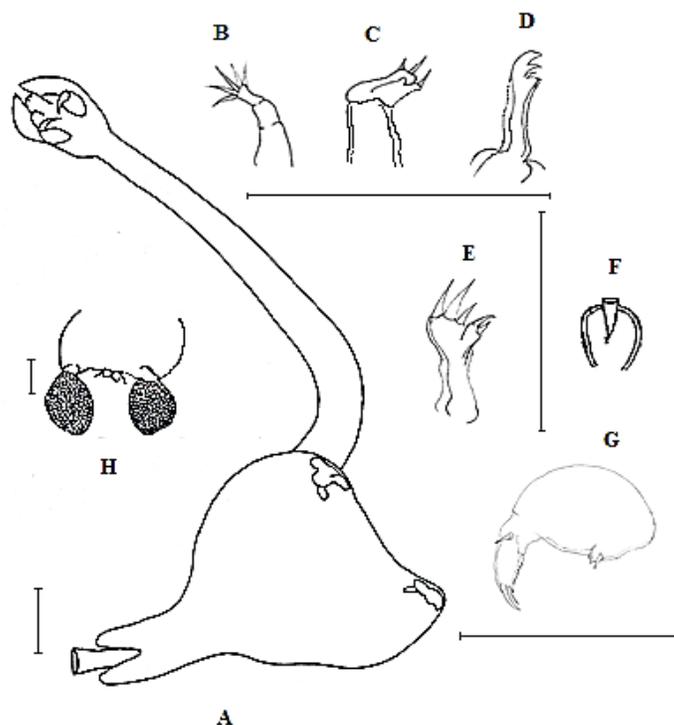


Fig. 1. *Clavellisa ilishae*. A) whole animal ventral view; B) antennules; C) antenna; D) mandible; E) first maxilla; F) second maxilla; G) second maxilliped; H) Trunk with ovisac. Scale bar: 0.01mm

Table 1. Comparison of reported sizes of *Clavellisa ilishae* from different countries.

Host	Cephalothorax (mm)	Trunk length (mm)	Trunk width (mm)	Locality	Authority
<i>Ilisha filigera</i>	0.9	0.6	1	India	Pillai, 1962
<i>Sardinops sagax</i>	1.5-2.0	-	0.80-1.0	South Africa	Kensley and Grindley, 1973
<i>Sardinella aurita</i>	2.0-2.75	0.50-0.73	0.73-1.06	Egypt	El-Rashidy and Boxshall, 2010
<i>Sardinella brasiliensis</i>	1.17-3.12	0.55-1.07	0.87-1.5	Brazil	Moreira <i>et al.</i> , 2013
<i>Tenualosa ilisha</i>	1.03-1.04	0.30-0.31	0.47-0.48	Pakistan	Present study

### REMARKS

The characteristic feature of *C. ilishae* is the presence of laterally rounded trunk and oval shaped egg sacs. *C. ilishae* was only reported to infect clupeid fishes (Rijin *et al.*, 2018). Tripathi (1962) reported this species from India from the fishes *Tenualosa ilisha*, *Ilisha filigera*, and *Euplatygaster indica*. However it is collected only from *Tenualosa ilisha* in Pakistan. The size of our specimen was smaller as compare to other areas (Table 1). The *C. ilishae* shows variation in size with respect to regions. Smaller individuals were reported from India and large size specimens were recorded in South Africa, Egypt and Brazil (Table 1). The present species differs from the specimens described by Pillai (1985) in having two segmented antennules while three segments were reported by Tripathi (1962) and four segments by Pillai (1962). In addition antenna has two spines unlike the Tripathi (1962) who reported one segmented antenna. Moreover, the first maxilla has five spines unlike the Pillai (1962) who noticed one spine on the palp.

### ACKNOWLEDGEMENT

The authors were thankful to Canadian copepodologist Dr Zbigniew Kabata (late), Fisheries Research Board of Canada for his help in the identification of *Clavellisa ilishae*.

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(Accepted for publication June 2019)