# FIRST REPORT ON THE OCCURRENCE OF PARASITIC COPEPOD, *NOTHOBOMOLOCHUS LATEOLABRACIS* YAMAGUTI & YAMASU, 1959 IN FRESHWATER FISH CAUGHT FROM HALEJI LAKE SINDH, PAKISTAN

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**ABSTRACT**

A copepod parasite, *Nothobomolochus lateolabracis* Yamaguti & Yamasu, was recorded first time from the freshwater fish *Cirrhinus mrigala* captured from Haleji Lake Sindh in Pakistan. *Nothobomolochus lateolabracis* is a rare species and was only reported from marine fishes in Japan and Taiwan. This is the third report on this species in the World and first report from Pakistan.

**Key Words:** Copepod parasite, Fish parasites, gill parasites, *Nothobomolochus lateolabracis,* Haleji Lake,

## 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 Bomolochidae (Poicelostomatoida) was first described by Claus, (1875) and now represented by 32 genera. The genus *Nothobomolochus* is the most diverse genus in the family Bomolochidae (Ho *et al*., 2000) with 38 species (WORMS, 2018). The typical Bomolochidae member possesses flattened cyclopoid body with differently developed rostrum. The fish parasites belonged to this family were reported from different parts of the world but only limited information about the occurrence of this family is available from Pakistan. Only one species *N. tricerus* was reported earlier from the marine fish *Pampus argenteus* (Ghani and Ali, 2003). The species of *Nothobomolochus* were recorded mainly from marine waters and most of the species are considered as host specific (El- Rashidy and Boxshall, 2014). This paper provides the description of *Nothobomolochus lateolabracis* which is collected first time from the freshwater fish in Pakistan.

## MATERIAL AND METHODS

The specimens of *Nothobomolochus lateolabracis*, ***were*** collected from the freshwater fish *Cirrhinus mrigala* captured from Haleji Lake, Thatta which is 70 km away from Karachi. A total of 20 host fishes were captured during 2002 to 2004. The 50 female parasites were separated from the gills of the host and sorted out 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. 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 Yamaguti and Yamasu (1959), Vervoort (1962) and Ho *et al.* (2000).

## RESULTS

**Systematic account:**
Order: Cyclopoida Burmeister, 1835
Family: Bomolochidae Claus, 1875
Genus: *Nothobomolochus* Vervoort, 1962

***Nothobomolochus lateolabracis*** Yamaguti and Yamasu, 1959
*Artacolax lateolabracis*, Yamaguti and Yamasu, 1959
*Nothobomolochus lateolabracis*, Vervoort, 1962
*Pseudartacolax lateolabracis*, Yamaguti, 1963

**Material examined:**

50 ♀ specimens removed from gill filaments.
Total length of adult female: 2.29 mm.
Host: *Cirrhinus mrigala*
Locality: Haleji Lake, Sindh.

**Description of female**

**Prosome**

Body is long and cylindrical. The anterior portion is broader than the posterior portion (Fig. **1 and 2a**). Cephalothorax is large, deeply notched and wider than long. Thorax contains five distinctly separated segments and narrowing posteriorly. First thoracic segment is fused with the head and 0.46 - 0.47 mm in length and 0.59 - 0.60 mm in width. Third segment overlaps the fourth thoracic segment. Length 0.56 - 0.57 mm and 0.25 - 0.26 mm in width. Seven pairs of cephalic appendages are present.

**Antennule and Antenna**

Antennule is six segmented and uniramous with indistinctly separated, heavily sclerotized basal part and three segmented cylindrical distal part (Fig. **2c**). The basal part has twenty five setae. Among them, twelve stout dorsal setae, six small ventral setae and four small and three long marginal setae are present. The first segment of the distal part has four setae, second contains three setae while eight setae are present on the terminal segment.

Antenna is three segmented and uniramous. Basal segment is longest and has one outer seta at the distal end. Second segment is smallest with one short seta. Third segment is large and oval shaped and protruded distally in to a large blunt cylindrical process with rows of many denticles, three unequal setae and pectinate at the base. The terminal segment possesses four curved, long claws. It is also pectinate and has rows of denticles (Fig. **2d**).

**Labrum and Mandible**

Labrum is triangular transversally. It is covered by patches of spinules and setae on the ventral surface. It contains bunch of setae on both lateral margins. Mandible is long and possesses two unequal blades on the terminal tip. These blades have dentition along the posterior margin (Fig. **2f**).

**Maxilla and Maxilliped**

First Maxilla consists of a single segment with two long plumose and two small naked setae (Fig.2e). Second Maxilla has two segments (Fig.2h). Basal segment is large while distal segment short and oblong, contains two large denticulated posterior processes and a short seta. Maxilliped is three segmented. Basal segment has one subterminal, short seta while the second segment contains two large plumose setae. The third segment has a smooth claw and a large basal plumose seta (Fig. **2g**).

**Thoracic Appendages**

There are six pairs of thoracic legs. Among them first to fourth thoracic appendages are biramous while fifth and sixth are uniramous (Fig. **3a-f**).

**First Thoracic Leg**

Basal segment has many large patches of spinules and a small papilla tipped with a seta on the ventral surface. Exopod is two segmented. The distal segment has six long plumose setae. Endopod is three segmented. First and second segments contain single seta while terminal third segment has five long plumose setae (Fig. **3a**).

**Second Thoracic Leg**

Both rami of the second thoracic leg are three segmented. All the segments of exopod contains a pecten at the base of the spines. First and second segments of the exopod have a single spine while the second segment also has a single seta in addition to the spine. The third segment of exopod has four spines and five setae. The first segment of endopod has single seta, second segment consists of two setae. The third segment bears three setae and two short obtuse spines (Fig. **3b**).

**Third Thoracic Leg**

Both rami are three segmented and each segment of exopod contains pecten at the bases of the spines like the second thoracic leg. First and second segments have single spine but second segment has also a single seta in addition to the spine. Third segment of the exopod has three spines and five long setae. The first segment of

endopod has single long seta. Second segment contains two long setae while third segment contains two long setae and two short obtuse spines (Fig.**3c**).

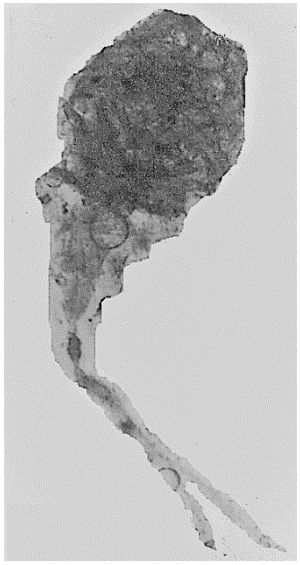

Fig. 1. *Nothobomolochus lateolabracis* adult ♀ in dorsal view.

**Table1.** Reports and original descriptions of *Nothobomolochus lateolabracis* from World.

| Host | Locality | Reference |
|---|---|---|
| *Lateolabrax japonicus* (Cuvier) | Inland Sea, Japan | Yamaguti &Yamasu, 1959 |
| *Lateolabrax japonicus* (Cuvier) | Kojima Bay, Japan | Ho et al., 1983 |
| *Sillago sihama* (Forsskal) | West Coast, Taiwan | Lin and Ho, 2005 |
| *Cirrhinus mrigala* (Ham.) | Haleji Lake, Sindh, Pakistan | Present Study |

**Fourth thoracic Leg**

Both rami are three segmented. First segment of exopod has single spine. Second segment contains single seta and single spine also. Third segment consists of three spines and four long setae. This leg has pecten at the bases of all spines in the exopod. First, second and third segments of the endopod has single seta and a short obtuse spine is also found in the third segment of this leg (Fig. **3d**).

**Fifth Thoracic Leg**

This thoracic leg is uniramous and two segmented. The basal segment is short and has an outer short seta. Second segment is long. It has patch of spinules on the distal part and three long unequal setae at the apical end and a short seta at the lateral margin (Fig. **3e**).

**Sixth Thoracic Leg**

This thoracic leg is also uniramous and vestigial. It has three long setae near the pit for the attachment of the egg sac (Fig. **3f**).

**Urosome**

The lateral sides of genital segment are swollen and almost equal in the length and width. It has two long ovisacs (Figs. **3g**) measuring 0.20 - 0.21 mm in length and 0.21 - 0.22 mm in width. Eggs arrange in many rows. Abdomen is three segmented and all the segments are wider than long (Fig. **1a**). Caudal rami measuring 0.54 - 0.55 mm in length and 0.53 - 0.54 mm in width and consists of five short setae and a single terminal long seta (Fig. **1b**).

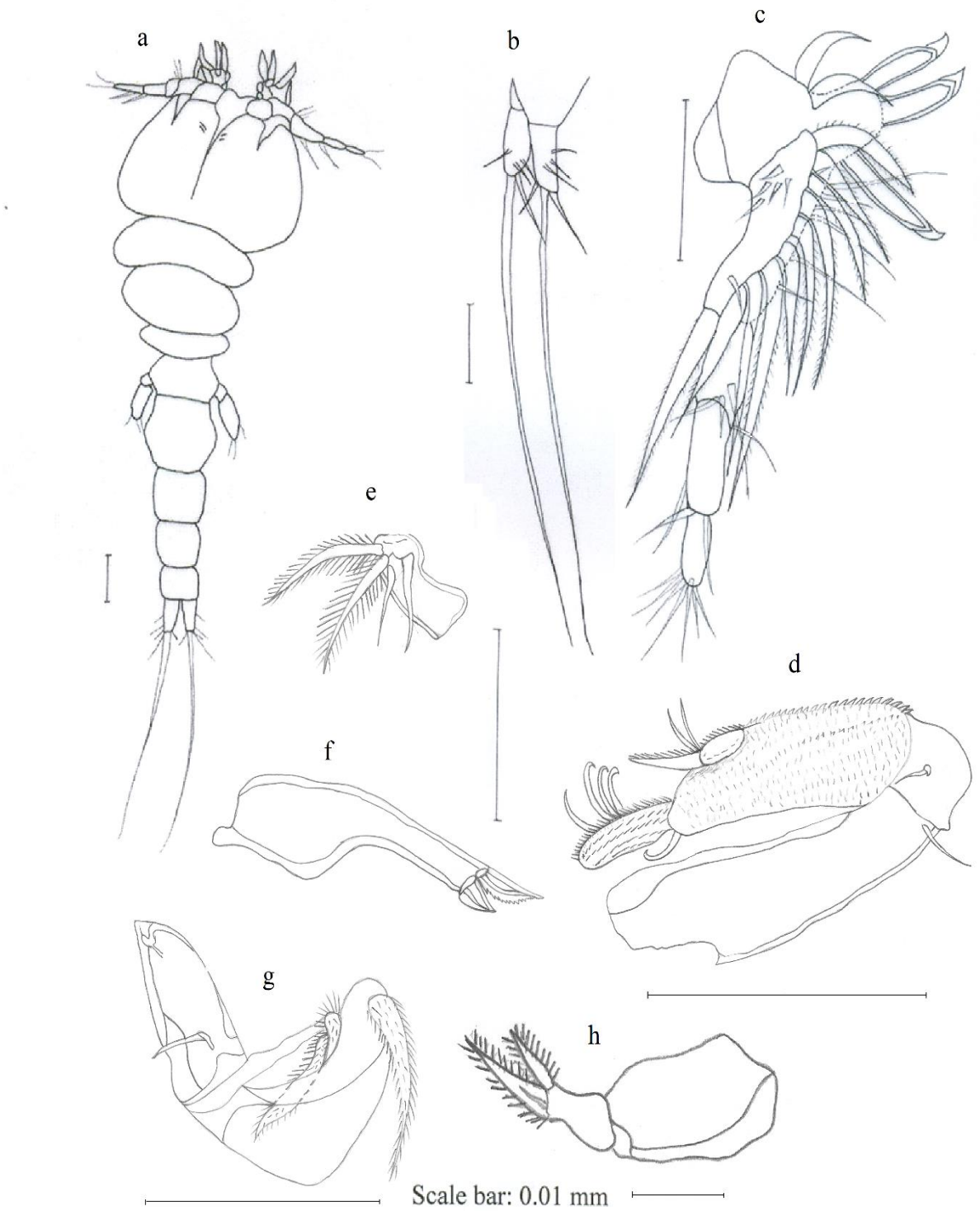


Fig. 2. *Nothobomolochus lateolabracis* (Yamaguti &Yamasu) adult ♀. a) whole animal dorsal view; b) caudal ramii; c) antennule; d) antenna; e) first maxilla; f) mandible; g) maxilliped; h) second maxilla. Scale bar: 0.01 mm.

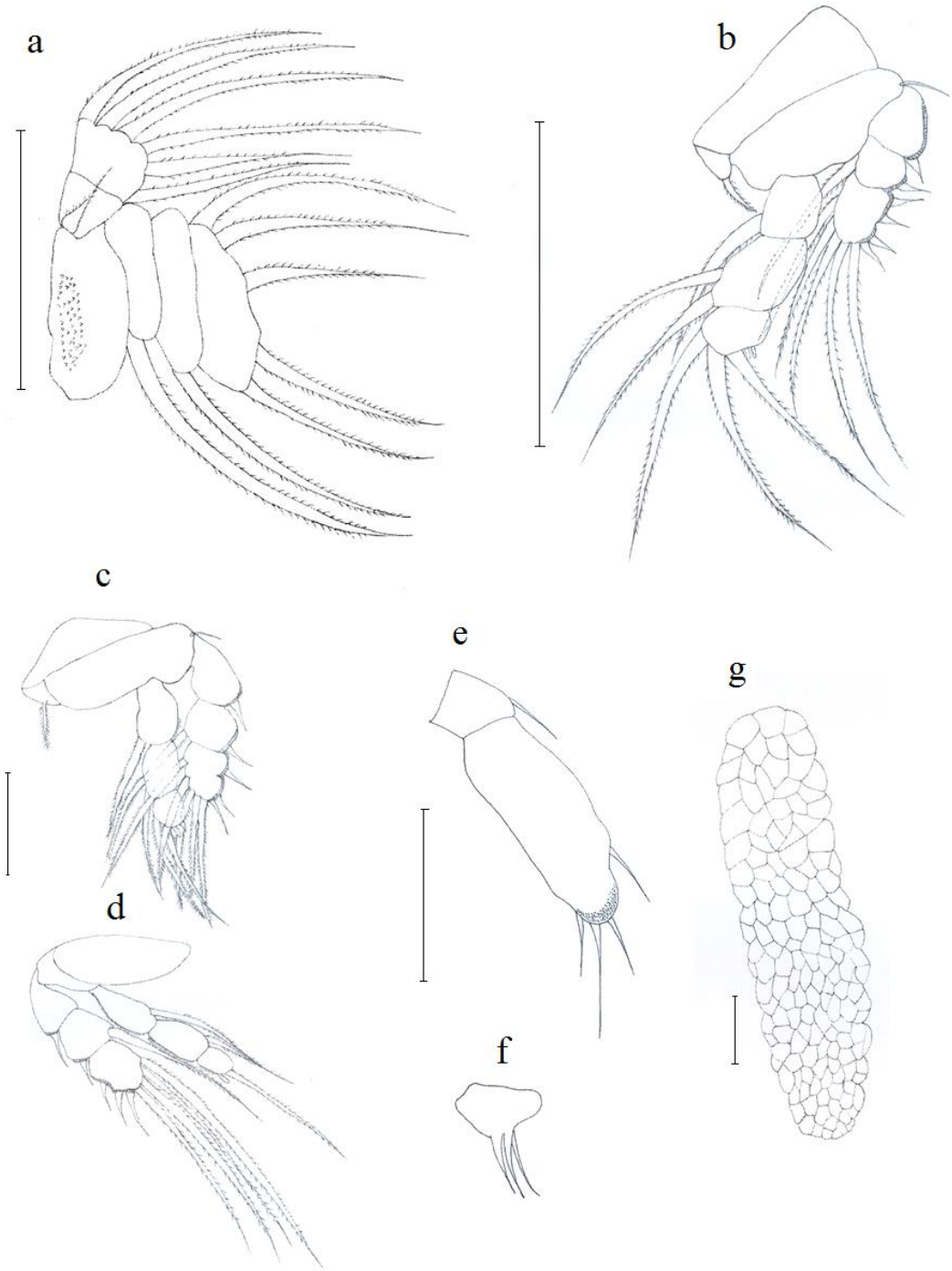


Fig. 3. *Nothobomolochus lateolabracis* (Yamaguti &Yamasu) adult ♀. a) first thoracic leg; b) second thoracic leg; c) third thoracic leg; d) fourth thoracic leg; e) fifth thoracic leg; f) sixth thoracic leg; g) ovisac. Scale bar: 0.01 mm.

**REMARKS**

In this study *Nothobomolochus lateolabracis* was recorded first time from the freshwater fish *Cirrhinus mrigala* and is a new record for Pakistan. *Nothobomolochus lateolabracis* is reported earlier from two marine fishes (Table 1), L*ateolabrax japonicus* from Japan (Yamaguti and Yamasu, 1959; Ho *et al*, 1983) and *Sillago sihama* from Taiwan by Lin and Ho (2005). The characteristic features of this species is the presence of an obtuse spine and a single seta on the third endopodal segment of fourth thoracic leg. The present species differs from Lin and Ho

(2005) in having two plumose setae instead of three on the first maxilla and by the absence of three minute elements on the exopod of the first thoracic leg.

**ACKNOWLEDGEMENT**

The authors were thankful to Dr Ju-shey Ho, Department of Biological Sciences, California State University, USA, for his help in the identification of *Nothobomolochus lateolabracis*.

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(*Accepted for publication December 2019*)