



Sphyraena barracuda (Edwards, 1771), a new host for *Lernaeolophus sultanus* (Milne Edwards, 1840) (Siphonostomatoida; Pennellidae) from Andaman and Nicobar waters, India

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Received: 26 Dec 2019 Accepted: 24 Nov 2020 Published: 30 Nov 2020

Short communication

Abstract

Lernaeolophus sultanus (Milne Edwards, 1840) is reported from a new host *Sphyraena barracuda* (Edwards, 1771) hooked during tuna longline operation in Andaman Sea, after 42 years from its first record from Indian waters. One ovigerous female *L. sultanus* of total length 24.5 mm was recovered, which was deeply embedded in to the host musculature in front of the anal fin. Cephalosome is bulbous with three profusely branching antlers. This is the first record of *L. sultanus* from Andaman Sea.

Keywords: Parasitic copepod, pennellid, barracuda, Andaman and Nicobar Islands, Indian EEZ

Introduction

Members of the family Pennellidae (Burmeister, 1835) include some of the most highly modified parasitic copepods of marine fishes (Ho and Honma, 1983) and mammals (Aznar *et al.*, 2002). They have a characteristic elongated body deeply embedded into the host's tissue leaving only the genital and abdominal portions exposed outside of the host (Kabata, 1979; Boxshall and Halsey, 2004). The family comprises of 138 species within 24 genera

(Walter and Boxshall, 2020). The genus *Lernaeolophus* Heller, 1865 have three valid species *Lernaeolophus sultanus* (Milne Edwards, 1840), *Lernaeolophus striatus* (Wilson, 1913) and *Lernaeolophus aceratus* (Ho and Honma, 1983). Of the three valid species, *L. sultanus* is the most prevailing species with records from Mediterranean Sea (Raibaut and Ktari, 1971; Papoutsoglou, 1976; Ben Hassine, 1983; Anato *et al.*, 1991; Benmansour and Ben Hassine, 1998; Raibaut *et al.*, 1998; Boualleg *et al.*, 2010; Öktener and Trilles, 2004; Azizi and Bahri, 2016; Mansouri *et al.*, 2017), New South Wales, Australia (Heegaard, 1962), Atlantic Ocean (Wilson, 1917, 1932; Grabda, 1972; Bashirullah, 1975; Cressey and Collette, 1970; Suarez-Morales and Ho, 1994), Pacific Ocean (Justine *et al.*, 2012) and Indian Ocean (Kirtisinghe 1935, 1964; Natarajan and Balakrishnan, 1977).

L. sultanus was first described by Milne Edwards (1840) as *Pennella sultana* based on a sample collected by Von Nordmann from *Caranx lugubris* Poey, 1860. Heller (1865) had done the detailed examination of the oral region of the *L. sultanus* collected from *Serranus scriba* (Linnaeus, 1758) and *S. cabrilla* (Linnaeus, 1758) and transferred *P. sultana* in to a separate genus *Lernaeolophus* (Grabda, 1972). Later in 1913, Wilson described two more species under the genus, *L. striatus* and *L. recurvus*. *L. striatus* (Wilson, 1913) differs from *L. sultanus* in having straight trunk and unbranched abdominal processes; whereas *L. sultanus*

have a sigmoid trunk and branched posterior processes giving a brush like appearance. Ho and Honma (1983) synonymised *L. recurvus* as *L. sultanus*, because the varied flexion of the neck of *L. recurvus* cannot be considered as a distinguishing character, it is common in family Pennellidae. In the same year Ho and Honma described a new species *Lernaeolophus aceratus* from motley stripe rainbow fish, *Halichoeres tenuispinis* (Günther, 1862). It differs from other two congeners in lacking dendritic

processes on the head, strongly flexed cephalosome and neck, anterior oral lobes well developed and bilobate and abdomen with seven pairs of irregularly branched lateral processes.

L. sultanus shows low host specificity and was recorded from marine teleosts belonging to 13 families (Raibaut *et al.*, 1998; Walter and Boxshall, 2020). From Indian Ocean, it has been recorded from *Istiophorus gladius* (Kirtisinghe, 1935), *Rastrelliger kanagurta* (Kirtisinghe, 1964) and *Priacanthus hamrur* (Natarajan and Balakrishnan, 1977). The present record of *L. sultanus* from the new host *Sphyraena barracuda* is after forty-two years from Indian Ocean with a new geographical record for the parasite, *i.e.* the Andaman waters. *L. striatus* is rare, recorded only from Puerto Rico and Jamaica (Williams and Bunkley-Williams, 1996).

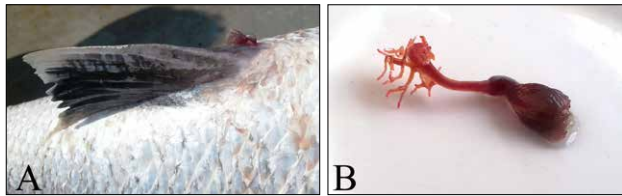


Fig. 1. A) *L. sultanus* (Milne Edwards, 1840) attached to *S. barracuda* (Edwards, 1771), FL 118 cm; B) *L. sultanus* (Milne Edwards, 1840), adult female (24.5 mm) before fixation.

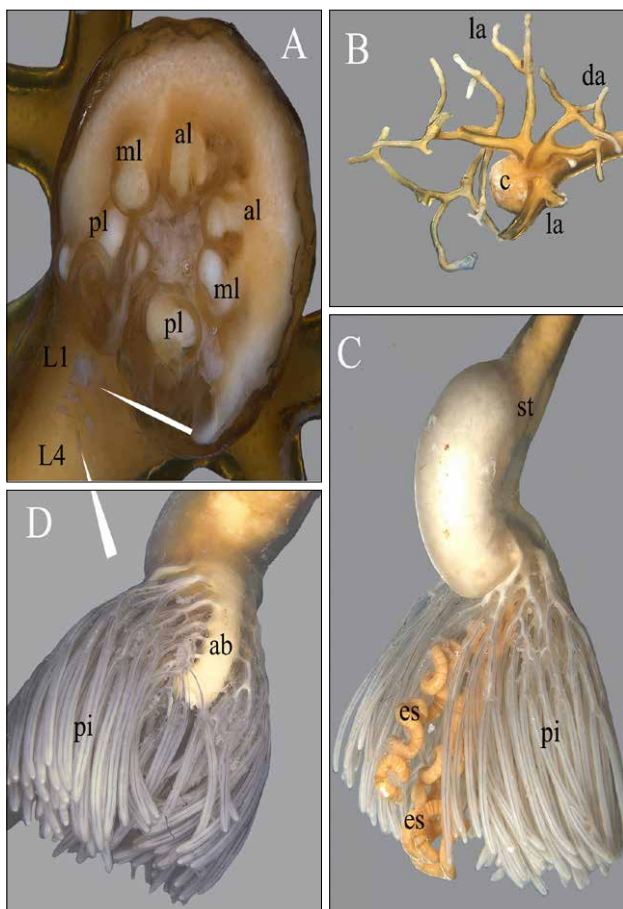


Fig. 2 A, oral region, ventral; B, Cephalosome and anterior of the neck, antero-lateral; C, Abdomen, dorso-lateral; D, Abdomen and posterior trunk. Abbreviations: al= anterior oral lobe, ml= median oral lobe, pl= posterior oral lobe, da = dorsal antler, la = lateral antler, c = cephalosome, ab = abdomen, st = sigmoid trunk, es = egg string, pi = pinnules, L1 = Leg 1, L4 = Leg 4 (0.21 mm to 0.26 mm).

Material and methods

Parasite specimen was opportunistically collected from the anal fin region of *S. barracuda* of 9 Kg and fork length (FL) 118 cm, caught by exploratory horizontal longlining in the oceanic waters of the Andaman (11°20.28N and 093°10.42E) during December 2017 survey in the vessel, MFV *Blue Marlin* of the Fishery Survey of India (FSI), Port Blair. Copepod parasite located was carefully removed by dissecting the anal fin region using fine forceps and scissors and then preserved in 70% ethanol for detailed analysis. After completion of the voyage sample was dipped in a drop of 85% lactic acid for about an hour before examining under a stereo microscope following (Humes and Gooding, 1964). Measurements and microphotographs were made using stereozoom microscope LEICA M 205A, total length of the specimen was measured from anterior tip of cephalosome to abdomen following Pillai, 1985. The taxonomic identity of the parasite was confirmed by using descriptions of Kabata, 1979; Radujkovic and Raibaut 1987. For future reference specimen was deposited in the National collections of Zoological Survey of India, Andaman and Nicobar Regional Centre (ANRC), Port Blair with Referral No. ANRC/ZSI/25565.

Results

Taxonomy

Order : Siphonostomatoida Burmeister, 1835
 Family : Pennellidae Burmeister, 1835
 Genus : *Lernaeolophus* Heller, 1865

Lernaeolophus sultanus (Milne Edwards, 1840)

Diagnosis

One adult female *L. sultanus* specimen of total length 24.5 mm was recovered from the anal region of *S. barracuda*

(Fig. 1 A & B). The globular head of 3.5 mm width bears three profusely branching antlers (Fig. 2B); two lateral antlers and a dorsal antler, which aids to hold firmly into the musculature of host tissue, one of the lateral antlers got damaged during the removal of parasite from the host. Cylindrical neck (2.2 mm) is heavily sclerotised and bears four pairs of vestigial legs varying in sizes from 0.21 to 0.26 mm (Fig. 2A). The oral region is almost circular (Fig. 2A) and with three pairs of lobes; the anterior lobe (0.76 mm), middle lobe (0.72 mm) and posterior lobe (0.85 mm). In continuation with the neck is the cylindrical trunk of 9.83 mm, which is linked to the flexed trunk protruding outside. Abdomen is shorter than trunk and possess two rows of dichotomously branching pinnules of 9.5 to 10.2 mm in length (Fig. 2D) and spiral egg sacs carrying single row of stacked ova (Fig. 3C).

Discussion

L. sultanus shows variation in its external morphology based on the type of host and in response to the confined environment for attachment (Kabata, 1968). They have specific attachment sites on the host fish like eye sockets, the buccal cavity, bony vault of the mouth, the tongue and the opercula (Grabda, 1972; Raibaut and Ktari, 1971). In contrast, present specimen antlers were well developed with profuse branching and were attached to host musculature in front of anal fin but not reaching to the anal spine and radials. Similar cases were noted in swordfish, where attachment is reported near to the anus and in cobia it was in the body just posterior to the last dorsal fin ray (Williams and Bunkley- Williams, 1996). These attachments can induce several pathological changes and deformities in the host (Azizi and Bahri, 2016). Natarajan and Balakrishnan (1977) reported the penetration of *L. sultanus* in to the gill chamber of *Priacanthus hamrur* Forsskal, 1775 and noted the reduction in the efficiency of respiration and atrophy of the filaments.

L. sultanus is distinguished from other two valid conspecific species by the following characters: globular head with three profusely branching antlers, neck with four pairs of minute legs, post genital region with two rows of dichotomously branching pinnules (Kabata, 1968). Cephalosome is a bulbous structure, subdivides anteriorly by a distinct groove into two hemispheres (Kabata, 1968) and bears three antlers which divides dichotomously close to their bases. Size and shape of the antlers varies depending on the individual circumstances of attachment (Kabata, 1968). In *L. aceratus*, cephalosome lacks the antlers and the adult specimens have scalloped margin, while it is smooth in younger specimens (Ho and Honma, 1983). In addition to the three pairs of oral lobes, it possesses two lateral papillae and a posterior papillae arranged inner to the oral lobes (Kabata, 1968), and centrally it possess typical lernaocerid buccal tube.

Lernaolophus possess minute but complete set of appendages as in other lernaocerids (Kabata, 1968). First and second antennas are closely placed in the anterior region of the cephalosome. Armature of the antennas got damaged during the removal of specimen from the host. Legs are highly reduced and vestigial and have no role in the attachment; cephalic antlers aid the firm attachment by penetrating into the musculature, even to the bony structures as noted in greater weever (Azizi and Bahri, 2016; Ramdane *et al.*, 2009). Kabata (1968) recorded short and undivided dorsal antlers as in other *Lernaocera* Blainville, 1822 the division is more prominent in mature specimen.

In certain extreme cases, growth retardation of the host was noted as in marine farmed fish sharp snout sea bream, *Diplodus puntazzo* Walbaum, 1792 (Varvarigos, 2007) and *Trachinus draco* (Azizi and Bahri, 2016). No such effect on growth of the host was noted in the present study. High infestation of *L. sultanus* on farmed *Pagellus erythrinus* Linnaeus, 1758 in the Gulf of Tunis resulted in significant mortality (Raibaut and Ktari, 1971). Therefore, the presence of the mature parasite in the farmed fish poses a potential threat to marine aquaculture and a close surveillance is recommended for the control.

Acknowledgements

We are indebted to the Director General, Fishery Survey of India for encouragement and support during the study. We thank the skipper and crew of the MFV Blue Marlin, longline survey vessel of the Fishery Survey of India for assisting in the specimen collection.

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