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Short Communication

New Record of *Pseudocycnus appendiculatus* Heller, 1868 Parasites of Yellowfin Tuna *Thunnus albacares* (Bonnaterre, 1788) in the Andaman Sea, Thailand

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Abstract

Four samples of yellowfin tuna, *Thunnus albacares* (Bonnaterre, 1788), were collected from the Andaman Sea in the Exclusive Economic Zone, Thailand in May 2010. All samples were infested by the parasitic copepod *Pseudocycnus appendiculatus* at their gill filaments. This report documents a new record of the Andaman Sea, Thailand for *P. appendiculatus* and also a new host, *T. albacares*, for this apparent parasite in Thailand is recorded.

Keywords: Parasite, *Pseudocycnus appendiculatus*, yellowfin tuna, *Thunnus albacares*, Thailand

Introduction

The Andaman Sea is a non-enclosed sea with deep oceanic waters connected to the Eastern Indian Ocean. It possesses a rich marine ecosystem especially in pelagic resources [1]. One of the most important pelagic resources of the Eastern Indian Ocean is the yellowfin tuna, *Thunnus albacares* (Bonnaterre, 1788). Yellowfin tuna (YFT) is a large pelagic species, which is widely distributed throughout the tropical and subtropical oceans between 52 ^{o}N - 45 ^{o}S and 180 ^{o}W - 180 ^{o}E but absent from the Mediterranean Sea [2]. YFT is the second largest tuna catch, accounting for 25 % of tuna fisheries in the Indian Ocean [3]. Meanwhile, the global catch of the species, 1.5 million MT, represents 32 % of all tuna fisheries in 2006 [3]. Due to its commercial and economical importance, the overall knowledge of YFT is essential for effective fishery management [4]. Although there have been several studies regarding the biology of YFT such as, life history, migration and fish stocks, there is, so far, little information on parasites of this species [5]. There are a number of publications about diseases and parasites of tuna and tuna-like species [5-8], but none is reported in the Andaman Sea. In this note, we report the parasites of YFT, focusing on parasitic copepods at gill filaments to provide the information on parasites in YFT in the Andaman Sea especially in the Thai waters.

Materials and methods

Yellowfin tunas were caught by pelagic longline fishing gear conducted by ResearchVessel (R.V.), Chulabhorn. The sampling areas were located at a depth between 100 and 450 m in the Exclusive Economic Zone of the Andaman continental shelf in Thai waters (latitude 07° 41.090′ N-09° 25.430′ N; longitude 097° 27.240′ E-097° 57.490′ E) in May 2010. Species identification of tunas were undertaken according to [9,10]. Gills of YFT were removed from both sides and preserved in 10 % buffered

formaldehyde solution. Parasite identification was based on morphological features, according to [6,11-13].

Results and discussion

Four samples of yellowfin tuna were examined for ectoparasites. All samples were infested by the parasitic copepod, *Pseudocycnus appendiculatus* (Syn. *Pseudocycnus spinosus* Pearse, 1952; *Pseudocycnus thynnus* Brandes, 1955). Five males and 4 females of *P. appendiculatus* were found at gill filaments (2 - 3 parasites per individual host) (**Figure 1**). Female samples of *P. appendiculatus* ranged between 9 and 10 mm in total length with 16 to 22 mm of egg string. The abdomen was short, incompletely separated from the genital segment. The lengths of caudal rami were about one-half of the genital segments, fused with the abdomen. Meanwhile, the male samples were between 2.3 and 2.5 mm in total length. The abdomen was longer than it is wide whereas caudal rami were longer than the abdomen. *P. appendiculatus* could be separated from other *Pseudocycnus* species by the third and the fourth thoracic segments that lack projecting lateral processes. The lengths of caudal rami were longer than half of the trunk length and the fourth leg of the male mounted on a long stout base (**Figure 2**).

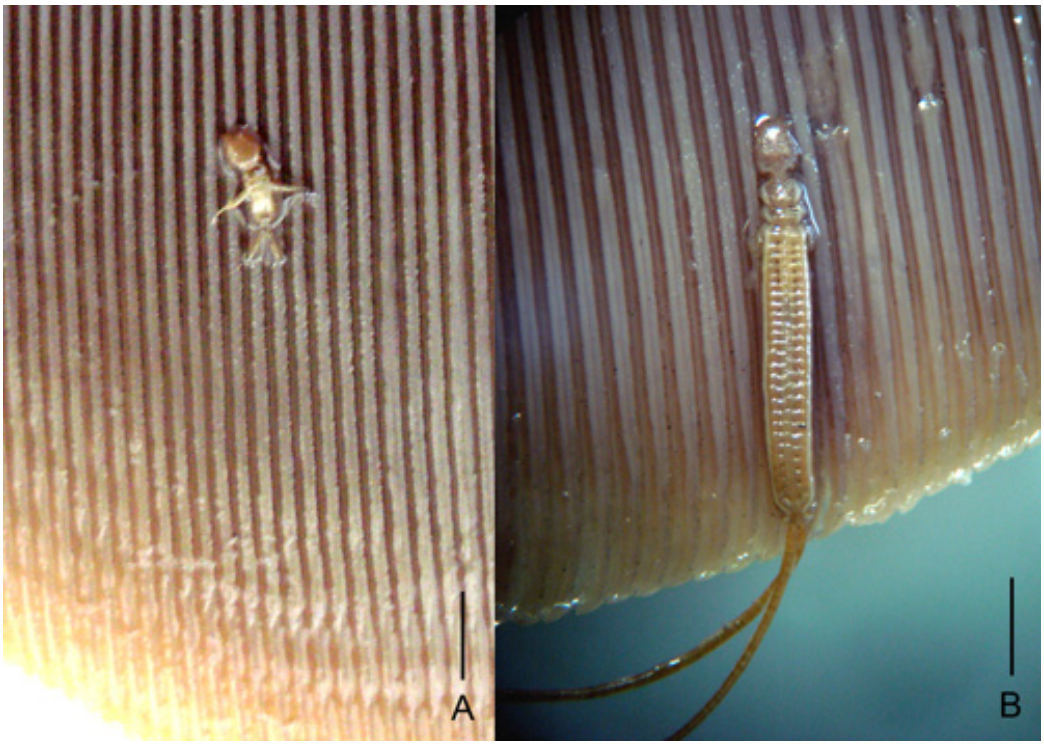

Figure 1 *Pseudocycnus appendiculatus* attached at gill filament of *Thunnus albacares*. A. male (scale bar = 2 mm), B. female (scale bar = 2.5 mm).

Figure 2 *Pseudocycnus appendiculatus*. A.- D. female (A. whole parasite, B. anterior dorsal, C. anterior ventral, D. posterior end at dorsal side showing the genital segment with egg string) E.-F. male (E. dorsal, F. ventral) (A. scale bar = 1.5 mm, B.- D. scale bar = 0.4 mm, E.- F. scale bar = 4 mm) ab = abdomen, cep = cephalothorax, cr = caudal rami, es = egg string, l4 = leg 4, T = thorax, 1an = first antenna, 2an = second antenna, 2TS = second thoracic segment, 3TS = third thoracic segment, 4TS = fourth thoracic segment.

P. appendiculatus attached at the host's gill filament by the second antenna, with a heavily sclerotized claw and maxilliped. The maxilliped consisted of wide basal articulation, narrow basal segment that proximally articulated with the bifid tip claw (**Figure 3**). This species has been recorded as a parasite of many scombrids e.g. *Euthynnus alletteratus*, *Euthynnus yaito*, *Euthynnus affinis*, *Katsuwonus pelamis*, *Sarda sarda*, *Thunnus atlanticus, Thunnus alalunga*, *Thunnus albacares*, *Thunnus maccoyii*, *Thunnus obesus*, *Thunnus thynnus*, *Thunnus tonggol* [5-6,8,12-13]. This parasite is the most common species on scombrids of the tribe Thunnini and to a lesser extent Sardini [6].

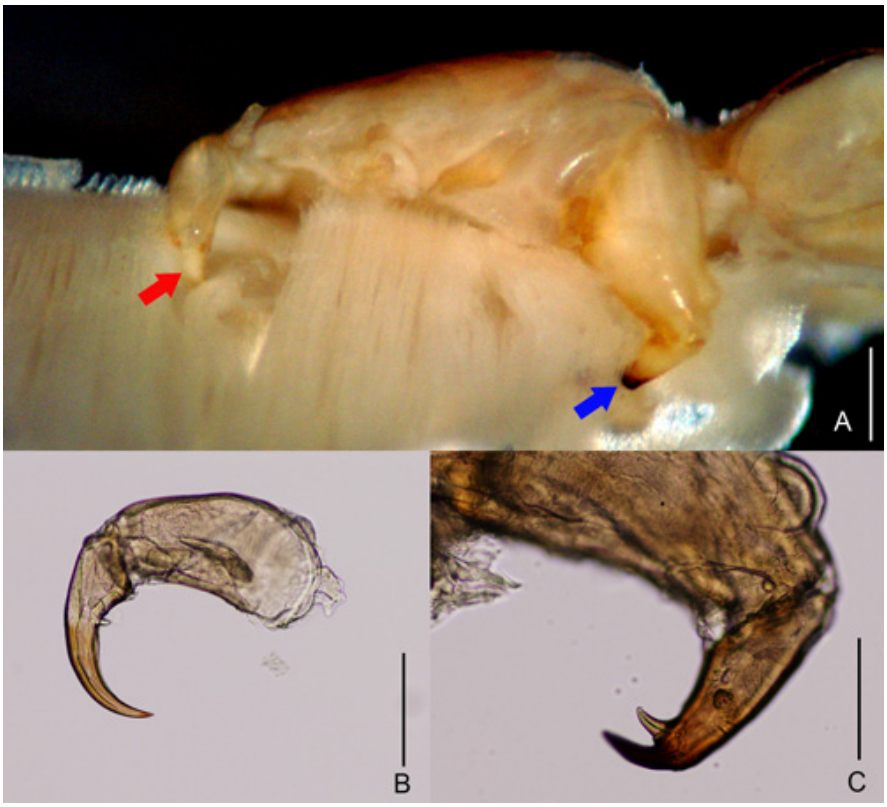

Figure 3 Anterior part of female *Pseudocycnus appendiculatus* attached at gill filament of *Thunnus albacares* by the second antenna (red arrow) and maxilliped (blue arrow) (A.). B. second antenna C. maxilliped. (A. scale bar = 400 µm B.- C. scale bar = 200 µm).

From this study, the total length of female *P. appendiculatus* from the Andaman Sea was similar to the specimens from India with a length of 8 - 10 mm [12]. However, there was a variation in female total length which depends on the local environment [6]. Lewis *et al* also reported that cooler water, results in longer total length, ranging from 11 - 18 mm [14].

P. appendiculatus was distributed around the world in 12 fish hosts as mentioned above. For YFT, the infection incidents of this species were reported in the Western Indian Ocean (Seychelles Island and Somalia), Australia (Queensland), the Philippines, the Southern Pacific Ocean (Caroline Islands), and the South America (Peru) with the exception of the Eastern Indian Ocean (the Andaman Sea) [6]. Hence, this is the first time that *P. appendiculatus* has been recorded as a parasite of YFT in Thai territorial waters of the Andaman Sea.

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