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FIRST RECORD OF *LERNAEOLOPHUS SULTANUS* (Milne-Edwards, 1840) (Copepoda, Pennellidae) FROM THE GREATER WEEVER *TRACHINUS DRACO* (L.)

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ملخص

أول تسجيل لوجود نوع من المجدافيات الطفيلية عند سمك البلم : في هذا البحث سجلنا وجود نوع من المجدافيات الطفيلية يسمى *Lernaeolophus sultanus* (Milne-Edwards, 1840) عند سمك البلم الذي تم اصطياده من سواحل بنزرت في تونس، ويعتبر هذا أول تسجيل لوجود هذا الطفيلي عند سمكة البلم *Trachinus draco*.

ولقد كان رأس الطفيلي منغمسا في رأس السمكة مما تسبب في تلف خطير للأنسجة كما تسبب في تشوهات على مستوى عظام الفك العلوي للسمكة

الكلمات المفتاحية : تونس، سواحل بنزرت ، *Lernaeolophus sultanus* , *Trachinus draco*

RESUME

Première signalisation de *Lernaeolophus sultanus* (Milne-Edwards, 1840) (Copepoda, Pennellidae) chez la grande vive *Trachinus draco* (L.) : Le copépode *Lernaeolophus sultanus* (Milne-Edwards, 1840), membre de la famille des Pennellidae, a été trouvé dans la cavité buccale de la grande vive, *Trachinus draco* (Linnaeus, 1758), provenant de la Baie de Bizerte, Tunisie. Nous signalons pour la première fois la présence de *Lernaeolophus sultanus* chez *T. draco*. La région céphalique du parasite est enfoncée dans la tête du poisson, causant de graves dommages aux tissus de l'hôte et entraînant des déformations des os de la mâchoire supérieure du poisson.

Mots clés : *Lernaeolophus sultanus*, *Trachinus draco*, Baie de Bizerte, Tunisie.

ABSTRACT

Lernaeolophus sultanus (Milne-Edwards, 1840) is reported from *Trachinus draco* (L.), collected in the Bay of Bizerte off Tunisia. The cephalic holdfast of the parasite was embedded in the head of the fish, causing serious damage to the host tissues and resulting in deformities of the bony vault of the mouth. This is the first report of *L. sultanus* from the greater weever.

Keywords: *Lernaeolophus sultanus*, *Trachinus draco*, Bay of Bizerte, Tunisia.

INTRODUCTION

Lernaeolophus sultanus (Milne-Edwards, 1840) is a member of the family Pennellidae that has been recorded from Mediterranean Sea, Atlantic Ocean, Pacific Ocean and Indian Ocean. *Lernaeolophus sultanus* was first found by Von Nordmann (1832) on *Caranx ascensionis* (Cuvier, 1833) and material was placed in the collections of the Museum National d'Histoire Naturelle in Paris. It was subsequently described under the name *Pennela* [sic!] *sultana* by Milne-Edwards (1840), based on von Nordmann's material.

Lernaeolophus sultanus has been reported from about 30 species of marine teleost fish belonging to 13 families (Walter & Boxshall, 2015) including: *Serranus cabrilla* (Linnaeus, 1758), *S. scribe* (L.) and *Maena vulgaris* (Valenciennes, 1830) in the Mediterranean (Brian 1912; Raibaut *et al.* 1998), *Haemulon plumieri* in Florida (Wilson, 1917), *Alutera schoepfi* (Walbaum, 1792) and *Tylosurus marinus* (Walbaum, 1792) in the Woods Hole region (Wilson, 1932), *Rastrelliger kanagarua* (Cuvier, 1816) in Ceylon (Kirtisinghe, 1964), *Lithognathus*

mormyrus (L.) and *Boops boops* (L.) in Spain (Zúñiga & Suau, 1967), Tunisia (Anato *et al.*, 1991; Raibaut *et al.*, 1998) and Algeria (Boualeg *et al.*, 2010), *Acanthocybium solandri* (Cuvier, 1832) in Guinea (Kabata 1968), *Tylosurus acus* (Lacepède, 1803), *Platybelone argalus* (Lesueur, 1821) in Haiti and *Strongylura marina* (Walbaum, 1792) in British Honduras (Cressey & Collette, 1970), *Pagellus erythrinus* (L.) in western Mediterranean (Raibaut & Ktari, 1971; Benmansour & Ben Hassine, 1998; Raibaut *et al.*, 1998; Boualeg *et al.*, 2010), *Pneumatophorus colias* (Gmelin, 1789) in Las Palmas, Spain (Grabda, 1972), *Rachycentron canadum* (L.) in Venezuela (Bashirullah, 1975), *Belone belone* (L.) in Greece (Papoutsoglou, 1976), *Diplodus annularis* (L.) in Greece (Papoutsoglou, 1976) and in western Mediterranean (Raibaut *et al.*, 1998; Boualeg *et al.*, 2010), *Priacanthus hamrur* (Forsskål, 1775) in India (Natarajan & Balakrishnan, 1977), *Chelon labrosus* (Risso, 1827) and *Liza saliens* (Risso, 1810) in western Mediterranean (Raibaut & Ben Hassine, 1977; Raibaut *et al.*, 1998), *Lutjanus campechanus* (Poey, 1860) in the Gulf of Mexico (Suárez-Morales & Ho, 1994), *Diplodus*

puntazzo (Walbaum, 1792) in Montenegro (Radujkovic & Raibaut, 1987, 1989) and in the Mediterranean (Raibaut *et al.*, 1998), *D. vulgaris* (Geoffroy Saint-Hilaire, 1817) in Turkey (Öktener & Trilles, 2004), *Dicentrarchus labrax* (L.) in Spain (Poquet, 1981), *Sparus aurata* (L.) and *Dentex gibbosus* (Rafinesque, 1810) in western Mediterranean (Raibaut *et al.*, 1971; Raibaut *et al.*, 1998; Benmansour & Ben Hassine, 1998), and *Mugil cephalus* (L.), *Spicara maena* (L.), *S. smaris* (L.), *Pseudocaranx dentex* (Bloch & Schneider, 1801) and *Scorpaena scrofa* (L.) in the Mediterranean (Raibaut *et al.*, 1998).

In the present work we report morphological and pathological observations of *Lernaeolophus sultanus* infecting the greater weever *Trachinus draco* (Linnaeus, 1758).

MATERIALS AND METHODS

During the period from January to July 2016, 197 *Trachinus draco* (Linnaeus, 1758) (Trachinidae), ranging from 17 to 34 cm in total length, were caught by trawl and nets in the Bay of Bizerte located in northeastern Tunisia (37°16'60" N, 9°58'0" E). The body surface, eyes, opercula, tongue, buccal cavity

and gills were examined for parasitic copepods. A female copepod was removed from the buccal cavity of one fish and stored in 70% ethanol. The identification and morphometric characteristics were performed according to Kabata (1979). All measurements are given in millimeters.

RESULTS

In July 2016, one adult female of *Lernaeolophus sultanus* was isolated from a greater weever, 22.3 cm in total length and 39 g in weight. The parasite was attached to the buccal cavity of the host fish (Fig. 1). The trunk with its abdominal processes protruded out through the fish's mouth, while the cephalic holdfast was deeply embedded in the head tissues of the fish (Fig. 2). The visible trunk of the embedded female (Fig. 3) comprised a 10 mm long tubular neck linking the cephalic holdfast, about 2 mm in length, to the flexed 7 mm trunk bearing 6 mm long abdominal processes.

The cephalic holdfast of the copepod with its branched processes (cephalic horns) penetrates the head of the fish, resulting in the erosion and perforation of tissues (Fig. 2), and in deformities of the bony vault of the mouth (Fig. 4).



Figure 1: *Lernaeolophus sultanus* (arrow) attached to the mouth bony vault of *Trachinus draco* (Bar: 2 cm).

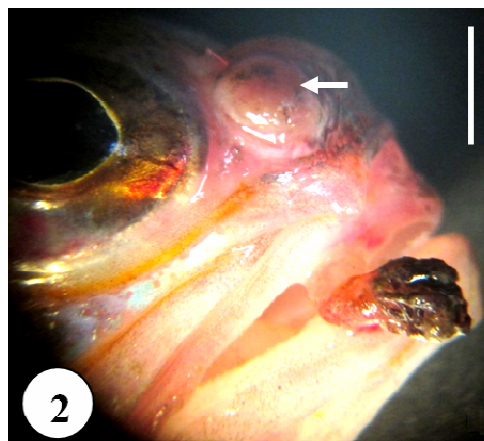


Figure 2: Pathological damage (arrow) caused by the penetration of the cephalic holdfast of *L. sultanus* into the skull of *Trachinus draco* (Bar: 5 mm).

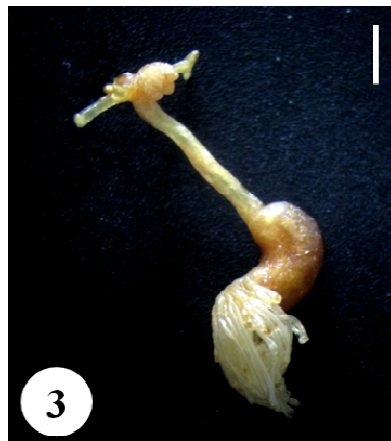


Figure 3: Photograph of the studied *Lernaolophus sultanus* female (Bar: 5 mm).



Figure 4: Deformities caused by the presence of *Lernaolophus sultanus* in the bony vault of the mouth. (a) Normal bone (left) and deformed bone (right), (b) deformation in the bone (arrow) (Bar: 5 mm).

In addition, the microhabitat of the anchored parasite in the buccal cavity and the pathological deformities may have impacted the growth of the host individual. We noted a decrease in the weight of the parasitized fish compared to uninfected fish of the same size (total length). Thus, the weight of fish infected by *L. sultanus* was 39 g while the weight of uninfected fish (n = 62) ranged between 75 and 134 g.

DISCUSSION

Lernaolophus sultanus has specific sites of attachment on the host fish, including the eye-sockets, the buccal cavity, the bony vault of the mouth, the tongue and the opercula. The damage caused by the penetration of the parasitic copepod is often associated with reduced growth. The penetration of *L. sultanus* into the eye-socket and the nasal cavity of *Pneumatophorus colias* (Gmelin, 1788) induced several pathological changes (Grabda, 1972). While in *Pagellus erythrinus* (Raibaut & Ktari, 1971), *Boops boops* and *Pagellus acarne*, the bony mouth vault was seriously damaged by the embedded holdfast of the parasite (Ramdane *et al.*, 2009).

Studies regarding the impact of *L. sultanus* on the health of host fish are scarce. Growth retardation has been reported for sharp snout sea bream *Diplodus puntazzo* in coastal marine fish farms in Greece (Varvarigos, 2007), and significant mortality (about 10.5%) of *Pagellus erythrinus* in the Gulf of Tunis, was caused by *L. sultanus* (Raibaut & Ktari, 1971).

The presence of *L. sultanus* in farmed fish in Greece (Varvarigos, 2007), suggested the possibility of its transfer from wild fish to farmed fish. In which case the farms might amplify the infection further and spread this parasite. Therefore, the presence of mature parasites in farmed fish poses a potential threat to marine aquaculture in Greece and in other countries. We recommend close monitoring of farmed fish for the presence of such parasites and the development of practical approaches for their control.

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