

## Two new hosts for *Caligus bonito* Wilson C.B., 1905 (Copepoda, Siphonostomatoida, Caligidae) from Turkey

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**Abstract.** Öktener A, Alaş A, Türker D. 2017. Two new hosts for *Caligus bonito* Wilson C.B., 1905 (Copepoda, Siphonostomatoida, Caligidae) from Turkey. *Bonorowo Wetlands* 7: 1-3. *Caligus bonito* Wilson C.B., 1905 (Copepoda, Siphonostomatoida, Caligidae) was reported for the first time on the gill filaments of *Sarda sarda* (Bloch, 1793), *Auxis rochei* (Risso, 1810) from Turkish marine waters. The morphological characters of this cosmopolitan parasitic copepod are given using photographs. This study presents two new host species and a new geographic distribution of *Caligus bonito* in Turkey.

**Keywords:** Copepod, *Caligus bonito*, *Sarda*, *Auxis*, Turkey

### INTRODUCTION

Copepods of the family Caligidae (Siphonostomatoida) are commonly known as sea lice among the fish culturists. It is the largest family of marine copepods comprising over 450 species. The members of this family are characteristic in possessing a flattened body, which is well adapted for life on a moving object - the fish. They feed on their host's blood, mucus, and epithelial cells (Ho 2004). This family has been responsible for most documented disease outbreaks (Johnson et al., 2004).

Hitherto, only ten species of the Caligidae family have been recorded parasitizing fishes in Turkish marine habitats. They are *Caligus apodus* (Brian 1924), *Caligus bonito* Wilson C.B., 1905, *Caligus brevicaudatus* Scott, 1901, *Caligus lagocephali* Pillai, 1961, *Caligus minimus* Otto, 1821, *Caligus pageti* Russel, 1925, *Caligus pelamydis* Krøyer, 1863, *Caligus solea* Demirkale, Özak, Yanar, Boxshall, 2014, *Caligus temnodontis* Brian, 1924, and *Lepeophtheirus europaensis* Zeddarn, Berrebi, Renaud, Raibaut, Gabrion, 1988 (Alaş et al. 2016). In this paper, we present a second report of the male of *Caligus bonito* Wilson C.B., 1905, with morphological characters from Turkey.

### MATERIAL AND METHODS

Thirty-three of Atlantic bonito, *Sarda sarda* (Bloch, 1793) (Scombridae) and forty-two of bullet tuna, *Auxis rochei* (Risso, 1810) (Scombridae) were collected by local gears from the Sea of Marmara, the Aegean Sea Coasts of Turkey) in 2014. The collected parasitic copepods were preserved in 70% ethanol. Some specimens were cleared in lactic acid before dissection of the appendages of

copepods. The drawings of appendages were carried with the aid of camera lucida (Olympus BH-DA). The photos were taken with Canon EOS 1100D connected to a microscope. Measurements were taken in millimeters (mm) with a micrometric program (Pro-way). The scientific names and synonyms of parasite and host were checked with WoRMS Editorial Board (2016) and Froese and Pauly (2016). The identification, scientific names, their synonyms of the parasite were checked with Wilson (1905), Brian (1935), Kabata (1979), Cressey and Cressey (1980), Cressey (1991), Ho and Lin (2004). The parasite (MNHN-IU-2013-18732) was deposited in the Museum National d'Histoire Naturelle (MNHN), Paris, France.

### RESULTS AND DISCUSSION

#### *Caligus bonito* Wilson, 1905 (Copepoda, Siphonostomatoida, Caligidae)

**Host:** *Sarda sarda*, *Auxis rochei*

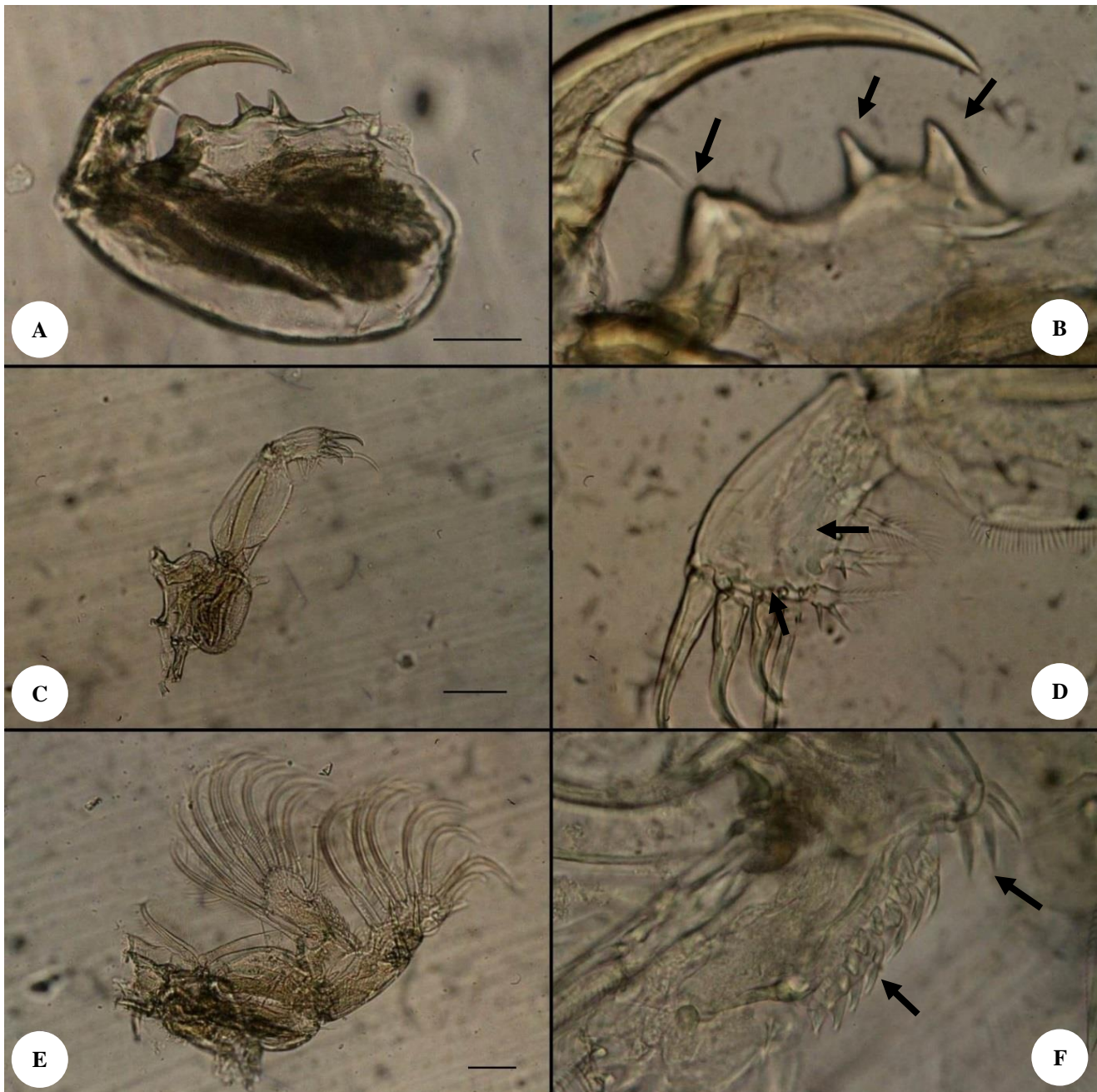
**Locality:** Bandırma Bay, Babakale Port

**Total parasite:** 5 males; **Dissected material:** 2 males

All parasites were firmly attached to the gill filaments of the host. The prevalence of parasite was 6% for *Sarda sarda* and 7.1% for *Auxis rochei*

**Male morphology** (Figure 1-2): Body length varies from 4.5 to 5 mm. Maxilliped 3-segmented; proximal segment with ornamentation has four small tubercles, a distal segment comprising claw with a short seta. The setae on the exopod of the first leg carry teeth. The first segment of the second leg endopod carries four teeth, while the second segment with teeth in two slightly alternating rows.

**Distribution:** *Caligus bonito* was cosmopolitan, found in all waters inhabited by its wide-ranging hosts. It was reported from the Mediterranean Sea, the Black Sea, The Atlantic Ocean, the Pacific Ocean (Kabata 1979).



**Figure 1.** *Caligus bonito* ♂. A. Maxilliped (Bar = 0.075 mm), B. Four small tubercles on proximal segment of maxilliped, C. First leg (Bar = 0.10 mm), D. Setae on exopod of the first leg, E. Second leg (Bar = 0.08 mm), F. Four teeth and teeth in two slightly alternating rows on the first and second segment of second leg endopod

**Hosts:** *Caligus bonito* parasitizes several teleost species belonging to the family Scombridae, such as *Euthynnus affinis*, *Euthynnus alletteratus*, *Katsuwonus pelamis*, *Sarda sarda*, *Sarda orientalis*, *Sarda australis*, *Sarda chilensis chilensis*, *Scomberomorus regalis*, *Thunnus thynnus*, *Euthynnus lineatus*, *Gymnosardaunicolor* (Walter and Boxshall 2008), *Scomberomorus carvalla*, *Scomberomorus maculatus* (Bere 1936). However, it has been collected on hosts from other families (Mugilidae, Carangidae,

Lutjanidae, Sciaenidae, Pomatomidae, Serranidae, Coryphaenidae), including *Mugil cephalus*, *Oligoplites saurus*, *Lutjanus griseus*, *Pomatomus saltatrix* (Bere 1936), *Mugil platanus* (Knoff et al. 1994), *Mugil curema* (Cavalcanti et al. 2006), *Oligoplites palometa* (Takemoto and Luque 2002), *Cynoscion nebulosus* (Blanchet et al. 2001), *Cratinus agassizii*, *Lutjanus novemfasciatus*, *Trachurus murphyi* (Ho and Lin 2004), and *Coryphaena hippurus* (Ho and Lin 2004; Ökten and Trilles 2009).



**Figure 2.** *Caligus bonito* ♂ (Bar = 1 mm)

## Discussion

Significantly, the Scombridae family fishes are the host of *Caligus bonito*. This parasite selects carnivorous and pelagic fishes as hosts for habitat and feeding habits. This study examined *Sarda sarda* ve *Auxis rochei*, carnivorous and pelagic fish. It is fit for host preferring of *Caligus bonito*.

Concerning the studies about the prevalence values of *Caligus bonito*, Takemoto and Luque (2002) found 3.57% prevalence on *Oligoplites palometa*; Knoff et al. (1994) found 13.33% prevalence on *Mugil platanus*; Cavalcanti et al. (2011), 3.23% prevalence on *Mugil curema*. The low prevalence values on *Sarda sarda* (6%) and *Auxis rochei* (7.1%) show the similarity with Takemoto and Luque (2002), Cavalcanti et al. (2011). Both differences in the infestation values and morphology of the parasite can result from the parasite-host interactions and host species that have migratory character.

The morphological characters found in this study are compared with mainly (Wilson 1905; Brian 1935; Lewis 1967; Pillai 1969; Kabata 1979; Cressey and Cressey 1980; Cressey 1991; Ho and Lin, 2004). The general morphology, three adhesion pads on the antenna, teeth on three setae of exopod of the first leg, four teeth and teeth in

two slightly alternating rows on the first and second segment of second leg endopod, maxilliped proximal segment with four small tubercles, the setal and spinal formula of from the first leg to the fourth leg in this study are compatible according to this literature. The morphologic features of all dissected parasites permitted identification of this copepod as *Caligus bonito* Wilson, 1905. This study was aimed to present two new host species and a new geographic distribution of *Caligus bonito* in Turkey.

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