

Parasitic Isopods of Bogue [*Boops boops* (Linnaeus, 1758)] from the Antalya Gulf (Turkey)

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Summary

The sampling studies were carried out to determine parasitic isopod species of *Boops boops* (Linnaeus, 1758) from Antalya Gulf between September 2006 - May 2007. At the end of study five parasitic isopod species [*Ceratothoa parallela* (Otto, 1828), *Ceratothoa oestroides* (Risso, 1826), *Ceratothoa capri* (Trilles, 1964), *Anilocra frontalis* Milne-Edwards, 1840 and *Anilocra physodes* (Linnaeus, 1758)] were recorded. Two (*C. parallela* and *C. capri*) of these species were new records for the Isopoda fauna at the Mediterranean coast of Turkey. Prevalance and intensity of infection have been obtained.

Keywords: *Cymothoidae*, Bogue, *Boops boops*, Mediterranean, Turkey

Antalya Körfezi'nde (Türkiye) Kupesin [*Boops boops* (Linnaeus, 1758)] Parazitik İso podları

Özet

Antalya Körfezi'nde *Boops boops* (Linnaeus, 1758) türünün parazit isopod türlerini tespit edebilmek için Eylül 2006- Mayıs 2007 tarihlerinde örnekleme çalışmaları düzenlenmiştir. Çalışma sonucunda 5 parazitik isopod türü [*Ceratothoa parallela* (Otto, 1828), *Ceratothoa oestroides* (Risso, 1826), *Ceratothoa capri* (Trilles, 1964), *Anilocra frontalis* Milne-Edwards, 1840 ve *Anilocra physodes* (Linnaeus, 1758)] tespit edilmiş, bunlardan ikisinin (*C. parallela* ve *C. capri*) Türkiye'nin Akdeniz Kıyıları için yeni kayıt oldukları belirlenmiştir. Enfeksiyonun yoğunluğu ve prevalansı tespit edilmiştir.

Anahtar sözcükler: *Cymothoidae*, Kupes, *Boops boops*, Akdeniz, Türkiye

INTRODUCTION

Cymothoids (Crustacea, Isopoda) are ectoparasites of marine and freshwater teleost fishes ¹. Cymothoids are blood-feeding; several species settle in the buccal cavity of fish, others live in the gill chamber or on the body surface including the fins ². They parasitize numerous marine species of commercial importance, including members of the families Mugilidae, Atherinidae, Serranidae, Carangidae, Sciaenidae, Embiotocidae, Bothidae, Clupeidae, Pleuronectidae, Scombridae and Haemulidae ³.

The Cymothoid fauna of the coast of Turkey is still poorly known. Previous studies suggest the presence of a

significant number of species in the region ^{4,17}.

Interactions of bogue [*Boops boops* (Linnaeus, 1758)] with parasitic isopods is little studied. Bogue were known to be host of 6 parasitic isopod species [*Ceratothoa oestroides* (Risso, 1826), *Ceratothoa capri* (Trilles, 1964), *Emetha audouini* (Milne-Edwards, 1840) ⁹; *Anilocra physodes* (Linnaeus, 1758), *Ceratothoa parallela* (Otto, 1828) ^{7,8}; *Anilocra frontalis* Milne-Edwards, 1840 ¹⁷].

The aim of the study is to determine of parasitic isopods of bogue from Antalya Gulf (Turkey). Prevalance and intensity of infection have been obtained and compared with other studies.



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MATERIAL and METHODS

This study was conducted to determine parasitic isopods species of Bogue [*Boops boops* (Linnaeus, 1758)] from Antalya Gulf (Turkey) coasts between September 2006 - May 2007.

Two stations (Name of stations: 1- Kundu; 2- Manavgat) were selected and samplings were carried out by trawling nets. The two stations surveyed were located 4 to 7 km off the coast, at depths ranging from 40 to 80 m. The specimens of *B. boops* were examined for the presence of parasitic isopods immediately after being taken from the sea. After removal from the host, parasitic isopods were immediately fixed in 70% ethanol and placed in a labelled tube for later study. Species of isopod was determined in the laboratory using a dissecting microscope according to studies ^{9,18,19}. Species of Ceratothoa were photographed with a Olympus C 5050. They are now deposited at the Ege University Fisheries Laboratory. Prevalence (percent of hosts infected) and intensity (number of parasites per infected host) were calculated in the field.

RESULTS

Out of 272 individuals (27 immature, 110 males and 135 females) of bogue were caught with trawling nets and 26 (9.56%) individuals were infested with parasitic isopods.

Individuals of bogue, caught from Antalya Gulf, were found to be parasitized by five species of Cymothoid isopods; *C. oestroides*, *C. parallela*, *C. capri*, *A. frontalis* and *A. physodes*. Three Ceratothoa species were found in the buccal cavity of host specimens. *A. frontalis* and *A. physodes* were collected from body surface of *B. boops*.

The two *Anilocra* were distinguished using two criteria: 1) The anterior end of the head is truncated in *A. physodes* and rounded in *A. frontalis*, 2) Endopodits of uropods slightly surpass the distal part of the pleotelson in *A. physodes* but distinctly surpass in *A. frontalis*. The three Ceratothoa were distinguished using this criteria: posterior edge of the pleotelson is slightly pointed in *C. parallela*, angled in *C. capri* and rounded in *C. oestroides*. Dorsal and ventral view of *C. capri* and *C. parallela* are given in *Fig. 1a, 1b, 2a, 2b*.



Fig 1. a and b: Dorsal and ventral view of *C. capri*

Şekil 1. a ve b: *C. capri*'nin dorsal ve ventral görünümü



Fig 2. a and b: Dorsal and ventral view of *C. parallela*

Şekil 2. a ve b: *C. parallela*'nin dorsal ve ventral görünümü

Table 1. Prevalence and intensity of parasite species**Tablo 1.** Parazit türlerin yoğunluğu ve prevalansı

Species	N	N'	% Pr.	Total parasites (Int.)	Sex of speciemens	
					Female	Male
<i>Ceratothoa parallela</i>	272	8	2.94	10 (1.25)	3	7
<i>Ceratothoa oestroides</i>		12	4.41	12 (1)	4	8
<i>Ceratothoa capri</i>		5	1.84	8 (1.6)	4	4
<i>Anilocra frontalis</i>		3	1.10	3(1)	2	1
<i>Anilocra physodes</i>		1	0.37	2(2)	1	1
Total	272	26*	9.56	35 (1.35)	-	-

N: Total fish individuals, **N':** Infected fish individuals, **Pr:** Prevalence (percent of hosts infested), **Int:** Intensity (number of parasites per infested host). * Total of infected individuals are 26, Single isopods occurrences were recorded in 17 of the 26 parasitized fishes, multiple infestations were found in the remaining 9 fishes

Prevalence and intensity of parasite species are given in [Table 1](#).

Prevalence of Isopoda species ranged from 0.37% to 4.41%. *C. oestroides* was the most prevalent parasite species. Out of 272 potential hosts, 12 (4.41%) were infected with *C. oestroides*.

A total of 35 isopods was obtained from the 26 parasitized *B. boops*. Mean intensity of parasitic isopods was recorded 1.35 and with a range that varied from 1 to 2 isopods per host. Single isopods occurrences were recorded in 17 (65.38%) of the 26 parasitized fishes, whereas multiple infestations were found in the remaining 9 (34.62%) fishes.

DISCUSSION

In this study, five Cymothoid species were observed in *Boops boops* (Linnaeus, 1758) from Antalya Gulf (Turkey). These isopod species are not host specific and were described from a number of hosts worldwide ^{2,12,16,20,21}. The distribution of parasitic isopods is closely related to the occurrence and ecology of their hosts. Three (*C. oestroides*, *A. physodes* and *A. frontalis*) out of five Cymothoid species have previously been recorded from Mediterranean Coast of Turkey. Although *C. parallela* was reported from Marmara and Aegean Coasts of Turkey, *C. capri* was reported only from Aegean Coast of Turkey ^{10,16}. This is the first record of the *C. parallela* and *C. capri* for the Mediterranean coast of Turkey.

The difference in the prevalence and intensity of five species in *B. boops* may depend on variability of life history of parasite species and host resistance. The occurrence of Cymothoids in natural populations is patchy and levels of prevalence are extremely variable ^{3,22}. The infection prevalence (Pr) of *Ceratothoa* species in previous studies of host populations was as follows: *C. oestroides* for *B. boops*, Pr = 12.82% and for *Spicara smaris*, Pr = 10.43%

from Northern Adriatic ¹⁹; for *B. boops*, Pr = 7.9%, for *Spicara smaris*, Pr = 12%, for *Pagellus acarne*, Pr = 4.54% and for *Trachurus trachurus*, Pr = 0.92% from Gulf of Bejaia ²; for *Pomatomus saltatrix*, Pr = 25% from Aegean Sea ¹². *C. parallela* for *B. boops*, Pr = 8.60 %, for *Spicara smaris*, Pr = 4%, for *Trachurus trachurus*, Pr = 2.75 % from Gulf of Bejaia ². The infection prevalence of *Ceratothoa* species of *B. boops* in present study is lower than previous studies. Prevalence of infection is variable and depends on size, sex, age, host condition and other environmental factors ²³.

Marine fish parasitology is a rapidly developing field of aquatic science. Parasitic isopods are fairly common Crustacean infestations of wild marine fish species of Turkey ¹⁰. This study revealed for the first time the presence of two *Ceratothoa* species from Mediterranean Coast of Turkey. Out of 272 potential hosts, 8 (2.94%) were infected with *C. parallela* and 5 (1.84%) were infected with *C. capri*. Further studies are desirable on the biology of these parasites in a wide spectrum of potential hosts.

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