

SHORT COMMUNICATION

Occurrence of trypanorhynch cestod in blackmouth catshark, *Galeus melastomus* Rafinesque, 1810 (Scyliorhinidae) from the Gulf of Antalya, Turkey

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Abstract

Blackmouth catshark *Galeus melastomus* samples were collected using trawl operations from the deep sea area of the Gulf of Antalya, Turkey, in September and October 2016. The present study aims to clarify the status (prevalence and mean intensity) of endo-parasite infection in blackmouth catshark. All parasite specimens were identified as *Grillotia* sp. Guiart, 1927 (Grillotidae), Trypanorhyncha cestoda. Total length and weight of uninfected fish (Nui=33) was 30.95 ± 2.06 cm was 26.86 ± 7.56 g, respectively. Total length and weight of infected fish (Ni=7) was 43.63 ± 6.60 cm, 266.22 ± 130.36 g, respectively. Total number of isolated parasite was 363, prevalence 21.67 ± 11.79% and mean intensity 58.50±20.51. This is the first documented report on the occurrence of *Grillotia* sp. in blackmouth catshark caught in the Gulf of Antalya, Turkey.

Keywords: Parasites, blackmouth catshark, *Galeus melastomus*, Antalya, Turkey

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Marine species diversity in the Mediterranean has increased with the effect of the shipping and transport activities of ornamental fish sector, global warming and also by the migration of non-native species from the Atlantic and Indo-pacific (Bianchi and Morri 2000; Bianchi 2007; Lejeusne *et al.* 2010). Parasitism, one of symbiotic relationships, can be described as a mode of life of live organisms requiring hosts to survive and reproduce. Parasites damage the tissues on their

site of infection, cause stress, weaken their hosts and may lead secondary bacterial infections. It is also important to know parasite-host relationships in order to understand predator-prey relationships within the food chain because most predators look for easy targets such as sick and weak fish as prey. In marine ecosystem sharks are generally evaluated as the group of apex predators, which means the last (type) host for parasites.

We have extensive information on the natural parasite fauna of many sharks that are easily caught during commercial fishing activities (Gilman *et al.* 2008). However, there are a limited number of studies on deep-sea forms such as *Galeus melastomus* Rafinesque 1810, a member of the Scyliorhinidae family. *G. melastomus* is known as a deep sea fish approximately in the depths of 100-1000 m. The deep sea environment is suitable for preying on some deep sea taxa such as Foraminifera, Hydrozoa, Polychaeta, Copepoda, Ostracoda, Isopoda, Amphipoda, Mysidacea, Cumacea, Euphausiacea, Decapoda, Crustacea, Bivalvia, Gastropoda, Cephalopoda, Brachiopoda, and also some fish species as seen in the diet of *G. melastomus* (Carrassón *et al.* 1997). This rich diversity in diet can naturally increase the risk of parasitism in *G. melastomus* as a predator. The examination for the presence of parasites, especially from the predatory fish and/or end-consumer sharks, is described as a valuable knowledge to understand host-parasite relationship and other effects in ecosystem (Wood and Lafferty 2015). Therefore, in the present study, we aimed to clarify the status (prevalence and mean intensity) of endo-parasite infection in blackmouth catshark, *Galeus melastomus* from the Gulf of Antalya, Turkey.

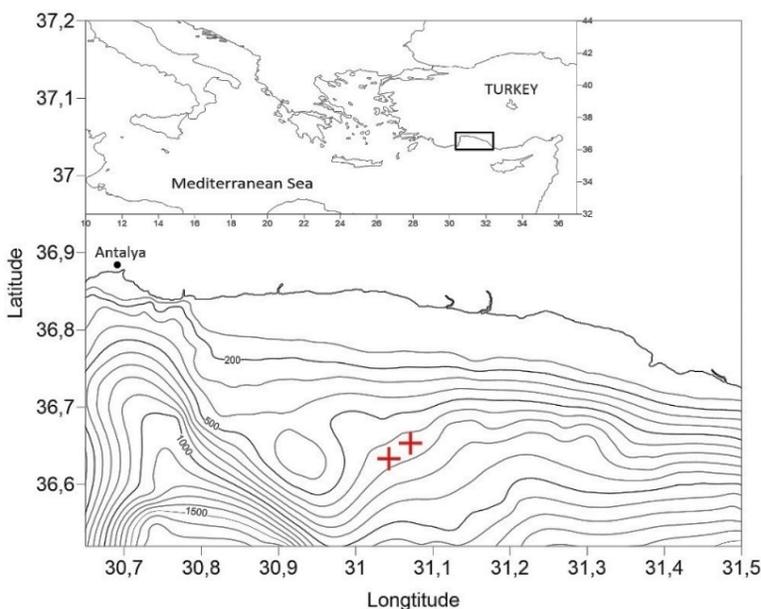


Figure 1. Sampling area (trawl operation depths ranging 610-640 m)

A total of 40 specimens of blackmouth catshark, *Galeus melastomus* were collected by bottom trawling during 2016 from the deep sea area of the Gulf of Antalya, Turkey. The first trawl operation was carried out on 26 September 2016 at the depths ranging 610-640 m for one hour. The location was 36°41'190"N-31°12'920"E/36°41'360"N-31°09'900"E. After the first operation 30 blackmouth catsharks were examined (Figure 1). The second operation date was carried out on 26 October 2016 at the depths ranging 610-640 m for one hour in same coordinates. After the second operation 10 blackmouth catsharks were examined.

All fish were labelled and kept in plastic bags for parasitological investigation. Endo-parasitological examinations, evaluation and identification were conducted using standard techniques. Ecological terms used for parasite status followed Bush *et al.* (1997). Prevalence (P%) was calculated as the proportion of hosts in each sample infected by a given parasite and mean intensity (MI) as the total number of parasite found in a host fish. All parasite samples were rapidly removed and stored in a 70% ethanol and lactofenol solution. Parasitic trypanorhynch cestode larvae were removed from hypaxial muscle tissue near the gastrointestinal wall (posterior part of the cloak between the ventral part of the caudal fin near the musculus ventralis lateralis) of the host fish.

As a result of the parasitological examination, on September 26, 2016, four out of 30 fish sampled in the first operation and three out of ten fish sampled in the second operation were found to be infected with parasites. In total, seven out of 40 examined fish were recorded as infected. The length and weight of infected fish and uninfected fish are presented in Table 1. It is speculated that fish with a large total size are found to have parasites.

After morphological examination all parasite specimens were identified as *Grillotia* sp. Guiart, 1927 (Superfamily: Obothridea; Family: Grillotidae Dolfus, 1969), belonging to Trypanorhyncha Diesing, 1863 order (Figure 2). According to the identification keys to the cestode parasites of vertebrates (Champel and Beveridge 1994; Palm 2004); some diagnostic specifications were found, such as the elongate scolex, two bothridia, inclined apically, sessile, patelliform or cordiform, margins free, and rims thickened features. The plerocercoid stages of this type of cestodes are commonly found in teleost fishes, however, the adults occur in chondrichthyes. *Grillotia* sp. is known as a fish parasite from various localities including the Atlantic, Mediterranean, Pacific and Australian waters (Champel and Beveridge 1994; Palm 2004; Dallarés *et al.* 2017a, b).



Figure 2. Lateral view of the scolex with two bothridia of *Grillotia* sp.

Table 1. The information of *Galeus melastomus* with and without trypanorhynch cestod infection

Sampling date	N	TL (cm)	W (g)	Nui	TLui (cm)	Wui (g)	Ni	TLi (cm)	Wi (g)	Nc	P%	MI
26 Sept. 2016	30	32.65 ±5.01	142.64 ±62.57	26	31.12 ±2.22	125.95 ±8.05	4	42.6 ±7.0	251.11 ±138.53	231	13.33	73
26 Oct. 2016	10	34.71 ±7.94	177.08 ±101.96	7	30.30 ±1.25	130.24 ±4.24	3	45.0 ±7.21	286.37 ±145.36	132	30.00	44
TOTAL	40	33.17 ±5.83	151.25 ±74.42	33	30.95 ±2.06	26.86 ±7.56	7	43.63 ±6.60	266.22 ±130.36	363	21.67 ±11.79	58.50 ±20.51

Number of fish (N), total length (TL), weight (W), number of uninfected fish (Nui), total length of uninfected fish (TLui), weight uninfected fish (Wui), number of infected fish (Ni), total length of infected fish (TLi), weight infected fish (Wi), total number of cestode (Nc), prevalence ($[Nc/N] \times 100 = P\%$), mean intensity (MI)

This parasite species is reported from the Mediterranean waters by different researchers especially from the northwestern Mediterranean Sea (Champel and Beveridge 1994; Genc *et al.* 2005; Keser *et al.* 2007; Özer *et al.* 2014; Dallarés 2016, Dallarés *et al.* 2017a, b). There is no report, however, on cestode infection in blackmouth catshark in the Turkish waters. Thus, this is the first documented report on the occurrence of *Grillotia* sp. in the blackmouth catshark caught in the Gulf of Antalya, Turkey.

Antalya Körfezi (Türkiye)'nden avlanan siyah ağızlı kedi-köpek balığında, *Galeus melastomus* Rafinesque, 1810 (Scyliorhinidae) trypanorhynch sestot varlığı

Öz

Antalya Körfezi'nin derin su bölgesinden Eylül ve Ekim 2016 tarihlerinde trol operasyonu ile siyah ağızlı kedi-köpek balığı (*Galeus melastomus*) örnekleri elde edilmiştir. Bu çalışmada siyah ağızlı kedi-köpek balığında endoparazit varlığının (bulunma oranı ve

ortalama yoğunluk) belirlenmesi amaçlanmıştır. Parazitolojik incelemede izole edilen sestot Trypanorhyncha takımından *Grillotia* sp. Guiart, 1927 (Grillotidae) olarak tanımlanmıştır. İncelenen parazitsiz balık sayısı (Nui) 33 olup bu balıkların toplam boyu $30,95 \pm 2,06$ cm ve canlı ağırlıkları ise $26,86 \pm 7,56$ g olarak belirlenmiştir. Yedi balıkta (Ni: 7) parazit bulunmuştur. Parazit ile enfekte olmuş bu balıkların toplam boyu $43,63 \pm 6,60$ cm ve canlı ağırlıkları $266,22 \pm 130,36$ g olarak ölçülmüştür. İzole edilen toplam parazit sayısı (Nc) 363, parazit bulunma oranı (P) $\%21,67 \pm 11,79$ ve ortalama parazit yoğunluğu (MI) $58,50 \pm 20,51$ olarak hesaplanmıştır. Bu çalışma Antalya Körfezi'nden avlanan siyah ağızlı kedi-köpek balığında *Grillotia* sp. varlığını rapor eden ilk döküman niteliğindedir.

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