

## Journal of the Hellenic Veterinary Medical Society

Vol 71, No 3 (2020)



### First occurrences of *Nerocila bivittata* on Dusky Grouper (*Ephinephelus marginatus*) and Mottled Grouper (*Mycteroperca rubra*)

S.Y. ÇELİK, J. KORUN, M. GÖKOĞLU

doi: [10.12681/jhvms.25077](https://doi.org/10.12681/jhvms.25077)

Copyright © 2020, S.Y. ÇELİK, J. KORUN, M. GÖKOĞLU



This work is licensed under a [Creative Commons Attribution-NonCommercial 4.0](https://creativecommons.org/licenses/by-nc/4.0/).

### To cite this article:

ÇELİK, S., KORUN, J., & GÖKOĞLU, M. (2020). First occurrences of *Nerocila bivittata* on Dusky Grouper (*Ephinephelus marginatus*) and Mottled Grouper (*Mycteroperca rubra*). *Journal of the Hellenic Veterinary Medical Society*, 71(3), 2309–2314. <https://doi.org/10.12681/jhvms.25077>

## First occurrences of *Nerocila bivittata* on Dusky Grouper (*Ephinephelus marginatus*) and Mottled Grouper (*Mycteroperca rubra*)

S. Y. Çelik<sup>1</sup>, J. Korun<sup>1\*</sup>, M. Gökoğlu<sup>2</sup>

<sup>1</sup>Akdeniz University, Faculty of Fisheries, Aquaculture Division, Department of Fish Diseases, Antalya, Turkey, 07058

<sup>2</sup>Akdeniz University, Faculty of Fisheries, Aquaculture Division, Department of Aquaculture, Antalya, Turkey, 07058

**ABSTRACT:** The parasitic Isopod *Nerocila bivittata* was collected from caudal fins and body surface of dusky grouper (*Ephinephelus marginatus*) and mottled grouper (*Mycteroperca rubra*) captured by commercial trawl vessels as non-target species from Antalya Bay which is located in the eastern Mediterranean coast of Turkey. The parasites caused typically hemorrhages on caudal fins of both hosts. The parasitic isopod was identified as *Nerocila bivittata* which has not been reported from groupers in the worldwide. The study represents new hosts and geographical records.

**Keywords:** *Nerocila bivittata*, Isopoda, *Ephinephelus marginatus*, *Mycteroperca rubra*

*Corresponding Author:*

J. Korun, Akdeniz University, Faculty of Fisheries, Aquaculture Division, Department of Fish Diseases, Antalya, Turkey  
E-mail address: jalekorun@akdeniz.edu.tr

*Date of initial submission:* 27-09-2020

*Date of revised submission:*

*Date of acceptance:* 20-02-2020

## INTRODUCTION

The dusky grouper (*Epinephelus marginatus*) and mottled grouper (*Mycteroperca rubra*) which is the most important littoral fish species (Maggio et al., 2006) are greatly distributed worldwide from the eastern Atlantic Ocean to the Mediterranean Sea (Bouchereau et al., 1999). Groupers, members of the genus *Epinephelus*, are mostly tropical fish species. Distributions of them in subtropical and temperate waters are limited (Dulcic et al., 2006). *E. marginatus* is one of the seven species of groupers which were recorded in the Mediterranean Sea (Harmelin and Vivien-Harmelin, 1999). The mottled grouper, *M. rubra* prefers the shallow rocky habitats and occurs at depths less than 40 metres in the eastern Mediterranean Sea (Aranov and Goren, 2008). The members of Epinephelinae subfamily are more popular than the other fish species in the world-wide due to their commercial importance (Genç et al., 2005). Also, groupers play an important role in the ecological stability of marine ecosystems (La Mesa et al., 2006). For these reasons, many researches carried out studies on ecology (Hackradt, 2012), distribution (Mahé et al., 2012), growth (Bouchereau et al., 1999) reproduction (Andrade et al., 2003, Glamuzina et al., 1998), genetic (Maggio et al., 2006), larval evolution (Cunha et al., 2009), breeding (Marino et al., 2001) and diseases included bacterial, viral and parasitic infections (Eissa et al., 2011; Moravec and Justine, 2008; Katharios et al., 2004) of them.

Parasitic diseases are among the major problems in the aquaculture and hunting of food fish species. About 25% of parasitic agents include crustaceans such as copepod, brachiura and isopod species. The Isopoda are the second largest order and contain terrestrial and aquatic species (Kirkim et al., 2008). Marine species of this order are divided into 12 suborders which include Cymothoidae and this suborder possess Cymothoidae family presented by 43 genera and 358 species (Worms, 2018). *Nerocila bivittata* is a parasite species belong to the family Cymothoidae. It shows a wide distribution including the British waters, French coasts, Black Sea, Marmara and Aegean Seas (Fig. 1: Kayış and Er, 2012; Akmirza 2014; Kirkim et al., 2008). Although *N. bivittata* acts specifically in choice of host and has been usually reported on the members of the family Labridae, e.g. *Symphodus mediterraneus*, *S. tinca*, *S. melops* (Bariche and Trilles, 2005), there are many reports about different host species such as *Boops boops*, *Gobius geniporus*, *Mugil cephalus*, *Sciaena umbra*, *Labrus merula* for *N. bivittata* (Trilles 1994; Charfi-Cheikhrouha et al, 2000; Oğuz and Öktener 2007;

Kirkim et al, 2008; Akmirza 2014 ).

The main objective of the present study was to inform as new hosts dusky grouper, *Ephinephelus marginatus* (Lowe, 1834) and mottled grouper, *Mycteroperca rubra* (Bloch, 1793) for *Nerocila bivittata*. This is also the first record of *N. bivittata* from the Gulf of Antalya, coastal waters of Mediterranean Sea in Turkey.

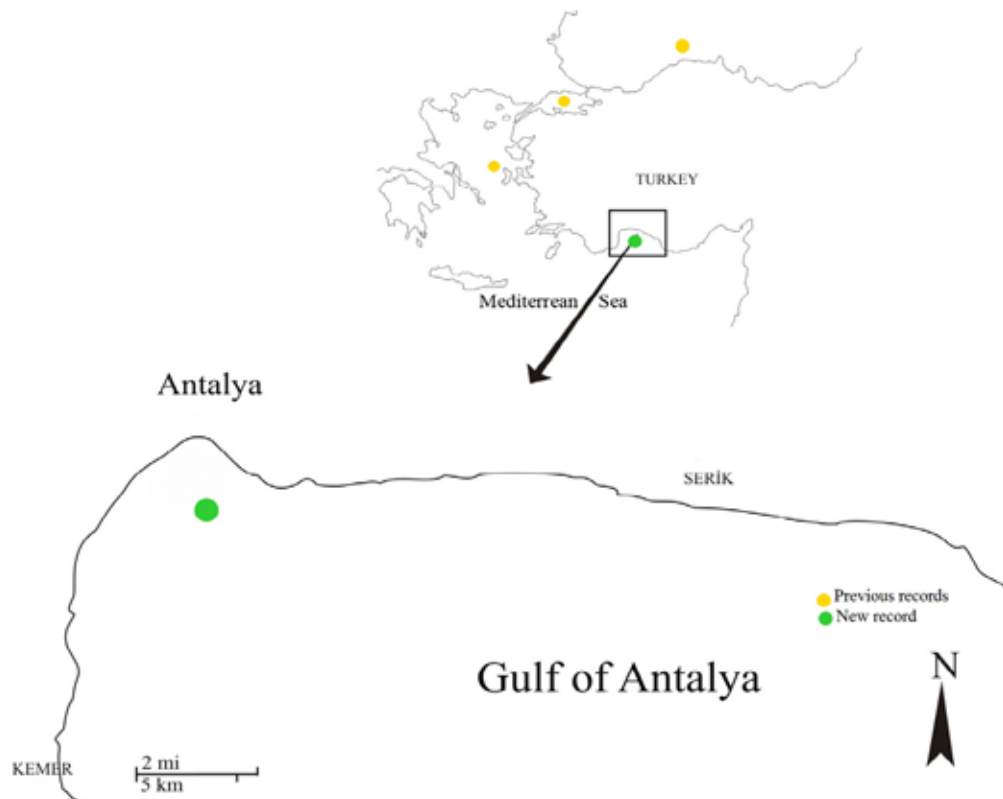
## MATERIALS AND METHODS

*Nerocila bivittata* was found on dusky grouper (*Ephinephelus marginatus*) and mottled grouper (*Mycteroperca rubra*) in the Mediterranean Sea coastal waters of Turkey. These fish species were captured by commercial trawl vessels as non-target, from Antalya Bay, which is located in the eastern Mediterranean coast of Turkey, on November 2014. The capture depth and coordinate of the specimens was 70 meters and 36° 46' 515'' N, 031° 12' 660'' E and 36° 46' 783'' N, 031° 08' 850'' E, respectively (Fig. 1). The parasites were removed from the body and fin surfaces of hosts and immediately preserved in 70% ethanol until brought to our faculty research laboratory. Subsequently, the fixed parasites were examined under a stereomicroscope. The total lengths of the isopods were measured and recorded in millimeters. Morphological characteristics of the parasites and these characters were used for the descriptions of the parasites (Risso, 1816; Brusca, 1978; Brusca, 1981).

## RESULTS

A hemorrhagic lesion on caudal fin rays of *E. marginatus* where *Nerocila bivittata* was attached was observed (Fig.2). But, another external clinical finding except this lesion was not detected. The parasite was also detected on the caudal fin and body surface of *Mycteroperca rubra* (Fig. 3).

*N. bivittata* has dark brown body colour and there are two white strips along the dorsal part of body. The body is oval-shaped, the shell is cambered and bright. The head of the *N. bivittata* is small, rounded and flattened. There are seven large sections in the body followed by five smaller segments. The first three of its external antennas are swollen. Tail of the parasite is wide and almost square in shape. Extremities of *N. bivittata* are lanceolate and have small points at the ends. Uropod is twice the length of the endopod. Distal margin of endopod deeply intended. Totally, 3 parasites were detected on fishes and the average body length and width of them were measured as 17.2 mm and 8.3 mm, respectively. The species was identified as *Nerocila bivittata*.



**Figure 1.** The map showing the previously records (yellow dots; Kayış and Er 2012; Akmirza 2014; Kirkim et al 2008) and new record (green dot) for *Nerocila bivittata* in Turkey.



**Figure 2.** *Nerocila bivittata* on the caudal fin of *Ephinephelus marginatus* and hemorrhagic lesion.



**Figure 3.** *Nerocila bivittata* on caudal fin and body surface of *Mycteroperca rubra*.

## DISCUSSION

The Order Isopoda are widely distributed in all habitat types including terrestrial, marine, fresh and ground water. Some species are known as parasites and infested to the marine, freshwater and brackish water fish species (Bariche and Trilles, 2005). Parasitic isopods as crustacean ectoparasites are the most commonly reported group in marine fish species (Kabata, 1984). They are attached on the body surface, the fins, in the gill chambers, buccal cavity and nostrils or they make a pouch in the muscle of many wild tropical and cultured fish having economic value (Williams and Williams, 1994; Brusca, 1981). Isopods are haematophagous species and produce an anticoagulant substance from their latero-oesophagus glands (Bariche and Trilles, 2005). They feed on their host's blood and haemolymph and cause lesions on the body surfaces of their hosts so these parasites bring about a decrease in the economic value of the fish (Printrakoon and Purivirojkul, 2011).

*N. bivittata* has been described in 1816 for the first time by Risso (Risso, 1816). In 1818, the parasite was considered as a new species and described it as *Nerocila blainvillii* and Risso reported that *N. blainvillii* as the single species found in the genus. The author's specimen has been preserved in the British Museum (BMNH 1979: 400:2) but has never been fully described. Subsequently, this material as *Nerocila bivittata* was identified and recorded as conspecific with *N. blainvillii* (Trilles, 1975).

*N. bivittata* was generally reported from the Mediterranean countries such as Greece, Egypt, Lebanon, Libya and Algerian (Trilles 1994; Ramdane et al. 2007; Shakman et al 2009; Kolygas M 2014; Elgendy et al., 2018). This parasitic species has been isolated from many fish species such as *Siganus luridus*, *Mullus surmuletus*, *Mugil cephalus*, *Serranus scriba*, *Pagellus erythrinus*, *Meluccius merluccius*, *Belone belone*, *Uranoscopus scraber*, *Dentex macrophthalmus* from the Black, Marmara and Aegean Seas in Turkey (Oktener and Trilles, 2004; Kirkim et al., 2008; Oguz and Oktener, 2007; Alas et al. 2008; Oktener et al., 2010; Er and Kayis, 2015).

**CONCLUSION**

As results of the present study, the parasitic isopod *Nerocila bivittata* (Crustacea, Isopoda, Cymothoidae) on dusky grouper (*Ephinephelus marginatus*) and mottled grouper (*Mycteroperca rubra*) is the first record in the worldwide and also the first notification of *Nerocila bivittata* from the coastal waters of Mediterranean Sea, Gulf of Antalya in Turkey.

## CONCLUSION

**CONFLICT OF INTEREST**

None declared by the authors.



## REFERENCES

- Alas A, Oktener A, Iscimen A, Triller JP (2008) New host record, *Parablennius sanguinolentus* (Teleostei, Perciformes, Blenniidae) for *Nerocila bivittata* (Crustacea, Isopoda, Cymothoidae). *Parasitol Res* 102(4):645-646.
- Akmirza A (2014) Metazoan parasites of brown meagre (*Sciaena umbra* L. 1758) caught near Gökçeada, Turkey. *Turk J Vet Anim Sci* 38:299-303.
- Andrade AB, Machado LF, Hostim-Silva M, Barreiros JP (2003) Reproductive biology of the dusky grouper *Epinephelus marginatus* (Lowe, 1834). *Braz Arch Biol Technol* 46(3):373-382
- Aronov A., Goren M. 2008. Ecology of mottled grouper (*Mycteroperca rubra*) in the eastern Mediterranean. *Electronic Journal of Ichthyology* 2: 43–55
- Bariche M, Trilles JP (2005) Preliminary check-list of Cymothoids (Crustacea: Isopoda) parasitic on marine fishes from Lebanon. *Zool Middle East* 34:53-60.
- Bouchereau JL, Body P, Chauvet C (1999) Growth of the dusky grouper *Epinephelus marginatus* (Linnaeus, 1758) (Teleostei, Serranidae) in the Marine Natural Reserve of Lavezzi Islands, Corsica, France. *Sci mar* 63(1):71-77.
- Brusca R.C., 1978. Studies on the cymothoid fish symbionts of the eastern Pacific (Isopoda, Cymothoide). I. Biology of *Nerocila californica*. *Crustaceana* 34: 141–154.
- Brusca RC (1981) A monograph of the Isopoda Cymothoidae (Crustacea) of the eastern Pacific. *Zool J Linnean Soc* 73:117-119.
- Charfi-Cheikrouha F, Zghidi W, Ould Yada L, Trilles JP (2000) Les Cymothoidae (Isopodes parasites de poissons) des côtes tunisiennes: ecologie et indices parasitologiques. *Syst Parasitol* 46:146–150.
- Cunha ME, Quental H, Barradas A, Pousao-Ferreira P, Cabrita E, Engrola S (2009) Rearing larvae of dusky grouper, *Epinephelus marginatus* (Lowe, 1834), (Pisces: Serranidae) in a semi-extensive mesocosm. *Sci Mar* 73(1):201–212
- Dulcic J, Tutman P, Caleta M (2006) Northernmost occurrence of the white grouper, *Epinephelus aeneus* (Perciformes: Serranidae), in the Mediterranean area. *Acta Ichthyol Piscat* 36(1):73–75
- Eissa A, Zaki EMM, Saied S (2011) Epidemic mortalities in the dusky grouper, *Epinephelus marginatus* (Lowe, 1834) in Egyptian coastal waters. In Proceedings of the 4th Global Fisheries and Aquaculture Research Conference, the Egyptian International Center for Agriculture, Giza, Egypt pp 3–5
- Elgendy MY, Hassan AM, Abdel Zaher MF, Abbas HH, Soliman WS, Bayoumy EM (2018) *Nerocila bivittata* Massive Infestations in *Tilapia zillii* with Emphasis on Hematological and Histopathological Changes. *AJSR* 11(1):134–144
- Er A, Kayış S (2015) Intensity and prevalence of some crustacean fish parasites in Turkey and their molecular identification. *Turk J Zool* 39:1142–1150
- Genc E, Genc MA, Can MF, Genc E, Cengizler I (2005) A first documented record of gnathiid infestation on white grouper (*Epinephelus aeneus*) in Iskenderun Bay (north-eastern Mediterranean), Turkey. *J Appl Ichthyol* 21:448–450.
- Glamuzina B, Skaramuca B, Glavic N et al (1998) Egg and early larval development of laboratory reared dusky grouper, *Epinephelus marginatus* (Lowe, 1834) (Pisces, Serranidae). *Sci Mar* 62:373–378
- Hackradt FCF (2012) Ecology of Mediterranean reef fish early life history stages, population connectivity and implications for marine protected areas design. Universidad de Murcia Facultad de Biología Departamento de Ecología e Hidrología, Doctoral Thesis, Murcia pp 238
- Harmelin, J.G. and Harmelin-Vivien, M. 1999. A review on habitat, diet and growth of the dusky grouper *Epinephelus marginatus* (Lowe, 1834). *Marine Life* 9(2): 11-20
- Kayış Ş, Er A (2012) *Nerocila bivittata* (Cymothidae, Isopoda) infestation on Syngnathid Fishes in the Eastern Black Sea. *Bull Eur Ass Fish Pathol* 32(4)
- Kabata Z (1984) Diseases caused by metazoans: crustaceans. In: Kinne O, editor. *Diseases of marine animals*. Hamburg, Germany: Biologische Anstalt Helgoland pp 321-399
- Katharios P, Papadakis IE, Prapas A, Dermon CR, Ampatzis K, Divanach P (2004) Mortality control of VNN disease in grouper, *Epinephelus marginatus* after prolonged bath in dense *Chlorella minutissima* culture. European Aquaculture Society, Biotechnologies for Quality 20-23 October Barcelona, Spain
- Kırkım F, Kocataş A, Katagan T, Sezgin M (2008) A Report on Parasitic Isopods (Crustacea) from Marine Fishes and Decapods Collected from The Aegean Sea (Turkey). *Turk J Parasitol* 32(4):382–385
- Kolygas M (2014) Implementation of Innovative and Efficacious Treatments Against Ectoparasites of Intensive Cultured Mediterranean Fish, phd Thesis, University of Thessaly, School of Health Sciences, Faculty of Veterinary Medicine, Greece.
- La Mesa, G., Di Muccio, S. and Vacchi, M. 2006. Abundance, size distribution and habitat preferences in the grouper assemblage of the Ustica marine reserve (SW Mediterranean). *Cybium* 30(4): 365-377.
- Maggio A, Zhu J-K, Hasegawa PM, Bressan RA (2006) Osmogenetics: Aristotle to *Arabidopsis*. *Plant Cell* 18:1542–1557
- Marino G, Azzuro E, Massari A, Finoia MG, Mandich A (2001) Reproduction in the dusky grouper from the southern Mediterranean. *J Fish Biol* 58: 909–927
- Mahé K, Cochard ML, Quéro JC, Sevin K, Bailly N, Tetard A (2012) First record of *Epinephelus marginatus* (Serranidae: Epinephelinae) in the eastern English Channel Premier signalement de *Epinephelus marginatus* (Serranidae: Epinephelinae) en Manche orientale. *Ichthyological notes – Notes ichthyologiques* 36(3):485–486
- Moravec F, Justine JL (2008) Some philometrid nematodes (Philometridae), including four new species of *Philometra*, from marine fishes off New Caledonia. *Acta parasitol* 53(4): 369-381
- Oguz MC, Ökten A (2007) Four Parasitic Crustacean Species From Marine Fishes of Turkey. *Turkish Journal of Parasitology* 31(1):79–83
- Okten A, Trilles J.P., (2004) Report on the Cymothoids (Crustacea, Isopoda) collected from marine fishes in Turkey. *Acta Adriat* 45 (2):15–23
- Okten A, Torcu-Koc H, Erdogan Z, Paul-Trilles J., 2010. Scuba diving photography: a useful method for taxonomic and ecologic studies on fish parasites (cymothoidae). *Journal of Marine Animals and Their Ecology*, 3(2).
- Printrakoon C, Purivirojkul W (2011) Prevalence of *Nerocila depressa* (Isopoda, Cymothoidae) on *Sardinella albella* from a Thai estuary. *J Sea Res* 65:322–326
- Ramdane Z, Bensouilah MA, Trilles J.P., 2007. The Cymothoidae (Crus-

- tacea, Isopoda), parasites on marine fishes, from Algerian fauna. Belg J Zool 137(1):67–74
- Risso A (1816) Histoire Naturelle des Crustacés des Environs de Nice. *Librairie Grecque-Latine-Allemande, Paris*. Pp 175
- Shakman E, Kinzelbach R, Trilles JP, Bariche M (2009) First occurrence of native cymothoids parasites on introduced rabbitfishes in the Mediterranean Sea. Acta Parasitol 54(4):380–384
- Trillies J.P. 1975. Les Cymothoidae (Isopoda, Flabellifera) des cotes francaises. H. Les Anilocridae Schiodte et Meinert, 1881. Genres *Anilocra* Leach, 1818, et *Nerocila* Leach, 1818. Bulletin du Museum National d'Histoire Naturelle, Paris 3e serie, 290, Zoologie 200: 347-378, pI. 1
- Trilles JP (1994) Les Cymothoidae (Crustacea, Isopoda) du Monde (Prodrome pour une Faune). Stud Mar 21/22(1–2):1–288
- Williams LB, Williams EH (1994) Parasites of Puerto Rican Freshwater Sport Fishes, Sportfish Disease Project, Department of Marine Sciences, University of Puerto Rico, pp168
- WoRMS, 2018, <http://www.marinespecies.org>, [accessed 4 September 2019].