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RESEARCH ARTICLE ARAŞTIRMA MAKALESİ

The list of deep-sea decapod crustaceans and new records from Sığacık Bay (Aegean Sea, Türkiye)

Sığacık Körfezi (Ege Denizi, Türkiye)'nin derin deniz dekapod tür listesi ve körfezden yeni kayıtlar

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Abstract: Decapod crustaceans were sampled monthly from May 2008 to April 2009 using a commercial trawl vessel at depths between 292 and 550 m from Sığacık Bay. 16 species were identified, of which 3 are Brachyura, 5 Caridea, 3 Dendrobranchiata, 1 Polychelida, 1 Astacidea, 3 Anomura. Of these, 4 species (*Bathynectes maravigna*, *Munida intermedia*, *Pontophilus spinosus*, and *Processa canaliculata*) are new records for Sığacık Bay. Furthermore, all of the previous studies were reviewed on the deep-sea decapod crustaceans of Sığacık Bay, depth range of each species is given.

Keywords: Decapoda, deep-sea, *Bathynectes maravigna*, *Munida intermedia*, *Pontophilus spinosus*, *Processa canaliculata*

Öz: Sığacık Körfezi'nden dekapod krustase örnekleri Mayıs 2008'den Nisan 2009'a kadar ticari trol teknesi kullanılarak 292 ve 550 m derinlikler arasından aylık olarak toplanmıştır. 3 Brachyura, 5 Caridea, 3 Dendrobranchiata, 1 Polychelida, 1 Astacidea, 3 Anomura olmak üzere 16 tür tespit edilmiştir. Tespit edilen türlerden 4'ü (*Bathynectes maravigna*, *Munida intermedia*, *Pontophilus spinosus* ve *Processa canaliculata*) Sığacık Körfezi'nden ilk kez rapor edilmektedir. Ayrıca, Sığacık Körfezi'nin derin deniz dekapod krustasea faunası üzerine daha önce yapılmış çalışmaların tümü gözden geçirilmiş, her bir türün derinlik aralığı verilmiştir.

Anahtar kelimeler: Dekapoda, derin deniz, *Bathynectes maravigna*, *Munida intermedia*, *Pontophilus spinosus*, *Processa canaliculata*

INTRODUCTION

Decapod crustaceans form an important part of the marine ecosystem because of their importance on the benthic biomass and activities in the food chain. They are one of the most dominant megafauna communities in the deep sea basin (Sarda et al.,1994).

In the most recent checklist compiled for the Turkish Seas (Bakır et al., 2014), the number of decapod crustacean species is given as 216 for the Aegean Sea coast of Türkiye and 259 in total for the Turkish Seas (given in the study *Monodaeus guinotae* Forest, 1976 is accepted as *M. couchii* (Couch, 1851) (WoRMS, 2023). The authors stated in their study that, 9 of these species (*Dorhynchus thomsoni* Thomson, 1873, *Geryon longipes* A. Milne-Edwards, 1882, *Monodaeus couchii* (Couch, 1851) (given as *Monodaeus guinotae* Forest, 1976 in the study), *Plesionika acanthonotus* (Smith, 1882), *P. martia* (A. Milne-Edwards, 1883), *Amalopenaeus elegans* Smith, 1882 (given under the name *Gennadas elegans* (Smith, 1882) in the study), *Munida tenuimana* Sars, 1872, *Richardina fredericii* Lo Bianco, 1903), also given from the Turkish Aegean Sea, were found at depths of more than 600 m.

In the Aegean coasts of Türkiye, the first study on the deep-sea decapod crustacean species (Katağan et al., 1988) recorded 13 species. In a later study by Kocataş and Katağan (2003), 7 decapod crustacean species were reported from the deep waters of Turkish Aegean Sea. Then Koçak and Katağan (2008) recorded 5 deep-sea decapod crustacean species. Besides these studies, Özcan et al. (2009a) and Gönülal et al. (2014) reported 1 and 3 species, respectively, from the region. Subsequently, an anomuran species, *Galathea bolivari* Zariquiey Álvarez, 1950, was reported from the deep waters of the Turkish Aegean by Gönülal and Dalyan (2017), although this species has been described in various studies as a species distributed in shallow waters (i.e. Geldiay and Kocataş, 1970; Noël, 1992; Falciai and Minervini, 1996; Koçak and Katağan, 2008).

Sığacık Bay located in the Central Aegean Sea is one of the most efficient trawling grounds in the Aegean Sea. The bay is an important commercial fishing area for deep-sea decapod crustaceans. The national waters of Sığacık Bay, lying between 100 and 550 m deep, are extensively fished by trawling. Shrimps are the most important bathyal resource here.

Several studies were present on the deep-sea decapod crustaceans of Sığacık Bay (Koçak et al., 2008, Özcan and Katağan 2009, Koçak, 2010, Özcan and Katağan 2011, Aydın and Aydın, 2011, Koçak et al., 2012, Oraner et al., 2018, Dereli

et al., 2021). In the research area, Koçak et al. (2008) reported 1 anomuran species. In a later study by Özcan and Katağan (2009), which is the only comprehensive study to date on deep-sea decapod crustaceans of Sığacık Bay, recorded 21 species, of which 10 are Brachyura, 5 Caridea, 2 Dendrobranchiata, 1 Astacidea, 1 Polychelida, 2 Anomura. Since then, 1 Brachyura by Koçak (2010), 1 Caridea by Koçak et al. (2012), and 1 Dendrobranchiata by Dereli et al. (2021) were recorded from the same area. The goal of the present study was a faunistic study of the deep-sea decapod crustaceans of Sığacık Bay.

MATERIALS AND METHODS

Sampling surveys are performed monthly from May 2008 to April 2009 using a commercial bottom trawl (44-mm nominal mesh size, PE netting at the codend) in Sığacık Bay, Aegean Sea (from 38°05'13"N, 26°35'08"E to 37°59'27"N, 26°54'47"E) (Figure 1, Table 1). A total of 24 hauls are taken at depths between 292 and 550 m. The trawling speed fluctuated from 2.3 to 2.6 knots, depending on the nature of the substrate. Each haul usually lasted 1 hour, but several hauls lasted between half an hour to 1.5 hours (Table 1). All hauls are performed in daylight. The specimens were fixed in 5% formaldehyde. Carapace length (CL) and total length (TL) were measured with digital calipers to the nearest 0.01 mm.

All decapod crustaceans are determined to species level using the studies by Zariquiey Álvarez (1968), Noël 1992, Ingle (1993), and Falciai and Minervini (1996). In addition, WoRMS (2024) is considered for synonyms of the species and also variations in the nomenclature.

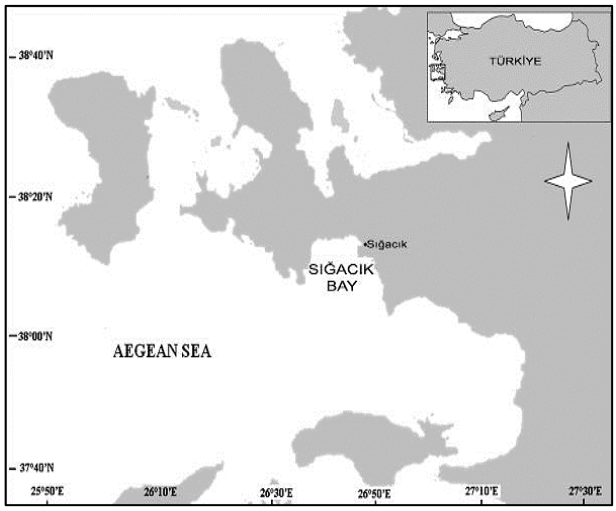

Figure 1. Map of the study area

Table 1. Information on bottom trawl surveys carried out in Sığacık Bay

Date	Depth (m)		Time		Coordinates	
	Start	Finish	Start	Finish	Start	Finish
28.05.2008	320	344	11:25	12:25	37°59'93"N 26°44'82"E	38°00'98"N 26°41'72"E
	526	550	13:45	14:45	37°55'51"N 26°40'85"E	37°55'08"N 26°43'69"E
19.06.2008	319	343	11:40	12:40	37°59'93"N 26°44'82"E	38°09'98"N 26°41'72"E
	526	500	13:55	14:55	37°55'51"N 26°40'85"E	37°55'08"N 26°43'69"E
12.07.2008	494	539	08:40	09:40	37°55'81"N 26°39'36"E	37°54'34"N26°41'11"E
	350	292	11:00	12:00	37°59'03"N 26°44'09"E	38°01'39"N 26°43'32"E
16.08.2008	316	366	09:10	10:10	37°59'83"N 26°45'54"E	38°00'57"N 26°42'19"E
	512	512	11:10	12:10	37°56'70"N 26°39'19"E	37°54'70"N 26°42'92"E
13.09.2008	310	347	09:50	10:50	37°59'84"N 26°44'96"E	38°00'63"N 26°41'48"E
	512	550	12:10	13:45	37°56'14"N 26°39'81"E	37°54'92"N 26°44'20"E
15.10.2008	530	545	07:15	08:15	37°55'28"N 26°41'38"E	37°54'86"N 26°43'75"E
	342	320	09:30	10:30	37°59'82"N 26°43'95"E	38°01'09"N 26°41'75"E
08.11.2008	520	550	06:40	08:10	37°55'11"N 26°42'35"E	37°56'31"N 26°38'25"E
	360	320	09:25	10:25	38°00'43"N 26°42'34"E	37°59'80"N 26°45'35"E
20.12.2008	495	510	09:50	10:20	37°55'10"N 26°42'74"E	37°56'00"N 26°38'65"E
	360	330	12:30	13:30	38°00'13"N 26°41'76"E	38°00'33"N 26°44'99"E
17.01.2009	520	550	07:18	08:40	37°56'09"N 26°39'73"E	37°54'96"N 26°43'65"E
	350	350	09:55	10:55	37°59'41"N 26°43'94"E	38°00'75"N 26°41'96"E
17.02.2009	520	550	07:10	08:40	37°55'07"N 26°43'06"E	37°55'99"N 26°39'12"E
	360	310	09:50	10:50	38°00'25"N 26°41'55"E	38°00'18"N 26°44'56"E
28.03.2009	500	530	12:05	13:35	37°54'96"N 26°43'23"E	37°56'10"N 26°39'70"E
	350	335	14:50	15:50	37°59'47"N 26°43'83"E	38°01'12"N 26°41'84"E
24.04.2009	350	335	08:25	09:25	37°59'99"N 26°45'84"E	38°00'00"N 26°41'71"E
	550	550	10:30	12:00	37°56'19"N 26°40'67"E	37°55'02"N 26°43'49"E

RESULTS

The bathyal trawling surveys in Sığacık Bay revealed 16 deep-sea decapod crustacean species, of which 3 are Anomura (*Pagurus prideaux* Leach, 1815, *Iridonida speciosa* (von Martens, 1878), *Munida intermedia* A. Milne-Edwards and Bouvier, 1899), 3 Brachyura (*Bathynectes maravigna* (Prestandrea, 1839), *Inachus parvirostris* (Risso, 1816), *Macropipus tuberculatus* (Roux, 1830), 1 Astacidea (*Nephrops norvegicus* (Linnaeus, 1758), 1 Polychelida (*Polycheles typhlops* Heller, 1862), 3 Dendrobranchiata (*Aristeomorpha foliacea* (Risso, 1827), *Parapenaeus longirostris* (Lucas, 1846), *Solenocera membranacea* (Risso, 1816), 5 Caridea (*Plesionika heterocarpus* (A. Costa, 1871), *P. martia* (A. Milne-Edwards, 1883), *Aegaeon lacazei* (Gourret, 1887), *Pontophilus spinosus* (Leach, 1816), *Processa canaliculata* Leach, 1815). Of these, 4 species (*M. intermedia, B. maravigna, P. spinosus*, *P. canaliculata*) newly recorded for the region. As a result of studies carried out in order to review the deep-sea decapod crustacean fauna of the Sığacık Bay, indicating the presence of 24 species inhabiting the Bay, of which 2 are Anomura, 6 Caridea, 3 Dendrobranchiata, 11 Brachyura, 1 Astacidea, 1 Polychelida.

The present study raises this species number, to 28, with the addition of the 4 new records.

Systematics

ANOMURA

SUPERFAMILY: GALATHEOIDEA SAMOUELLE, 1819

FAMILY: MUNIDIDAE AHYONG, BABA, MACPHERSON and POORE, 2010

GENUS: *MUNIDA* LEACH, 1820

***Munida intermedia* A. Milne-Edwards and Bouvier, 1899**

Synonyms: *Munida bamffia* (Pennant, 1777) *sensu* Bonnier, 1888 (part); *Munida bamffica* (Pennant, 1777) *sensu* Bouvier, 1940; *Munida bamffica tenuimana* Sars, 1872 *sensu* Bouvier, 1940; *Munida bamffica var. gracilis* A. Milne-Edwards and Bouvier, 1899; *Munida bamffica var. intermedia* A. Milne-Edwards and Bouvier, 1899; *Munida sarsi meridionalis* Zariquiey Álvarez, 1952

This is the first record of *M. intermedia* from Sığacık Bay. This species was recorded for the first time in Turkish seas by Katağan et al. (1988) in the Saros Bay (Aegean Sea) at a depth of 520 m in a muddy biotope. Sex was determined under a stereo microscope by observing the condition of the gonophores; in the coxa of the third pereiopod in females or the coxa of the fifth pereiopod in males.

Habitat: Muddy bottom.

Depth range: 300-400 m

Worldwide Distribution: Eastern Atlantic, Mediterranean (d'Udekem d'Acoz, 1999)

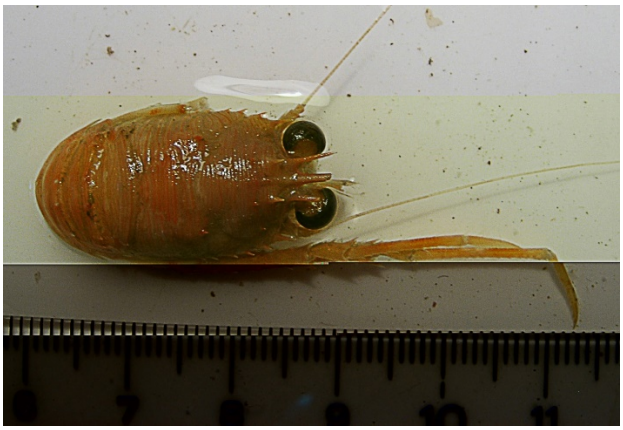

Figure 2. *Munida intermedia* A. Milne-Edwards and Bouvier, 1899 ♀, Sığacık Bay (dorsal view). CL (without rostrum): 15.3 mm

GENUS: *IRIDONIDA* MACPHERSON & BABA *IN* MACHORDOM, AHYONG, ANDREAKIS, BABA, BUCKLEY, GARCIA-JIMENEZ, MCCALLUM, RODRIGUEZ-FLORES & MACPHERSON, 2022

***Iridonida speciosa* (von Martens, 1878)**

Synonyms: *Munida iris* A. Milne Edwards, 1880 sensu A. Milne Edwards and Bouvier, 1900; *Munida iris rutllanti* Zariquiey Álvarez, 1952; *Munida rutllanti* Zariquiey Álvarez, 1952; *Munida speciosa* von Martens, 1878

This species (as *Munida rutllanti*) was reported by Kocak et al. (2008), Özcan and Katağan (2009; 2011) from Sığacık Bay.

Depth range: 200-400 m

Worldwide Distribution: Eastern Atlantic, Mediterranean (d'Udekem d'Acoz, 1999).

SUPERFAMILY: PAGUROIDEA LATREILLE, 1802

FAMILY: PAGURIDAE LATREILLE, 1802

GENUS: *PAGURUS* FABRICIUS, 1775

***Pagurus prideaux* Leach, 1815**

Synonyms: *Pagurus pridauxii* Leach, 1815; *Pagurus prideauxi* Leach, 1815; *Pagurus solitarius* Risso, 182

P. prideaux was reported by Özcan and Katağan (2009) from Sığacık Bay.

Depth range: 200-300 m

Worldwide Distribution: Atlantic, Mediterranean (Falciai and Minervini, 1996).

BRACHYURA

SUPERFAMILY: PORTUNOIDEA RAFINESQUE, 1815

FAMILY: POLYBIIDAE ORTMANN, 1893

GENUS: *BATHYNECTES* STIMPSON, 1871

***Bathynectes maravigna* (Prestandrea, 1839)**

Synonyms: *Bathynectes superba* (Costa, 1853); *Portunus maravigna* Prestandrea, 1839; *Portunus superbus* Costa, 1853; *Thranites velox* Bovallius, 1876

B. maravigna is new record for Sığacık Bay. *B. maravigna* was recorded for the first time in Turkish seas by Kocataş and Katağan (2003) in Aegean Sea at a depth of 720 m in a silty substratum. Sex was identified by observing the characteristic shape of the abdomen (triangular in males, circular in females) and the appearance of the first two pairs of pleopods (developed into gonopods in males).

Habitat: Sandy-muddy bottom.

Depth range: 500-600 m

Worldwide Distribution: Eastern Atlantic, Mediterranean (d'Udekem d'Acoz, 1999).

Figure 3. *Bathynectes maravigna* (Prestandrea, 1839) ♂, Sığacık Bay (dorsal view). CL: 41.6 mm

GENUS *MACROPIPUS* PRESTANDREA, 1833

***Macropipus tuberculatus* (Roux, 1830)**

Synonyms: *Macropipus citrinus Cocco,* 1832; *Macropipus citrinus Prestandrea,* 1833; *Portunus macropipus Cocco,* 1832; *Portunus macropipus Prestandrea,* 1833; *Portunus tuberculatus* Roux, 1830

The species was reported by Özcan and Katağan (2009; 2011) from Sığacık Bay.

Depth range: 200-400 m

Worldwide Distribution: Atlantic, Mediterranean (Falciai and Minervini, 1996).

SUPERFAMILY: CALAPPOIDEA DE HAAN, 1833

FAMILY: CALAPPIDAE DE HAAN, 1833

GENUS *CALAPPA* WEBER, 1795

***Calappa granulata* (Linnaeus, 1758)**

Synonyms: *Calappa tuerkayana* Pastore, 1996; *Calappa turkayana* Pastore, 1995; *Calappe granulata* (Linnaeus, 1758); *Cancer granulata* Linnaeus, 1758

C. granulata was recorded by Özcan and Katağan (2009) from Sığacık Bay.

Depth range: 200-400 m

Worldwide Distribution: Atlantic, Mediterranean (d'Udekem d'Acoz, 1999).

SUPERFAMILY: GONEPLACOIDEA MACLEAY, 1838

FAMILY: GONEPLACIDAE MACLEAY, 1838

GENUS *GONEPLAX* LEACH, 1814

***Goneplax rhomboides* (Linnaeus, 1758)**

Synonyms: *Cancer angulata* Pennant, 1777; *Cancer rhomboides* Linnaeus, 1758; *Gelasimus Bellii* J Couch, 1838; *Goneplax angulata* (Pennant, 1777); *Goneplax rhomboidalis* Risso, 1827; *Gonoplax angulata* (Pennant, 1777); *Gonoplax rhomboides* (Linnaeus, 1758); *Ocypoda bispinosa* Lamarck, 1801; *Ocypoda unispinosa* Rafinesque, 1814; *Ocypode longimana* Latreille, 1803

It was reported by Özcan and Katağan (2009) from Sığacık Bay.

Depth range: 200-400 m

Worldwide Distribution: Atlantic, Mediterranean (d'Udekem d'Acoz, 1999).

SUPERFAMILY: MAJOIDEA SAMOUELLE, 1819

FAMILY: INACHIDAE MACLEAY, 1838

GENUS *MACROPODIA* LEACH, 1814

***Macropodia tenuirostris* (Leach, 1814)**

Synonyms: *Leptopodia tenuirostris* Leach, 1814; *Macropodia longipes* (A. Milne-Edwards and Bouvier, 1899); *Stenorhynchus longipes* A. Milne-Edwards and Bouvier, 1899; *Stenorhynchus longipes* A. Milne-Edwards and Bouvier, 1894

This species was recorded by Özcan and Katağan (2009) from Sığacık Bay under the name *Macropodia longipes*.

Depth range: 200-400 m

Worldwide Distribution: Atlantic, Mediterranean (Falciai and Minervini, 1996).

Macropodia rostrata

Synonyms: *Cancer rostrata* Linnaeus, 1761; *Cancer rostratus* Linnaeus, 1761; *Macropodia parva* Van Noort and Adema, 1985; *Macropodia spinulosa* (Miers, 1881); *Stenorhynchus inermis* Heller, 1856; *Stenorhynchus rostratus* (Linnaeus, 1761); *Stenorhynchus rostratus var. spinulosus* Miers, 1881

M. rostrata was reported by Özcan and Katağan (2009) from Sığacık Bay.

Depth range: 200-300 m

Worldwide Distribution: Atlantic, Mediterranean (d'Udekem d'Acoz, 1999).

GENUS: *INACHUS* WEBER, 1795

***Inachus parvirostris* (Risso, 1816)**

Synonyms: *Doclea fabriciana* Risso, 1827; *Macropus parvirostris* Risso, 1816

The species was reported Kocak (2010) from Sığacık Bay.

Depth range: 300-400 m

Worldwide Distribution: Atlantic, Mediterranean (Falciai and Minervini, 1996).

SUPERFAMILY: DORIPPOIDEA MACLEAY, 1838

FAMILY: DORIPPIDAE MACLEAY, 1838

GENUS: *MEDORIPPE* MANNING & HOLTHUIS, 1981

***Medorippe lanata* (Linnaeus, 1767)**

Synonyms: *Cancer lanatus* Linnaeus, 1767; *Dorippe affinis* Desmarest, 1823; *Dorippe lanata* (Linnaeus, 1767)

It was recorded by Özcan and Katağan (2009) from Sığacık Bay.

Depth range: 200-400 m

Worldwide Distribution: Atlantic, Mediterranean (Falciai and Minervini, 1996).

SUPERFAMILY: PARTHENOPOIDEA MACLEAY, 1838

FAMILY: PARTHENOPIDAE MACLEAY, 1838

GENUS: *SPINOLAMBRUS* TAN & NG, 2007

***Spinolambrus macrochelos* (Herbst, 1790)**

Synonyms: *Cancer macrochelos* Herbst, 1790; *Eurynome aldrovandi* Risso, 1827; *Lambrus macrochelos* (Herbst, 1790); *Lambrus mediterraneus* Roux, 1828; *Lambrus Miersii* A. Milne-Edwards and Bouvier, 1898; *Lambrus spinosissimus* Osório, 1923; *Parthenope humbertii* Costa, 1838; *Parthenope macrochelos* (Herbst, 1790); *Parthenope miersii* (A. Milne-Edwards and Bouvier, 1898)

This species (as *Parthenope macrochelos*) was reported by Özcan and Katağan (2009) from Sığacık Bay.

Depth range: 200-300 m

Worldwide Distribution: Atlantic, Mediterranean (Falciai and Minervini, 1996).

GENUS*: PARTHENOPOIDES* MIERS, 1879

***Parthenopoides massena* (Roux, 1830)**

Synonyms: *Lambrus (Parthenopoides) bicarinatus* Miers, 1881; *Lambrus (Parthenopoides) massena* (Roux, 1830); *Lambrus (Parthenopoides) massena* var. *atlanticus* Miers, 1881; *Lambrus (Parthenopoides) massena* var. *goreensis* Miers, 1881; *Lambrus (Parthenopoides) massena* var. *spinifer* Miers, 1881; *Lambrus hexacanthus* A. Costa in Hope, 1851; *Lambrus massena* Roux, 1830; *Lambrus rugosus* Stimpson, 1857; *Lambrus setubalensis* de Brito Capello, 1866; *Parthenope contracta* OG Costa and A Costa, 1840; *Parthenope massena* (Roux, 1830)

P. massena was reported by Özcan and Katağan (2009) from Sığacık Bay under the name *Parthenope massena*.

Depth range: 300-400 m

Worldwide Distribution: Atlantic, Mediterranean (Falciai and Minervini, 1996).

SUPERFAMILY: PILUMNOIDEA SAMOUELLE, 1819

FAMILY: PILUMNIDAE SAMOUELLE, 1819

GENUS: *PILUMNUS* LEACH, 1816

***Pilumnus hirtellus* (Linnaeus, 1761)**

Synonyms: *Cancer hirtellus* Linnaeus, 1761

The species was reported by Özcan and Katağan (2009) from Sığacık Bay.

Depth range: 200-300 m

Worldwide Distribution: Atlantic, Mediterranean (d'Udekem d'Acoz, 1999).

SUPERFAMILY: XANTHOIDEA MACLEAY, 1838

FAMILY: XANTHIDAE MACLEAY, 1838

GENUS: *XANTHO* LEACH, 1814

***Xantho pilipes* A. Milne-Edwards, 1867**

Synonyms: -

It was reported by Özcan and Katağan (2009) from Sığacık Bay.

Depth range: 300-400 m.

Worldwide Distribution: Atlantic, Mediterranean (d'Udekem d'Acoz, 1999).

CARIDEA

SUPERFAMILY: PROCESSOIDEA ORTMANN, 1896

FAMILY: PROCESSIDAE ORTMANN, 1896

GENUS: *PROCESSA* LEACH, 1815

***Processa canaliculata* Leach, 1815**

Synonyms: *Nika cannelata* Griffith and Pidgeon, 1833; *Nika couchii* Bell, 1847; *Nika edulis* var. *britannica* Czerniavsky, 1884; *Nika edulis* var. *mediterranea* (Parisi, 1915); *Nika mediterranea* Parisi, 1915; *Processa mediterranea* (Parisi, 1915); *Processa prostatica* Zariquiey Cenarro, 1941

P. canaliculata is recorded for the first time from Sığacık Bay. This species was recorded for the first time in Turkish seas by

Santucci (1928) from Aegean Sea. Sex was determined by the presence (males) and absence (females) of an appendix masculina on the second pleopod.

Habitat: Sandy-muddy bottom.

Depth range: 500-600 m

Worldwide Distribution: Eastern Atlantic, Mediterranean (d'Udekem d'Acoz, 1999).

Figure 4. *Processa canaliculata* Leach, 1815 ♀, Sığacık Bay (lateral view). TL: 64.2 mm

SUPERFAMILY: CRANGONOIDEA HAWORTH, 1825

FAMILY: CRANGONIDAE HAWORTH, 1825

GENUS: *PONTOPHILUS* LEACH, 1817

***Pontophilus spinosus* (Leach, 1816)**

Synonyms: *Crangon spinosus* Leach, 1816

The present report represents a new record for *P. spinosus* from Sığacık Bay. The species was recorded for the first time in Turkish seas by Adensamer (1898) from Aegean Sea. Sex determination was made by the same method as for *P. canaliculata*.

Habitat: Muddy bottom.

Depth range: 300-400 m

Worldwide Distribution: Eastern Atlantic, Mediterranean (d'Udekem d'Acoz, 1999).

Figure 5. *Pontophilus spinosus* (Leach, 1816) ♂, Sığacık Bay (lateral view). CL: 11.7 mm TL: 48.3 mm

GENUS *AEGAEON* AGASSIZ, 1846

***Aegaeon lacazei* (Gourret, 1887)**

Synonyms: *Aegeon brendani* Kemp, 1906; *Aegeon lacazei* (Gourret, 1887); *Crangon lacazei* Gourret,1887; *Pontocaris habereri* Doflein, 1902; *Pontocaris lacazei* (Gourret, 1887)

This species was reported by Özcan and Katağan (2009, 2011) from Sığacık Bay.

Depth range: 300-600 m

Worldwide Distribution: Atlantic, Mediterranean, Indo-Pacific (d'Udekem d'Acoz, 1999).

SUPERFAMILY: PANDALOIDEA HAWORTH, 1825

FAMILY: PANDALIDAE HAWORTH, 1825

GENUS: *CHLOROTOCUS* A. MILNE-EDWARDS, 1882

***Chlorotocus crassicornis* (Costa, 1871)**

Synonyms: *Chlorotocus gracilipes* A. Milne-Edwards, 1882; *Chlorotocus gracilipes var. andamanensis* Alcock and Anderson, 1899; *Chlorotocus incertus* Spence Bate, 1888; *Palemon chlorotocus* Filhol, 1885; *Pandalus crassicornis* A. Costa, 1871

C. crassicornis was reported by Özcan and Katağan (2009, 2011) from Sığacık Bay

Depth range: 300-400 m

Worldwide Distribution: Atlantic, Mediterranean (Falciai and Minervini, 1996).

GENUS: *PLESIONIKA* SPENCE BATE, 1888

***Plesionika narval* (Fabricius, 1787)**

Synonyms: *Astacus narval* Fabricius, 1787; *Nisea formosa* Risso, 1844; *Palaemon tarentinum* O.G. Costa, 1844; *Palemon pristis* Risso, 1816; *Pandalus escatilis* Stimpson, 1860; *Pandalus narwal* (Fabricius, 1787); *Pandalus stylopus* A. Milne-Edwards, 1883; *Parapandalus narval* (Fabricius, 1787)

This species was reported by Özcan and Katağan (2009) from Sığacık Bay as *Parapandalus narval*.

Depth range: 300-400 m

Worldwide Distribution: Atlantic, Mediterranean (Falciai and Minervini, 1996).

***Plesionika heterocarpus* (A. Costa, 1871)**

Synonyms: *Pandalus heterocarpus* A. Costa, 1871; *Pandalus longicarpus* A. Milne-Edwards, 1883; *Pandalus sagittarius* A. Milne-Edwards, 1883

The species was reported by Özcan and Katağan (2009, 2011), Oraner et al. (2018), and Dereli et al. (2021) from Sığacık Bay.

Depth range: 200-600 m

Worldwide Distribution: Atlantic, Mediterranean (Falciai and Minervini, 1996).

***Plesionika martia* (A. Milne-Edwards, 1883)**

Synonyms: *Pandalus martius* A. Milne-Edwards, 1883; *Plesionika (Pandalus) sicherii* Riggio, 1900; *Plesionika martia martia* (A. Milne-Edwards, 1883)

It was reported by Koçak et al. (2012) and Dereli et al. (2021) from Sığacık Bay.

Depth range: 400-600 m

Worldwide Distribution: Atlantic, Mediterranean (Falciai and Minervini, 1996).

DENDROBRANCHIATA

SUPERFAMILY: PENAEOIDEA RAFINESQUE, 1815

FAMILY: PENAEIDAE RAFINESQUE, 1815

GENUS: *PARAPENAEUS* SMITH, 1885

***Parapenaeus longirostris* (Lucas, 1846)**

Synonyms: *Penaeus bocagei* Johnson, 1863; *Penaeus lividus* Filhol, 1885; *Penaeus longirostris* Lucas, 1846; *Peneus cocco* Prestandrea, 1833

P. longirostris was reported by Özcan and Katağan (2009, 2011), and Dereli et al. (2021) from Sığacık Bay.

Depth range: 200-600 m

Worldwide Distribution: Atlantic, Mediterranean (d'Udekem d'Acoz, 1999).

FAMILY: ARISTEIDAE WOOD-MASON *IN* WOOD-MASON & ALCOCK, 1891

GENUS: *ARISTAEOMORPHA* WOOD-MASON IN WOOD-MASON & ALCOCK, 1891

***Aristaeomorpha foliacea* (Risso, 1827)**

Synonyms: *Aristaeomorpha giglioliana* Wood-Mason, 1892; *Aristaeomorpha mediterranea* Adensamer, 1898; *Aristaeomorpha rostridentata* (Spence Bate, 1888); *Aristeomorpha foliacea* (Risso, 1827); *Aristeus japonicus* Yokoya, 1933; *Aristeus rostridentatus* Spence Bate, 1881 *Penaeus meridionalis* Hope, 1851; *Peneus foliacea* Risso, 1827

This species was reported by Dereli et al. (2021) from Sığacık Bay.

Depth range: 200-400 m

Worldwide Distribution: Atlantic, Mediterranean, Indo-Pacific (d'Udekem d'Acoz, 1999).

FAMILY: SOLENOCERIDAE WOOD-MASON *IN* WOOD-MASON & ALCOCK, 1891

GENUS: *SOLENOCERA* LUCAS, 1849

***Solenocera membranacea* (Risso, 1816)**

Synonyms: *Penaeus carinatus* Otto, 1821; *Penaeus distinctus* De Haan, 1849; *Penaeus membranaceus* Risso, 1816; *Penaeus siphonoceros* Philippi, 1840*; Peneus siphonoceros* Philippi, 1840; *Solenocera philippii* Lucas, 1849

S. membranacea was recorded by Özcan and Katağan (2009, 2011) from Sığacık Bay.

Depth range: 200-400 m

Worldwide Distribution: Atlantic, Mediterranean (Falciai and Minervini, 1996).

SUPERFAMILY: PASIPHAEOIDEA DANA, 1852

FAMILY: PASIPHAEIDAE DANA, 1852

GENUS: *PASIPHAEA* SAVIGNY, 1816

***Pasiphaea sivado* (Risso, 1816)**

Synonyms: *Alpheus sivado* Risso, 1816; *Pasiphaea brevirostris* H. Milne Edwards, 1837; *Pasiphaea distincta* Guérin-Méneville, 1844; *Pasiphaea neapolitana* Hope, 1851; *Pasiphaea savignyi* H. Milne Edwards, 1837

The species was reported by Özcan and Katağan (2009) from Sığacık Bay.

Depth range: 400-600 m

Worldwide Distribution: Atlantic, Mediterranean (d'Udekem d'Acoz, 1999).

ASTACIDEA

SUPERFAMILY: NEPHROPOIDEA DANA, 1852

FAMILY: NEPHROPIDAE DANA, 1852

GENUS: *NEPHROPS* LEACH, 1814

***Nephrops norvegicus* (Linnaeus, 1758)**

Synonyms: *Astacus rugosus* Rafinesque, 1814; *Cancer norvegicus* Linnaeus, 1758; *Nephrops norvegicus var. meridionalis* Zariquey Cenarro, 1935; *Nephrops norwegicus (*Linnaeus, 1758); *Nephropsis cornubiensis* Spence Bate and Brooking Rowe, 1880

N. norvegicus was reported by Özcan and Katağan (2009, 2011), Aydın and Aydın (2011), and Dereli et al. (2021) from Sığacık Bay.

Depth Range: 200-600 m

Worldwide Distribution: Atlantic, Mediterranean (Falciai and Minervini, 1996).

POLYCHELIDA

SUPERFAMILY: ERYONOIDEA DE HAAN, 1841

FAMILY: POLYCHELIDAE WOOD-MASON, 1874

GENUS: *POLYCHELES* HELLER, 1862

***Polycheles typhlops* Heller, 1862**

Synonyms: *Eryoneicus Kempi* Selbie, 1914*; Pentacheles Agassizii* A. Milne-Edwards, 1880; *Pentacheles Hextii* Alcock, 1894; *Polycheles doderleini* Riggio, 1895; *Polycheles hextii* (Alcock, 1894); *Polycheles typhlops typhlops* Heller, 1862; *Stereomastis artuzi* Artüz, Kubanç and Kubanç, 2014

The species was recorded by Özcan and Katağan (2009) from Sığacık Bay under the name *Polycheles typhlops typhlops*.

Depth Range: 300-400 m

Worldwide Distribution: Atlantic, Mediterranean (Falciai and Minervini, 1996).

DISCUSSION

In the present study, 16 deep-sea decapod crustaceans were determined from the Sığacık Bay, 5 of which belong to the Caridea, 3 to the Brachyura, 3 to the Dendrobranchiata, 1 to the Polychelida, 1 to the Astacidea, and 3 to the Anomura. Among these, 4 species (*Bathynectes maravigna*, *Munida intermedia*, *Processa canaliculata*, and *Pontophilus spinosus*) were new records for Sığacık Bay. *B. maravigna* was reported by Kocataş and Katağan (2003) from Aegean Sea coasts of Türkiye; and by Özcan et al. (2009b), Deval and Froglia (2016) and Deval et al. (2017) from the Mediterranean coasts of Türkiye. Previous records of *M. intermedia* from Turkish seas were only from Aegean Sea coasts of Türkiye (Katağan et al., 1988; Koçak et al., 2001; Kocataş and Katağan, 2003; Gönülal et al., 2014). *P. canaliculata* was previously reported by Müller (1986) from Sea of Marmara; by Santucci (1928) from the Aegean Sea coasts of Türkiye; by Kocataş and Katağan (2003), and Gönülal and Dalyan (2017) from the Mediterranean coasts of Türkiye. *P. spinosus* was reported by Adensamer (1898) and Kocataş and Katağan (2003) only from the Turkish Aegean Sea coasts.

In Özcan and Katağan (2009) 21 species are reported from Sığacık Bay, of which 5 are Caridea (*Aegaeon lacazei*, *Chlorotocus crassicornis*, *Plesionika narval* (as *Parapandalus narval*), *P. heterocarpus*, *Pasiphaea sivado*), 2 Dendrobranchiata (*Parapenaeus longirostris*, *Solenocera membranacea*), 10 Brachyura (*Calappa granulata, Goneplax rhomboides, Macropipus tuberculatus, Macropodia tenuirostris* (as *M. longipes*), *M. rostrata, Medorippe lanata, Spinolambrus macrochelos* (as *Parthenope macrochelos*), *Parthenopoides massena* (as *Parthenope massena*), *Pilumnus hirtellus, Xantho pilipes*), 1 Astacidea (*Nephrops norvegicus*), 1 Polychelida (*Polycheles typhlops (as Polycheles typhlops typhlops)*), 2 Anomura (*Iridonida speciosa* (as *Munida rutllanti*), *Pagurus prideaux*). Among these, 9 were also recorded in the present study (*A. lacazei*, *P. longirostris*, *S. membranacea*, *P. heterocarpus*, *M. tuberculatus*, *N. norvegicus*, *P. typhlops*, *I. speciosa*, *P. prideaux*). Since then 3 more deep-sea decapod crustacean species have been reported from Sığacık Bay (*Inachus parvirostris* (Kocak, 2010), *Plesionika martia* (Koçak et al., 2012) and *Aristaeomorpha foliacea* (Dereli et al., 2021). The contributions increased the total number of deep-sea decapod crustacean species found in Sığacık Bay to 24.

CONCLUSION

In the present study, *Bathynectes maravigna*, *Munida intermedia*, *Pontophilus spinosus* and *Processa canaliculata* are the first record from Sığacık Bay. With these species, the total number of deep-sea decapod crustacean species in Sığacık Bay is raised from 24 to 28.

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AUTHORSHIP CONTRIBUTIONS

Single author.

CONFLICT OF INTEREST STATEMENT

The author declare that there are no conflicts of interest or competing interests.

ETHICS APPROVAL

No specific ethical approval was necessary for this study.

DATA AVAILABILITY

All relevant data is in the article.

REFERENCES

Adensamser, T. (1898). Berichte der Commission für Erforschung des östlichen Mittelmeers. XXII. Zoologische Ergebnisse. XI. Decapoden gesammelt auf S.M. Schiff Pola in den Jahren 1890-1894. *Denkschriften der Mathematisch-Naturwissenschaftlichen Classe der Kaiserlichen Akademie der Wissenschaften, 65*, 597-628.

Aydın, I., & Aydın, C. (2011). Length-length and length-weight relationships in *Nephrops norvegicus* from the Aegean Sea (Linnaeus, 1758). *Mediterranean Marine Science*, *12*(1), 121-128. https://doi.org/10.12681/mms.56

Bakır A.K., Katağan T., Aker H.V., Özcan T., Sezgin M., Ateş A.S., Koçak C., & Kırkım F. (2014). The Marine Arthropods of Turkey. *Turkish Journal of Zoology*, *38*, 765-831. https://doi.org/10.3906/zoo-1405-48

Dereli, H., Salman, M. A., Özaydın, O., & Tosunoğlu, Z. (2021). Spatial and temporal characteristics of demersal assemblages in Sığacık Bay, Central Aegean Sea, Turkey. *COMU Journal of Marine Science Fisheries*, *4*(2), 116-129. https://doi.org/10.46384/jmsf.977558

Deval, M.C., & Froglia, C. (2016). New records of deep-sea decapod crustaceans in the Turkish Mediterranean Sea (North Levant Sea). *Zoology in the Middle East, 62*(4), 323–330. https://doi.org/10.1080/09397140.2016.1250709

Deval, M.C., Yılmaz, S., & Kapiris, K. (2017). Spatio temporal variations in decapod crustacean assemblages of bathyal ground in the Antalya Bay (Eastern Mediterranean). *Turkish Journal of Fisheries and Aquatic Sciences*, *17*, 967-979. https://doi.org/10.4194/1303-2712-v17_5_12

Falciai, L., & Minervini, R. (1996). *Guide des Homards, crabes, langoustes, crevettes et autres Crustacés Décapodos d'Europe*. Paris, France: Delachaux et Niestlé Publishers.

Geldiay, R., & Kocataş, A. (1970). A report on the Anomura collected from the Aegean coast of Turkey (Crustacea, Decapoda). İzmir, Türkiye: Ege University, Faculty of Science Publishers.

Gönülal, O., & Dalyan, C. (2017). Bathymetric distribution of macroinvertebrates in the Northeastern Levantine Sea and the

Northeastern Aegean Sea based on bottom-trawl surveys. *Oceanological and Hydrobiological Studies*, *46*(4), 405-413. https://doi.org/ 10.1515/ohs-2017-0040

Gönülal, O., Sezgin, M., & Öztürk, B. (2014). Diversity and bathymetric distribution of decapod crustaceans attracted to baited traps from the middle slope of the Northern Aegean Sea. *Crustaceana*, *87*, 19–34. https://doi.org/10.1163/15685403-00003278

Ingle, R. W. (1993). *Hermit crabs of the Northeastern Atlantic Ocean and Mediterranean Sea. An Illustrated key*. London, Chapman and Hall Press.

Katağan, T., Kocataş, A., & Benli, H.A. (1988). Note Préliminaire Sur Les Décapodes Bathyaux de la côte Turque de la Mer Egée. CIESM. Rapp. Comm. int. Mer Médit. *31*(2), 23.

Kocak, C. (2010). Supplementary data on the distribution of *Inachus parvirostris* (Risso, 1816) (Decapoda, Brachyura, Inachidae) from Turkey. *Crustaceana*, *83*(9), 1135-1139. https://doi.org/10.1163/001121610X520975

Koçak, C., & Katağan, T. (2008). Contribution to the knowledge on the bathymetric Distribution of anomurans (Decapoda, Anomura) in the Aegean Sea (Eastern Mediterranean). *Crustaceana*, *81* (1), 99-108.

Koçak, C., Katağan, T., & Kocataş, A. (2001). Anomurans of the Aegean Coasts of Turkey and Reported Species from Turkish Seas. *Turkish Journal of Zoology*, *25* (3), 305-311.

Kocak, C., Leblebici, S., Ozaydın, O., & Katagan, T. (2008). Some morphometric aspects of *Munida rutllanti* Zariquiey Alvarez, 1952 (Decapoda, Anomura, Galatheidae) in Sıgacık Bay (Southeastern Aegean Sea). *Crustaceana*, *81*(7), 873-881.

Koçak, C., Özbek, M., & Tosunoğlu, Z. (2012). Aspects of biology of the deep-water pandalid shrimp *Plesionika martia* (A. Milne-Edwards, 1883) from Sığacık Bay (eastern Mediterranean). *Turkish Journal of Zoology*, *36*(2), 215-221. https://doi.org/10.3906/zoo-1006-4

Kocataş A., & Katağan, T. (2003). The decapod crustacean fauna of Turkish Seas. *Zoology in the Middle East*, *29*, 63–74.

Müller, G. J. (1986). Review of the hitherto recorded species of Crustacea Decapoda from the Bosphorus, the Sea of Marmara and the Dardanelles. *Cercetari Marine IRCM*, *19*, 109-130.

Noël, P. Y. (1992). *Clé préliminaire d'identification des Crustacea Decapoda de France et des principales autres espèces d'Europe. Secrétariat de la Faune et de la Flore*. Paris, France: Muséum National d'Histoire Naturelle Publishers.

Oraner, E., Tosunoğlu, Z., Koçak, C., & Özbek, M. (2018). Some morphometric features of *Plesionika heterocarpus* (Decapoda: Pandalidae) in Sığacık Bay, Aegean Sea. *Ege Journal of Fisheries and Aquatic Sciences, 35*(1), 1-6. https://doi.org/10.12714/egejfas.2018.35.1.01

Özcan T, Irmak, E, Ateş A.S., & Katağan, T. (2009a). First record of the red shrimp, *Aristeus antennatus* (Risso, 1816) (Decapoda: Aristeidae) from the Aegean Sea coast of Turkey. *Mediterranean Marine Science*, *10*, 121–124.

Özcan, T., Irmak, E., Ateş, A.S., & Katağan, T. (2009b). The occurence of *Bathynectes maravigna* (Decapoda: Brachyura: Portunidae) in the Turkish Part of the Levantine Sea. *Marine Biodiversity Records*, *2*, 1-2. https://doi.org/10.1017/S1755267209000955

Özcan, T., & Katağan, T. (2009). Deep-Water Decapod Crustacean Fauna of the Sıgacık Bay, Aegean Sea Coast of Turkey. *Ege Journal of Fisheries & Aquatic Sciences*, *26*(2), 149-151.

Özcan, T., & Katağan, T. (2011). Length-weight relationship of eight decapod crustaceans of the Sığacık Bay, Aegean Sea coast of Turkey. *IUFS Journal of Biology, 70*(1), 45-48.

Sardà, F., Cartes, J.E., & Company, J.B. (1994). Spatio-temporal variations in megabenthos abundance in three different habitats of the Catalan deep-sea (Western Mediterranean). *Marine Biology*, *120*, 211-219. https://doi.org/10.1007/bf00349681

Santucci R. (1928). Alcuni Crostacei Decapodi delle isole Egee. Ricerche faunistiche nelle isole italiane dell' Egeo. *Archivio Zoologico ItalianoArchivio Zoologico Italiano*,*12*, 345‑354.

Udekem d'Acoz, C.d', (1999)**.** *Inventaire et distribution des Crustacés Décapodes de l'Atlantique nord-oriental, de la Méditerranée et des eaux continentales adjacentes au nord de 25°N*. Paris, France: Muséum National d'Histoire Naturelle Publishers.

WoRMS (2024, February 14). World register of marine species. Decapoda. https://www.marinespecies.org/aphia.php?p=taxdetails&id=1130

Zariquiey Álvarez, R. (1968). *Crustáceos Decápodos Ibéricos*. Barcelona, Juvenil Press.