The morphological characters of *Mothocya taurica* (Czerniavsky, 1868) and *Emetha audouini* (H. Milne Edwards, 1840) from Turkey

AHMET ÖKṬENER¹, ALİ ALAŞ², DİLEK TÜRKER³

¹Department of Fisheries, Sheep Research Station. Çanakkale Street 7km, 10200, Bandırma, Balıkesir, Turkey. Tel.: +90-266-7380080, *email: ahmetoktener@yahoo.com*

²Department of Biology, Faculty of Education, Necmettin Erbakan University. B Block, 42090, Meram, Konya, Turkey

³Department of Biology, Faculty of Science, Balıkesir University. Cagni Campus, 10300, Balıkesir, Turkey

Manuscript received: 30 May 2017. Revision accepted: 27 June 2017.

Abstract. Ökṭener A, Alaş A, Tüker D. 2017. The morphological characters of *Mothocya taurica* (Czerniavsky, 1868) and *Emetha audouini* (H. Milne Edwards, 1840) from Turkey. *Bonorowo Wetlands* 7: 55-64. This paper aims to present morphological characters of two species, *Mothocya taurica* (Czerniavsky, 1868) and *Emetha audouini* (H. Milne Edwards, 1840) from Turkey. Although *Mothocya taurica* with different synonyms were described by several researchers, Bruce (1986) indicated the necessity of redescription of *Mothocya taurica*. Pleopods 1 to 5 having medial peduncle margin with 4 hooks of *Emetha audouini* is found for the first time in this study as distinct from other studies. Also, the host preferences of these parasites are given.

Keywords: Cymothoidea, *Emetha*, Isopoda, morphology, *Mothocya*, Turkey

INTRODUCTION

Cymothoids are ectoparasitic isopods on the body, fins, or inside the buccal or the branchial cavities of numerous freshwater and marine fishes. They are protandrous hermaphrodite (Bariche and Trilles 2005). Although the Cymothoidae family is famously known, there are some deficiencies from the taxonomic point of view. According to some researchers, studies concerned with molecular and morphological are needed on this family (Poore and Bruce 2012; Martin et al. 2013; Hadfield et al. 2016).

Thirty-one species in the *Mothocya* genus and two in the *Emetha* genus were listed by The World Register of Marine Species (Hadfield et al., 2017; Schotte 2007). Three species (*Mothocya epimerica*, *Mothocya taurica*, *Mothocya belonae*) of *Mothocya* and one species (*Emetha audouini*) of *Emetha* are reported from Turkish waters, but these studies include limited information about the morphology of mouth-parts (Ökṭener and Trilles 2004; Kırkım 1998). *Mothocya taurica* was reported from the Black Sea, the Mediterranean Sea (Trilles 1994; Bruce 1986; Kononenko 1988; Ramdane et al. 2006). Bruce (1986) pointed out a needed evaluation of the status of this species.

The morphological characters are given in the study obtain a possibility to compare the other countries’ findings next time. Although it could not use electron microscopy, the DNA barcoding and molecular identification methods are reliable and expensive in this study. It aims to present the morphological characters, especially including mouthparts of *Mothocya taurica* and *Emetha audouini* from Turkey.

MATERIALS AND METHODS

Eighty-three *Alosa* sp. (Pisces; Clupeidae) and 38 picarel *Spicara maena* (Linnaeus, 1758) (Pisces; Centracanthidae), 56 *Sardinella aurita* Valenciennes, 1847 (Clupeidae), 170 *Engraulis encrasicolus* (Linnaeus, 1758) (Engraulidae) were collected with the local fishing gears in the Sea of Marmara in 2014. The collected parasites were fixed in 70% ethanol. Mouthparts and pleopods were dissected using a Wild M5 stereo microscope. The dissected parts were mounted on slides in a glycerin medium. The pleopods of isopods were stained with methylene blue. The appendages were drawn with the aid of a camera lucida (Olympus BH-DA). The photos were taken with Canon EOS 1100D camera attached to the microscope. The measurements were taken in millimeters (mm) with a micrometric program (Pro-way). The scientific names synonyms of parasite and host were checked with the WoRMS Editorial Board (2017). According to Froese and Pauly (2017), the host’s feeding habits and habitat characteristics were prepared. *Mothocya taurica* (MNHN-IU-2013-18751) and *Emetha audouini* (MNHN-IU-2017-16) was deposited in the collections of the Musée National d’Histoire Naturelle (MNHN), Paris, France.

RESULTS AND DISCUSSION

*Mothocya taurica* (Czerniavsky, 1868) (Figure 1-6)

Synonyms:

*Cymothoa oestrum* Rathke, 1837: 394
*Cymothoa punctata* Uljanin, 1872: 113-114.—Popov, 1933: 193,196-198.—Markewitsch, 1934: 224,225, pl.XLV (fig.10-11).—Nikolaeva, 1963: 1-46
Lironeca pontica  Borcea, 1933a: 128.—Borcea, 1933b: 481-502, figs 1-9, pl.s 2-4.

Livoneca punctata  Vasiliu and Carasu, 1948: 180-184, pl.II (fig.1-12),pl.III (fig.13-38d).—Carasu, 1959: 349-351.pl.I (fig.A-B)

Livoneca punctata  Trilles, 1976a: 782-783, pl.I. fig.6.—
Dollfus and Trilles, 1976: 828

Livoneca taurica  Kussakin, 1979: 295, figs. 160, 161.

Lironeca taurica  Uljanin, 1871: 113.—Uljanin, 1872: 113

Host:  Alosa sp. (the shad); Locality: Bandırma Bay;
Total parasite: 5; Dissected parasite: 3.

All parasites were firmly attached to the gill cavity of the host. The prevalence means the intensity of parasites were 6%, 1 respectively.

Description-female: Body length varies from 15 to 19 mm. Body slightly twisted to one side, about 2 times as long as wide. Pereon widest at pereonite 4, most narrow at pereonite 1. Coxal plates are visible in dorsal view, with round posterior margins. Length of coxae greater than width. Pereonite 1 longest, length of pereonites decreasing step by step from 3 to 7; pereonite 7 shortest. The width of the head is about 2 times the head length. Pleotelson wider than length, posterior margin evenly rounded, about 1.6 wider than long. All pleonites visible, the first pleonite distinctly narrow, 2.5; pleonites slightly wider. Pleon 1 largely and pleon 2 partially concealed by pereonite 7. Antennula and antenna are composed of eight articles. Mandible palp third article distinctly shorter than others. Maxillula with four terminal spines, one long and three short spines. Maxilla medial lobe with 2 spines, lateral lobe with 2 spines. Maxilliped article 3 with five hooked spines. Pereopods 5-7 are slightly larger than pereopod 1-4, all without spines. Pleopods 1 to 5 has a medial peduncle margin with 4 hooks. Pleopods 3 to 5 endopods with large proximomedial lobes. Uropod rami not extending beyond pleotelson; endopod slightly longer than exopod.

Distribution:  Black Sea, Mediterranean Sea, Aegean Sea (Bruce 1986; Kononenko 1988; Trilles 1994; Ramdane et al. 2006; Schotte 2008a; Ramdane et al. 2009.).

Hosts:  Alosa immaculata  (Borcea 1933a; Borcea 1933b; Vasiliu and Carasu 1948; Muradian 1972; Kussakin 1979; Trilles 1976; Bruce 1986; Trilles 1994; Öktener and Trilles 2004; Olguner 2008; Öktener et al. 2010);  Alosa fallax  (Dollfus and Trilles 1976);  Atherina hepetus  and  Gobius sp  (Markewitsch 1934);  Alosa tanaica,  Pomatomus saltatrix  (Borcea 1933a);  Engraulis encrasicolus, Sprattus sprattus, Trachurus mediterraneus  (Nikolaeva 1963);  Helicolenus dactylopterus, Trisopterus minutus  (Öktener et al. 2009);  Sardina pilchardus  (Borcea 1933a; Markewitsch 1934; Vasiliu and Carasu 1948);  Scompaena porcus  (Markewitsch 1934; Josipa et al. 2007).

The host’s parasitism with  Mothoeya taurica  has been examined according to family characteristics 37% of 13 hosts belong to Clupeidae, and 63% to Carangidae, Gadidae, Scorpaenidae, Pomatomidae, Sebastidae, Gobiidae, Engraulidae, and Atherinidae. The host’s parasitism with  Mothoeya taurica  was examined according to habitat selections; 54% of 13 host fish species are pelagic-neritic; 15% pelagic-oceanic; 15% demersal; 8% benthopelagic, and 8% bathydemersal. According to feeding habits, the host’s parasitism with  Mothoeya taurica; all hosts are carnivorous.

Clupeidae fishes are hosts of  Mothoeya taurica. This parasite selects carnivorous and pelagic fishes as hosts for habitat and feeding habits. This study examined  Alosa sp. is a carnivorous and pelagic fish. It is fit as preferring host for  Mothoeya taurica. Although it should indicate references to this statement that  Mothoeya taurica  is also reported from  Engraulis encrasicolus  and  Sardina aurita, it was not found in these fishes.

Remarks:  The antennula and the antenna with 8 articles found in this study agree with the descriptions of  Borcea (1933b); Vasiliu and Carasu (1948);  Kussakin (1979);  Bruce (1986);  Öktener et al. (2010, re-examined). The maxillula with four terminal spines found in this study is compatible with  Kussakin (1979), Vasiliu and Carasu (1948), and  Öktener et al. (2010). The medial lobe and lateral lobe with 2 spines of maxilla found in this study are compatible with the findings indicated by  Kussakin (1979) and  Öktener et al. (2010), while the medial lobe with 1 spine and the lateral lobe with 2 spines mentioned by  Vasiliu and Carasu (1948).

The third article without setae on the lateral margin of the mandible palp found in this study is compatible with the descriptions of  Kussakin (1979) and  Öktener et al. (2010), excepting for Vasiliu and Carasu (1948) findings. Five spines on article 3 of the maxilliped of ovigerous female were observed in this study, while 4 spines on an article of ovigerous female maxilliped were described by  Kussakin (1979); 4 spines on an article of female maxilliped by  Vasiliu and Carasu (1948), and 5 spines on an article of ovigerous female maxilliped by  Öktener et al. (2010).

There are limited studies about the morphology of  Mothoeya taurica  (Borcea 1933b; Vasiliu and Carasu 1948;  Kussakin 1979;  Bruce 1986;  Öktener et al. 2010). The findings of the structures of mouthparts, pereopod, and pleopod in this study agree with the previous literature. In appearance,  Mothoeya taurica  is very similar to  M. beloae. It can be distinguished by having slightly wider coxae, a rounder pleotelson, and pleopods 3 to 5 endopods with much larger proximomedial lobes as well as a distolateral extension, according to  Bruce (1986).

Emetha audouini  (H. Milne Edwards, 1840) (Figure 9-14)

Synonyms:
Cymothoa audouini  Milne-Edwards, 1840: 274-275.—
Heller, 1866: 738-739.—Statio, 1877: 237.—Stossich, 1880: 45.—Gerstaecker, 1901: 255-257
Cymothoa nigropunctata  Hope, 1851: 33
Cymothoa audouini:  Hope, 1851: 33
Emetha audouini:  Schoedelte and Meinert, 1883: 317-321, tab.XI, fig.14-18.—
Dudib, 1931: 18.—Montalenti, 1941: 337-394.—Montalenti, 1948: 27-36,tav.1 (fig.1-8).—
Amar, 1951: 530.—Euzet and Trilles, 1961: 190-191.—
Trilles, 1962: 103-106.—Trilles, 1964: 107-108.—Trilles, 1968: 20-36, pl.IV,phot.2-5.—Thampy and John, 1974: 580, 582.—Quignard and Zaouali, 1980: 357.—Brusca, 1981: 127.—Sartor, 1986: 1-12.—Sartor, 1987: 49.—
Wagele, 1987: 1-398.
Figure 1. Mothocya taurica ♀

Figure 3. Mothocya taurica ♀, A. antennula (0.25 mm), B. antenna (0.27 mm), C. maxillula (0.40 mm), D. maxilla (0.26 mm), E. mandible (0.35 mm), F. maxilliped (0.47 mm)

Figure 4. Mothocya taurica ♀, A-G. pereopds I-VII (1.2 mm)

Figure 5. Mothocya taurica ♀, A-E. pleopds I-V (1.43 mm), F. uropod (1.33 mm).
Figure 2. *Mothocya taurica* ♀, A. antenna (0.27 mm), B. antennula (0.25 mm), C. maxilliped (0.47 mm), D. spines on maxilliped (2 mm), E. maxilla (0.26 mm), F. spines on maxilla, G. maxillula (0.10 mm), H. mandible (0.14 mm)
Figure 6. Four hooks on medial peduncle margin of pleopods (Mothocya taurica♀)

Figure 7. Mothocya taurica on the right and left gill chamber of fish

Figure 8. Atrophy on the gill filaments of fish parasitized by Mothocya taurica

Emetha audouini Carus, 1885: 442.—Quintard-Dorques, 1966: 10.—Berner, 1969: 93-95.—Trilles, 1972a: 1192-1196, fig.1-45, pl (1-3).—Trilles, 1972b: 1232-1233.—Trilles, 1972c: 1269-1277, fig.1-13.—Trilles, 1977: 8.—Romestand and Trilles, 1977: 92-95, fig.1-2.—Radujkovic, 1982: 155-161.—Radujkovic et al, 1984: 161-181.—Trilles et al. 1989: 279-306, fig.7

Emetha adriatica Bovallius, 1885: 17-20, pl.IV (fig. 34-40)

Ceratothoa salparum Gourret, 1891: 18-19, tav.I (fig.19), tav. XI (figs.7-13)

Host: Spicara maena (Linnaeus, 1758) (Blotched picarel); Locality: Bandırma Bay; Total parasite: 8; Dissected parasite: 6.

All parasites were firmly attached to the mouth cavity of the host. The prevalence means the intensity of parasites was 21%, 1 respectively.

Description-female: Body length varies from 18 to 22 mm. The body expands from anterior to posterior, later narrower. The body is about 2.5-3 times as long as wide. The width of pereonites increases from 1 to 5, after that decreasing. Pereonite 5 widest, pereonite 7 narrowest. 3-7 coxal plates visible in dorsal view. 3-5 pereonites are approximate of equal length, pereonite 7 shortest. The eyes are small, concealed by antennula and antenna. Pleotelson wider than large, posterior margin rounded. All pleonites visible, first pleonite narrowest. 2-5 pleonites wider than
the first one. All pleonites are of equal length. Antennula is extending to behind the eye, composed of seven articles. Antenna extending to the middle of 1 pereon. Pereon, with eight articles. Mandible palp third article distinctly shorter than others, without setae. Maxillula with four terminal spines, one long and three short spines. Maxilla medial lobe with 2 spines, lateral lobe with 3-4 spines. Maxilliped article 6 with five hooked spines in ovigerous and non-ovigerous females. Pereopods 1-3 are slightly smaller than 4-7, all without spines. The expansion on the upper and lower parts of 5-7 pereopod is distinct from 1-4 pereopods. Pleopods gradually decrease in length. Pleopods 1 to 5 has a medial peduncle margin with 4 hooks. Uropod rami extend to the posterior margin of the pleotelson. Exopod is slightly longer than endopod.

**Distribution:** The Mediterranean Sea, Adriatic (Trilles 1994; Schotte 2008b).

**Hosts:** Boops boops (Montalenti 1948; Kirkum 1998); Spicara smaris (Montalenti 1948; Berner 1969; Papoutsoglou 1976; Trilles 1977; Trilles et al. 1989; Ramdane et al. 2009; Radujkovic et al. 1984; Kirkum 1998); Spicara maena (Montalenti 1948; Berner 1969; Romestand et al. 1976; Öktenen and Trilles 2004); Sarpa salpa (Montalenti 1948); Centracanthus cirrus (Schioedte and Meinert 1883); Pagellus acarne, Raja clavata (Trilles et al. 1989); Scomber scombrus (Balcells 1954); Dicentrarchus labrax (Papapanagiotou et al. 1999); Clupea sp (Trilles 1977).
Figure 10. *Emetha audouini* ♀. A. antenna (0.68 mm), B. antennula (0.37 mm), C. maxilla (0.24 mm), D. distal of maxilla, E. maxilliped of non-ovigerous female (0.17 mm), F. maxilliped of ovigerous female (0.21 mm), G. distal of maxilliped, H. mandible (0.35 mm), I. maxillula (0.30 mm), J. distal of maxillula.
The host’s parasitism with *Emetha audouini* was examined according to the family characteristics; 30% of 10 host species belong to Sparidae; 30% to Centracanthidae; 40% to Rajidae, Scombridae, Moronidae, and Clupeidae. According to habitat selections, the host’s parasitism with *Emetha audouini* was examined; 30% of 10 host fish species are benthopelagic; 30% demersal; 30% pelagic-neritic; 10% pelagic-oceanic. The host’s parasitism with *Mothoeya taurica* was examined according to feeding habits; 60% of the 10 host fish species are omnivorous; 40% carnivorous.

Fish of the Centracanthidae family are the preferred hosts for *Emetha audouini*, which mainly select omnivorous and benthopelagic fishes.

Remarks: The antennula with 7 articles and antenna with 8 articles are observed in this study, while antennula and antenna with 7 articles are indicated by Montalenti (1948); antennula with 7 articles and antenna with 9 articles by Trilles (1972) and Karkum (1988); antennula and antenna with 8 articles by Schoedtele ve Meiner (1883). The maxillula with four terminal spines found in this study is compatible with Trilles (1968, 1972) and Montalenti (1948)’s findings. The medial lobe with 4-7 spines and lateral lobe with 6-12 spines of the maxilla is found in this study, while the medial lobe without spines and the lateral lobe with 4 spines were found by Montalenti (1948); medial lobe with 1 spine and lateral lobe with 3 spines by Trilles (1968, 1972). The third article with setae on the lateral margin of the mandible palp found in this study is compatible with Trilles’s (1968, 1972) and Montalenti’s (1948) findings. This study found six spines on article 3 of maxilliped of ovigerous and non-ovigerous females, while 6 spines on an article of only ovigerous female maxillipede were described by Trilles (1968). The observed expansions based on pereopod 7 distinct from pereopods 1-4 are compatible with Trilles (1968, 1972) and Montalenti (1984) findings. The pleopods 1 to 5 having peduncle medial margin with 4 hooks are found for the first time as distinct from the previous studies.

REFERENCES

Amar R. 1951. Isopodes marins de Banyuls. Vie et Milieu 2 (4): 529-530.
Balcells E. 1953. Sur des isopodes, parasites de poissons. Vie et Milieu 4 (3): 547-552.
Bariche M, Trilles JP. 2005. Preliminary check-list of Cymothoids (Crustacea, Isopoda) from Lebanon, parasitising marine fishes. Zool Middle East 34 (1): 5-12. DOI: 10.1080/099397140.2005.10638082.
Berner L. 1969. Les principaux Cymothoïdes (Crustaces Isopodes) du Golfe de Marseille. Bulletin du Museum d'Histoire Naturelle de Marseille 29: 93-95.
Borcea I. 1933a. *Livoneca pontica* nov. sp., copepode parasite des Aloses et Sardines de la Mer Noire. Bulletin du Muséum National d’Histoire naturelle de Paris 2: 128-129.
Borcea I. 1933b. *Livoneca pontica* nov. sp., Cymothoïde parasite des Aloses et Sardines de la Mer Noire. Annales Scientifiques de l’Université de Jassy 17: 481-502.
Bovalius C. 1885. New or imperfectly known Isopoda. Part 1.Bihang till Kongl. Svenska vetenskaps-akademiens handlingar 10 (2): 1-32.
Bruce NL. 1986. Revision of the Isopod crustaceae genus *Mothoeya* Costa, in Hope, 1851 (Cymothoidae: Flabellifera), parasitic on marine fishes, J Nat Hist 20 (5): 1089-1112. DOI: 10.1080/0022293600770781.
Brusca RC. 1981. A monograph on the Isopoda Cymothoidae (Crustacea) of the eastern Pacific. Zool J Linn Soc 73 (2): 117-199. DOI: 10.1111/j.1096-3642.1981.tb01592.x.
Carasus A. 1959. Contribution à l’étude des Cymothoïnaceae (Isopodes Parasites) de la mer Noire. 2. Un cas d’infestation massive avec *Livoneca punctata* (U1.) chez *Caspialosa pontica* (Eichw.). Trav. Larcurlele Sesuim Stintificio a Statiuna Zoologice Marine Agiea 1959: 349-351.
Carus JY. 1885. Prodomus faunae mediterraneae sive Descriptio Animalium maris Mediterranean incolarum quam comparata silva rarum quatenus innotuit adjectis locis et nominibus vulgaribus eorumque auctoribus in commodum zoologorum. Schweizerbart, Stuttgart. DOI: 10.5962/bhl.title.11523.
Dollfus RP, Trilles JP. 1976. A propos de la collection R. Ph. Dollfus, mise au point sur les Cymothoidiens jusqu’ à présent récoltés sur des Télérosteens du Maroc et de l’Algérie. Bulletin du Muséum National d’Histoire naturelle de Paris 272: 821-830.
Dudich E. 1931. Systematische und biologische Untersuchungen über die Kalkenlagerungen des Crustaceenpanzers in polarisiertem lichter. Zoologica Stuttgart 30 (80): 1-54.
Euzet L, Trilles JP. 1961. Sur l’anatomie et la biologie de Cyclocotyla bellones (Otto, 1821) (Monogenea-Polyopisthocotylea), Revue Suisse de Zoologie 68 (2): 182-193. DOI: 10.5962/bhl.part.117723.
Froese R, Pauly D. Editors. 2017. FishBase. World Wide Web electronic publication. www.fishbase.org, version (06/2017).
Gerstaecker A. 1901. Isopoda In: Bronn HG (ed) Die Klassen und Ordnungen der Arthropoden wissenschaftlich dargestellt in Wort und
Bild Crustacea (Zweite Hälfte: Malacostraca), Fünfter Band. II, Abtheilung.

Gouret P. 1891. Les Lemnopodes et les Isopodes de Golfe de Marseille. Annales du Musée d'Histoire Naturelle de Marseille 4 (1): 1-44.

Hadfield KA, Horton T, Bruce NL, Schotte M. 2017. Mohocya Costa in Fishery Research Greece 8 (12). DOI: 10.5962/bhl.title.3924.

Josipa F, Mirela P, Sanja M, Jakov D. 2007. An occurrence of isopode parasitism on black scorpion fish, Scorpaena porcus (Percoformes, Scorpaenidae) in the eastern part of Adriatic Sea. 12th European Congress of Ichthyology (ECI-12) Book of abstracts / Burgess, B. Juga; Zanella, Linda; Mrakovic, Milorad (ed.).-Zagreb: Tepontal.

Kirkm F. 1998. Ege Denizi Isopoda (Crustacea) Faunasının Sistematiği ve Ekolojisi Üzerine Araştırma”. Doktora Tezleri, Ege Üniversitesi, İzmir, 233 syf. [Turkish]

Kononenko AF. 1988. Parasitic Isopoda of the Black Sea fishes. Wiadomosci Parazytopatologiczne 34 (1), 1p.

Kussakin OG. 1979. Marine and Brackish Water Isopod Crustacea. Suborder Flabellifera. Academy of Science, USSR, Leningrad. [Russian]

Markewish P. 1934. Skorupiaki paszytniczy ryb. Ukrainy. Die Schmarogdzerkze der Fische der Ukraine. Annales Museum Zoology Polonica 12: 229-249.

Martin MB, Bruce NL, Nowak BF. 2013. Redescription of Ceratophela sarina (Biancomb, 1869) and Ceratophela oxyrhyncha Koebel, 1878 (Crustacea: Isopoda: Cymothoidea), buccal-attaching fish parasites new to Australia, Zootaxa 3683 (4): 395-410. DOI: 10.11646/zootaxa.3683.4.4.

Milne-Edwards H. 1840. Histoire Naturelle des Crustacés Comprément l’anatomie, la physiologie et la classification de ces animaux. Roret, Paris.

Montalenti G. 1948. Note sulla sistematica e la biologia di alcuni Cimotoidi del Golfo di Napoli. Atti della Reale Instituto Veneto di Scienze, Lettere ed Arti 274 (127): 629.

Muradian Z. 1972. Contribution a La Connaissance de la Parasitofaune des poissons hôtes. Thèse de Doctorat en Biologie Médicale, Université de Fribourg, Suisse.

Öktener A, Trilles JP. 2004. Report on the Cymothoids (Crustacea, Anilocra physoides) from cu. Benthic Amphipods of the south Adriatic economically important fish species. Acta Adriatica 23 (1/2): 153-161.

Öktener A, Trilles JP. 2017. Influence of Cymothoaidens (Crustacea, Isopoda, Flabellifera) on certaine constantes hâtologiques des poissons hôtes, Zeitschrift für Parasitenkunde 52 (1): 91-95. DOI: 10.1007/BF00380562.

Schotte M. 2008. Emetha Schioedte & Meinert, 1883. In: Boyko CB, Bruce NL, Hadfield KA, Merrin KL, Ota Y, Poore GCB, Taiti S, Schotte M, Wilson GDF (eds) (2008 onwards). World Marine, Freshwater, and Terrestrial Isopod Crustaceans database. http://www.marinespecies.org/aphia.php?p=taxdetails&id=118894.

Schotte M. 2007. Emetha Schioedte & Meinert, 1883. In: Boyko CB, Bruce NL, Hadfield KA, Merrin KL, Ota Y, Poore GCB, Taiti S, Schotte M, Wilson GDF (eds) (2008 onwards). World Marine, Freshwater, and Terrestrial Isopod Crustaceans database. http://www.marinespecies.org/aphia.php?p=taxdetails&id=55241987000100006.

Schotte M. 2008a. Mohocya Costa in Fishery Research Greece 8 (12). DOI: 10.5962/bhl.title.3924.

Schotte M. 2008b. Emetha audouini (H. Milne Edwards, 1840). In: Boyko CB, Bruce NL, Hadfield KA, Merrin KL, Ota Y, Poore GCB, Taiti S, Schotte M, Wilson GDF (eds) (2008 onwards). World Marine, Freshwater, and Terrestrial Isopod Crustaceans database. http://www.marinespecies.org/aphia.php?p=taxdetails&id=118894.

Schotte M. 2008c. Mohocya Costa in Fishery Research Greece 8 (12). DOI: 10.5962/bhl.title.3924.

Schotte M. 2008d. Mohocya Costa in Fishery Research Greece 8 (12). DOI: 10.5962/bhl.title.3924.

Schotte M. 2008e. Mohocya Costa in Fishery Research Greece 8 (12). DOI: 10.5962/bhl.title.3924.

Schotte M. 2008f. Mohocya Costa in Fishery Research Greece 8 (12). DOI: 10.5962/bhl.title.3924.

Schotte M. 2008g. Mohocya Costa in Fishery Research Greece 8 (12). DOI: 10.5962/bhl.title.3924.
Trilles JP. 1962. Remarques morphologiques et biologiques sur les ‘Isopodes Cymothoida, parasites des poissons, de l’État de Thau. Naturalia Monspellogia 3: 101-124.

Trilles JP. 1964. Specificité parasitaire chez les isopodes Cymothoidae Mediterraneens. Note preliminaire. Vie et Milieu 15: 105-116.

Trilles JP. 1968. Recherches sur les Isopodes. Cymothoidae de cotes Françaises. I. Systematique et faunistique. II. Bionomie et parasitism. [These de Doctorat sciences], CNRS, AO 2305, Montpellier, France.

Trilles JP. 1972a. Les Cymothoidae (Isopoda, Flabellifera) des côtes françaises (systématique, faunistique, écologie et répartition géographique). I. Les Ceratothoinae Schiodte and Meinert, 1883. Bulletin du Muséum national d’Histoire naturelle, Paris, 3e série, Zoologie 91: 1191-1230.

Trilles JP. 1972b. Les Cymothoidae (Isopoda, Flabellifera) du Muséum National d’Histoire Naturelle de Paris. Etude critique accompagnée de précisions en particulier sur la répartition géographique et l’écologie des différentes espèces représentées. I. Les Ceratothoinae Schiodte et Meinert, 1883. Bulletin du Muséum d’Histoire Naturelle, Paris, 3e série, Zoologie 91: 1231-1268. [French]

Trilles JP. 1972c. Sur la structure des plkopodes et des oosttgites chez les Cymothoidae (Isopoda, Flabellifera) et ses rapports avec les caracteristiques kologiques des espèces. Bulletin du Muséum National d’Histoire Naturelle, Paris, 3ème série 91 (3): 1269-1277.

Trilles JP. 1976. Les Cymothoidae (Isopoda, Flabellifera) des collections du Museum National d'Histoire Naturelle de Paris. IV. Les Lironectinae Schiodte et Meinert, 1884. Bulletin du Museum National d'Histoire Naturelle, Paris, 3 serie 390 (272): 773-800.

Trilles JP. 1977. Les Cymothoidae (Isopoda, Flabellifera; parasites de poissons) du Rijksmuseum van Natuurlijke Historie de Leiden. Méditerranée et Atlantique nord-oriental. Zoologische Mededelingen (Leiden) 52: 7-17.

Trilles JP. 1994. Les Cymothoidae (Crustacea, Isopoda) du Monde (Prodrome pour une Faune). Stûda Marina 21/22: 1-288.

Uljanin VN. 1871. Beitrage zur fauna des Schwarzen Meeres. Protok. Sitzungsber Naturf. Antrop. Und Ethnogr. Gesellsch. Moscou, 113-114.

Uljanin VN. 1872. Data on the fauna of the Black Sea. Izvestiya Moskovskogo Obschestva Lyubitelei Estestvoznaniya, Antropoligii i Etnografii 9: 79 132.

Vasiliu G, Carasu MA. 1948. Contribution A l’étude des Cymothoïnae (Isopodes parasites) de la Mer Noire. Annales Scientifiques de l’ Université de Jassy 31: 175-188.

Wägele JW. 1987. Evolution und phylogenetisches System der Isopoda: Stand der Forschung und neue Erkenntnisse. Universität Oldenburg.

WoRMS Editorial Board. 2017. World Register of Marine Species. Available from http://www.marinespecies.org at VLIZ. DOI: 10.14284/170.