

Mothocya Taurica (Czerniavsky, 1868) Female Redescription Parasitizing on *Alosa Fallax* from the Black Sea Coasts of Turkey

Ahmet Öktener¹, Hatice Torcu-Koç², Zeliha Erdoğan² and Jean-Paul Trilles³

¹ Istanbul Provincial Directorate of Agriculture, Directorate of Control, Kumkapı Fish Auction Hall, Kennedy street, Kumkapı, 34130, Istanbul, Turkey

² University of Balıkesir, Faculty of Science and Art, Department of Biology, Çağış Campus, 10145, Balıkesir, Turkey

³ UMR 5119 (CNRS-UM2-IFREMER), Équipe Adaptation écophysiological et ontogénese, Université de Montpellier 2, CC. 092, Place E. Bataillon, 34095 Montpellier cedex 05, France

Correspondence: Ahmet Öktener: Istanbul Provincial Directorate of Agriculture, Directorate of Control, Kumkapı Fish Auction Hall, Kennedy street, Kumkapı, 34130, Istanbul, Turkey

Received 19th August 2010, Accepted 5th October 2010

Abstract

In the present study, the characteristic features such as mouth parts, pereopods, pleopods of female *Mothocya taurica* (Czerniavsky, 1868) (Crustacea, Isopoda, Cymothoidae) are given based on the drawings of the collected specimens parasitizing on *Alosa fallax* (Teleostei: Clupeidae) in the Black Sea Coasts of Turkey.

Keywords: Turkey, Isopoda, female, *Mothocya taurica*, *Alosa fallax*

1. Introduction

Crustacean ectoparasites on marine fish are diverse. Many species of fish are parasitized by cymothoids (Crustacea, Isopoda, Cymothoidae). These parasitic isopods 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 (Brusca, 1981; Trilles, 1994; Lester and Roubal, 1995).

The cymothoid fauna of Turkey has received no attention until a *Ceratothoa* sp. was reported from *Boops boops* (Linnaeus, 1758) (Perciformes: Sparidae) (Monod, 1931). Several years later, a number of studies have given some systematic records about several cymothoids parasitizing Turkish wild fishes (Öktener and Trilles, 2004; Öktener *et al.*, 2009).

The cymothoid fauna of Turkey comprises 15 species from the Aegean Sea, the Mediterranean Sea, the Sea of Marmara and the Black Sea Coasts of Turkey. Among them, five species (*Anilocra physodes*, *Anilocra frontalis*, *Nerocila bivittata*, *Nerocila maculata*, *Nerocila orbignyi*) were collected from the body surface; six species (*Ceratothoa oestroides*, *Ceratothoa parallela*, *Ceratothoa italica*, *Ceratothoa capri*, *Ceratothoa steindachneri*, *Emetha audouini*) from the buccal cavity and four species (*Mothocya epimerica*, *Mothocya belonae*, *Mothocya taurica*, *Livoneca sinuata*) from the gill chamber (Öktener and Trilles, 2004).

The aim of the present study is to need to a redescription of female *Mothocya taurica* (Czerniavsky, 1868) from the gill chamber of *Alosa fallax* (Teleostei: Clupeidae) because no detailed description of this species from the Black Sea except was given by Kussakin (1979) and Bruce (1986).

2. Materials and Methods

Ten females of *Mothocya taurica* were collected from the gill cavity of the fish, *Alosa fallax* from Sinop (42° 1' 37' N, 35° 9' 27' E), the Black Sea coasts of Turkey. Parasite specimens were preserved in 70% alcohol for the isopod collection. Drawings were performed using a stereomicroscope (Wild M5) with a camera lucida and a compound microscope (Olympus CH20). Measurements were taken in micrometres, with a micrometric programme. Bruce (1986) was consultant for terminology.

3. Result

3.1. *Mothocya taurica* (Czerniavsky, 1868)

Order Isopoda

Family Cymothoidae Leach, 1814

Mothocya taurica (Czerniavsky, 1868)

Syn:

Cymothoa oestrum Rathke, 1837 (nec *Cymothoa oestrum* (L., 1758): 394.

Cymothoa punctata Uljanin, 1872: 113-114.

Livoneca pontica Borcea, 1933 a: 128-129; 1933 b: 48t, figures 1-9, pls 2-4.

Livoneca punctata Vasiliu and Carausu, 1948: 180-184, pl. II (figures 1-12), pl. III (figures 13-38d), Pl. IV (photographs a-b)

Lironeca punctata Trilles, 1976: 782-783, pl. 1, figure 6.

Lironeca taurica. Kussakin, 1979: 295-296, figures 160, 161.

Mothocya taurica Bruce, 1986: 1126.

3.2. Description of female.

Body (20mm) slightly twisted to left side, elongate, length-width ratio 4.40 (Figures 1&2). Coxae conspicuous in dorsal view and posterior margins rounded; coxae 2-6 not produced beyond posterior of respective segments, coxae of pereonite 7 extending slightly beyond posterior of segment (Figures 2&5); dorsum weakly vaulted; anterior margin of cephalon slightly rounded; eyes large, 0.62 times width of cephalon (Figure 14), distance between them about 35% of head width. Pereon about 0.45 as wide as long, pereonite 1 the longest and pereonite 7 the shortest, posterolateral margins of pereonite 7 slightly rounded and produced in dorsal view. Pleon about 0.4 as long as wide; all pleonites visible in dorsal view, but pleonite 1 partially concealed by pereonite 7, pleonites 2-5 entirely conspicuous in dorsal view, 2-4 subequal in length, pleonite 5 slightly longer and wider than the others (Figures 2, 3&4). Pleotelson hemispherical, 0.66 times as long as wide, posterior margin rounded. Antennule with 8 articles, generally extending to the middle of eye; without esthetes and setules (Figure 13), antenna with 7 articles, slender than antennule, not extending to anterior of pereonite 1 (Figure 12). Mandible palp article 3 without setae or spines (Figure 11); maxillule with 4 terminal spines (Figure 8); maxilla medial and lateral lobes each with 2 curved spines, medial lobe covered with small spines (Figure 9); maxilliped article 3 with 5 recurved spines and covered with small spines (Figure 10); Pereopods almost similar, with merus and carpus short, pereopod 5 (5.21mm), pereopod 6 (5.20mm), pereopod 7 (5.72mm) distinctly longer than pereopods 1 to 4 (Figures 15-21). Pleopods with all rami lamellar (Figures 22-26), peduncles of pleopods 1-3 with four hooks (Figures 27-29) on medial margin, endopods 4-5 with proximomedial lobe moderately developed, pleopod 2 without appendix masculina. Uropod short, not extending beyond posterior margin of pleotelson, peduncle distomedial lobe weakly produced (Figure 7).

Figure 1, 2: Female *Mothocya taurica* (scale 5mm).

Figure 3: Pleonite, ventral view (left) (scale 1.5mm);

4: Pleonite, dorsal view (left) (scale 1.5mm); **5:**

Coxae of left side (scale 1.5mm); **6:** Pleotelson (scale 4 mm); **7:** Uropod (scale 2.5mm).

Figure 8: Maxillule (scale 0.6mm); **9:** Maxilla (scale 0.7mm); **10:** Maxiliped (scale 0.3mm).

Figure 11: Mandible (scale 0.7mm); **12:** Antenna (scale 0.65mm); **13:** Antennule (scale 0.65mm); **14:** Cephalon (dorsal view) (scale 2.5mm).

Figure 15: Pereopod I (scale 2.3mm); **16:** Pereopod II; **17:** Pereopod III; **18:** Pereopod IV.

Figure 19: Pereopod V; **20:** Pereopod VI; **21:** Pereopod VII (scale 2.85mm).

Figure 22: Pleopod I (scale 2.5mm); **23:** Pleopod II; **24:** Pleopod III; **25:** Pleopod IV; **26:** Pleopod V.

Figure 27: Hooks of pleopod I; **28:** II; **29:** III.

4. Discussion

Three species belonging to the genus *Mothocya* (*M. epimerica*, *M. belonae*, *M. taurica*) were previously reported from Turkish fishes (Öktener and Trilles, 2004; Öktener *et al.*, 2009).

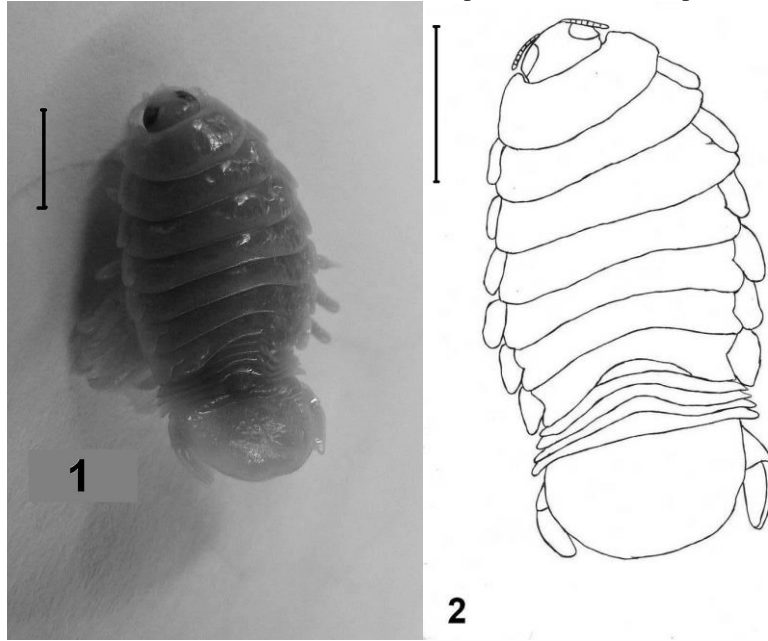
Mothocya taurica was collected in the Black Sea (Uljanin, 1872; Borcea, 1933a; Vasiliu and Carausu, 1948; Nikolaeva, 1963; Trilles, 1976 and 1994), from the Crimea (Rathke, 1837), particularly at the regions of Kertsch and Hellendzik (Popov, 1933), in the Dnieper and some other Ukrainian rivers (Markewitsch, 1934), from the county of Krasnodar in Russia, and the Agigea region near Constanta, Romania (Borcea, 1933a, b; Carausu, 1959; Bruce, 1986; Trilles, 1994). It was also reported from Castiglione in the Mediterranean Sea (Dollfus and Trilles, 1976 and Trilles, 1994).

This species is primarily associated with fishes belonging to the families Clupeidae and Engraulidae (Trilles, 1976). It was collected from *Alosa finta*, *Caspialosa pontica*, *C. nordmanni*, *Engraulis encrasicolus ponticus*, *Sardina pilchardus*, *Sprattus sprattus phalericus*. In addition, it has been reported from *Trachurus mediterraneus ponticus*, *Atherina hepsetus*, *Gobius* sp, *Scorpaena porcus*, and *Pomatomus saltator* (Trilles, 1994; Öktener and Trilles, 2004; Josipa *et al.*, 2007). It has been mentioned parasitizing *Alosa fallax*, *Helicolenus dactylopterus dactylopterus* and *Trisopterus minutus* on the Black Sea coast of Turkey (Öktener and Trilles, 2004; Öktener *et al.*, 2009).

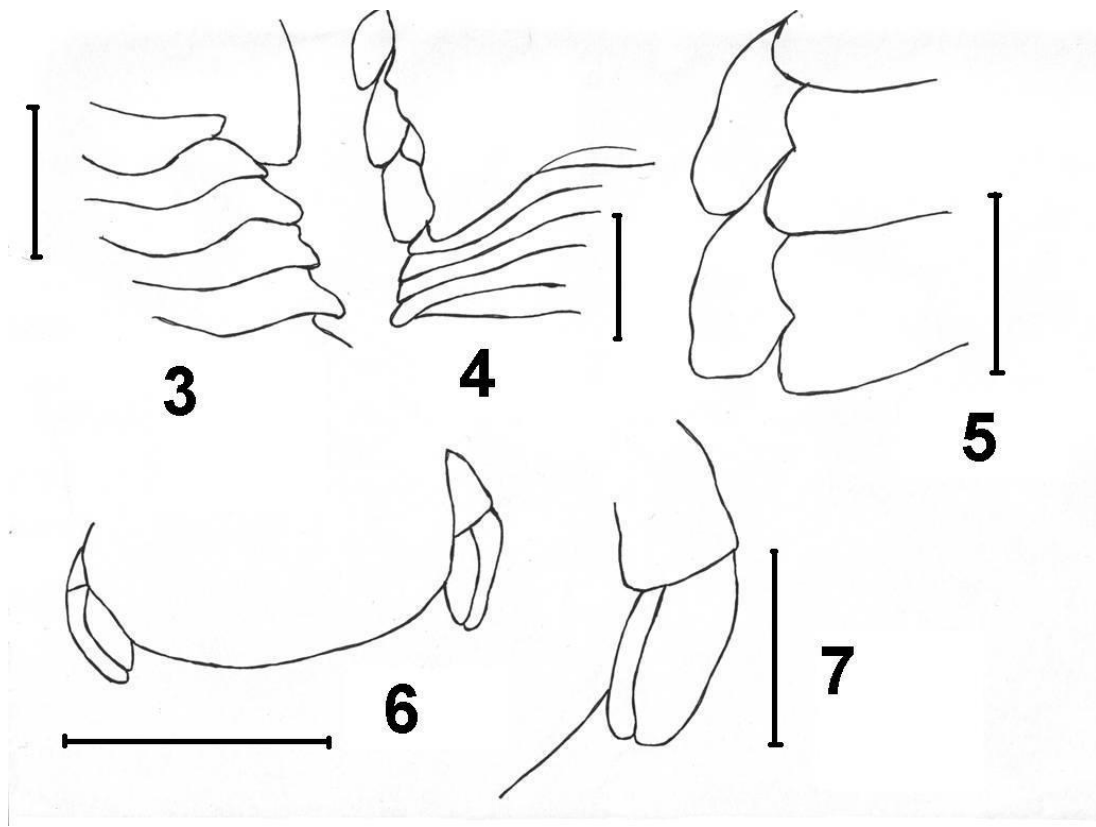
Examination of the parasite specimens showed that they were *M. taurica* according to the general drawings and descriptions given by Borcea (1933a, b), Vasiliu and Carausu (1948) and Kussakin (1979). Their general body shapes, maxillule with 4 terminal spines, maxilla with two curved spines on medial and lateral lobes, mandible palp article 3 without setae and pereopods 7 distinctly longer than other pereopods agree with the drawings given by Kussakin (1979). In collected parasite specimens, antennule is with 8 articles and antenna with 7 articles. However, Vasiliu and Carausu (1948) reported 8 articles on both antennule and

antenna (Borcea, 1933a, b) and a maxilla with three

spines. Besides, our specimens with a maxilliped article



Figures 1, 2: Female *Mothocya taurica* (scale 5mm).



Figures 3: Pleonite, ventral view (left) (scale 1.5mm); **4:** Pleonite, dorsal view (left) (scale 1.5mm); **5:** Coxae of left side (scale 1.5mm); **6:** Pleotelson (scale 4 mm); **7:** Uropod (scale 2.5mm).

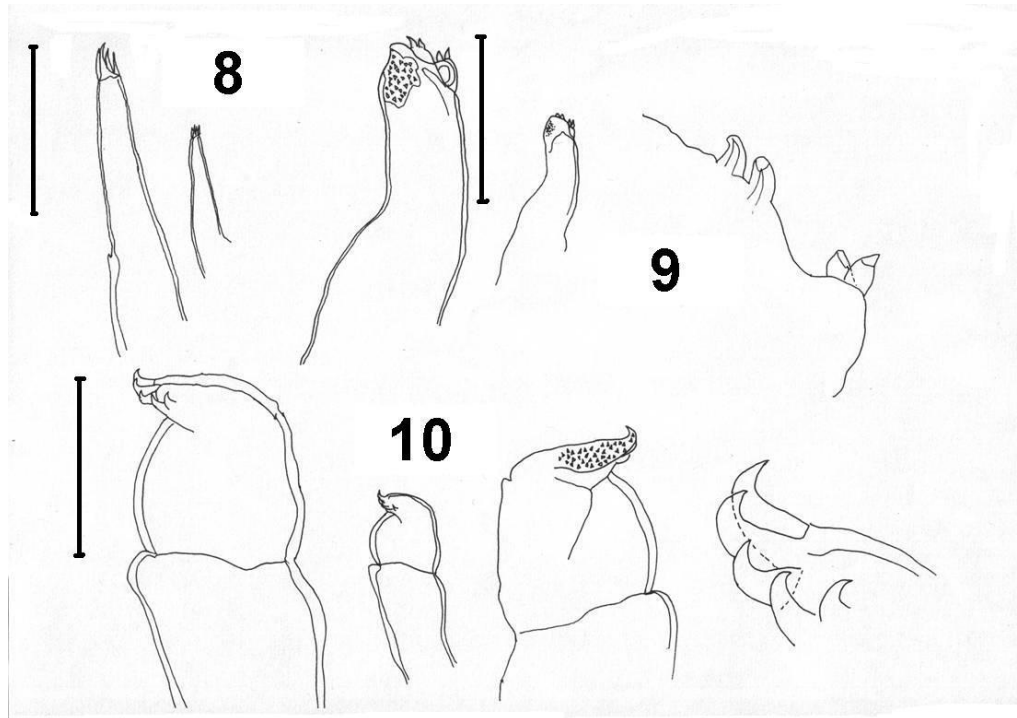


Figure 8: Maxillule (scale 0.6mm); **9:** Maxilla (scale 0.7mm); **10:** Maxiliped (scale 0.3mm).

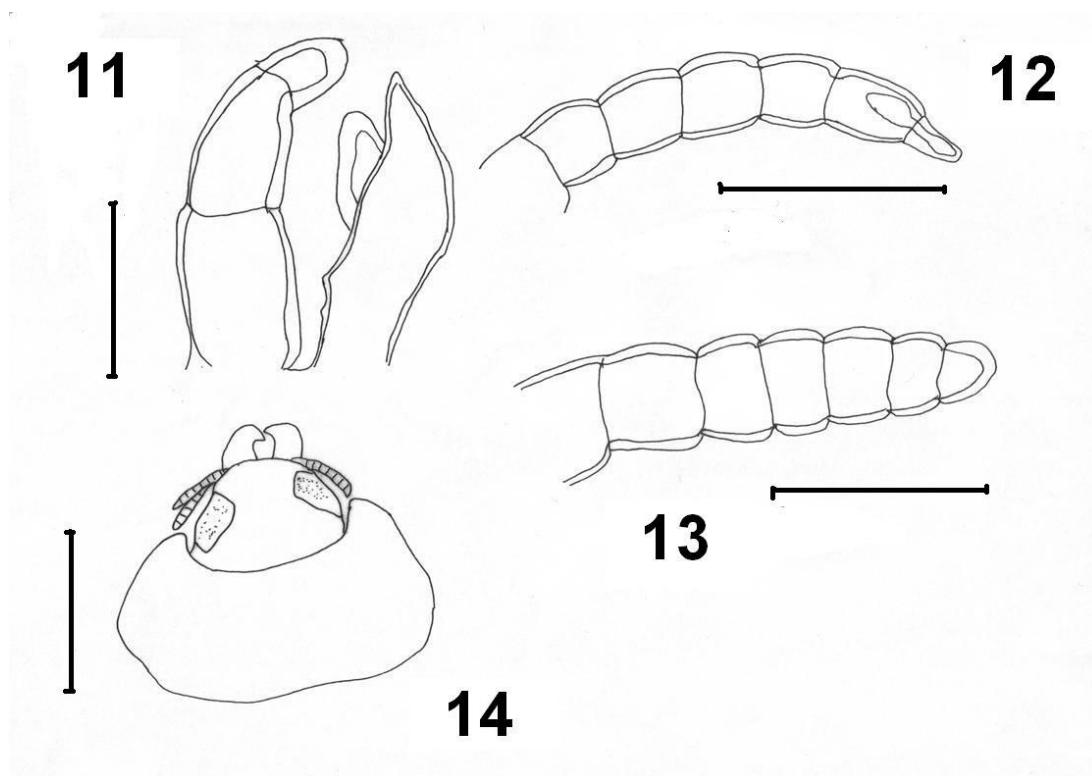


Figure 11: Mandible (scale 0.7mm); **12:** Antenna (scale 0.65mm); **13:** Antennule (scale 0.65mm); **14:** Cephalon (dorsal view) (scale 2.5mm).

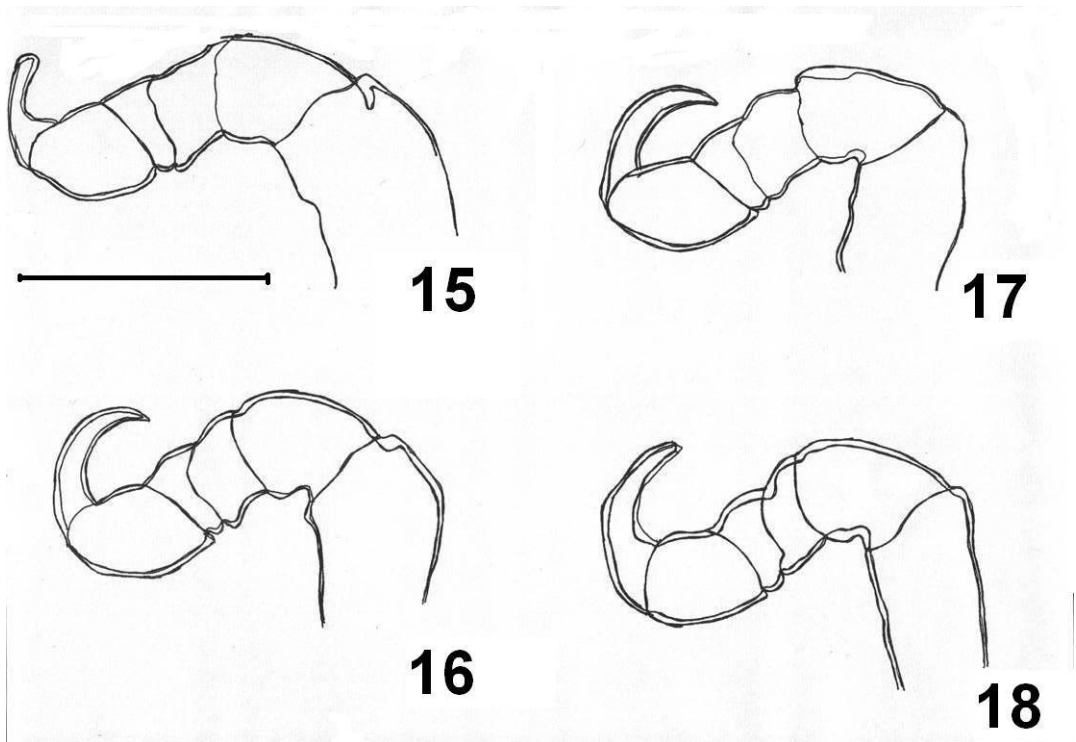


Figure 15: Pereopod I (scale 2.3mm); **16:** Pereopod II; **17:** Pereopod III; **18:** Pereopod IV.

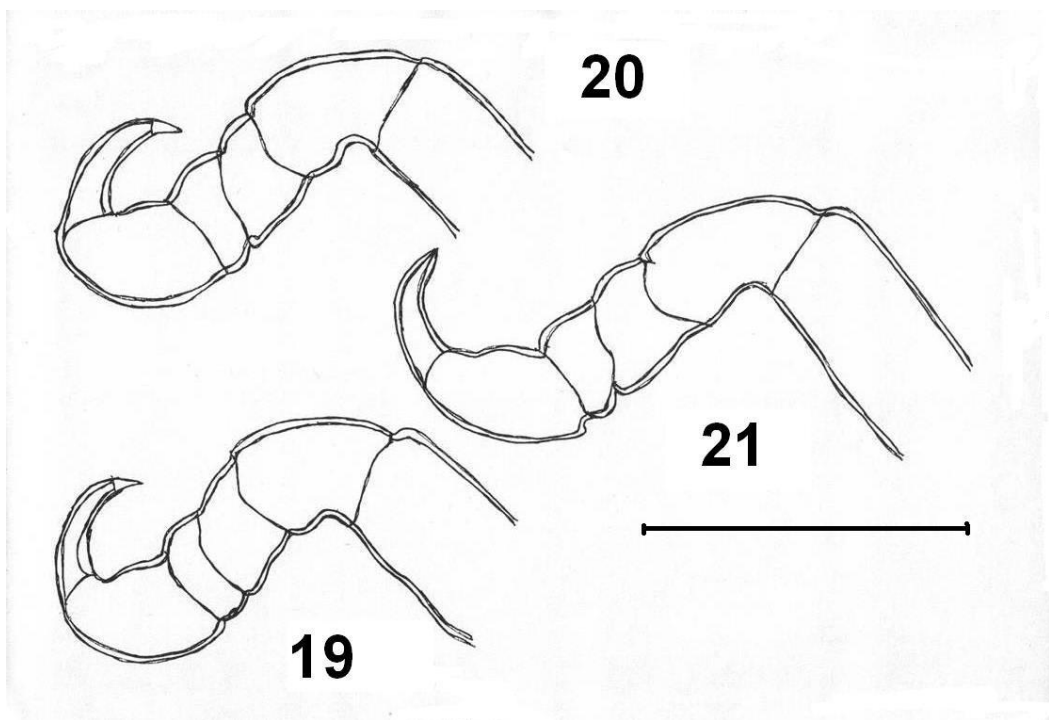


Figure 19: Pereopod V; **20:** Pereopod VI; **21:** Pereopod VII (scale 2.85mm).

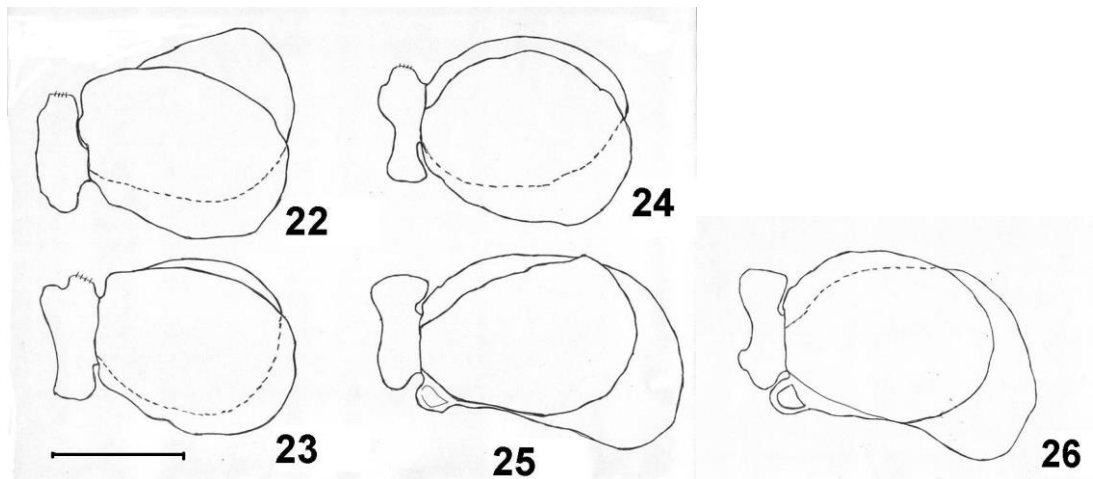


Figure 22: Pleopod I (scale 2.5mm); **23:** Pleopod II; **24:** Pleopod III; **25:** Pleopod IV; **26:** Pleopod V.

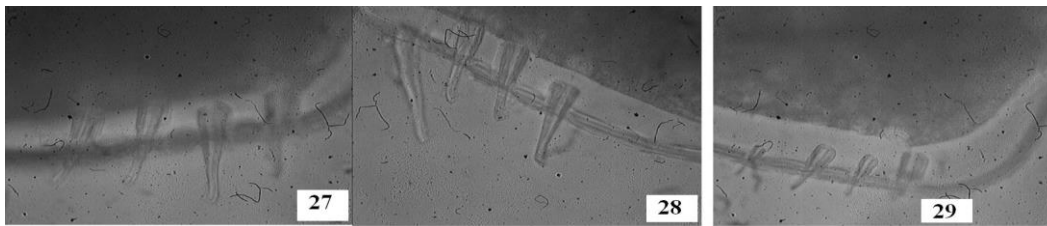


Figure 27: Hooks of pleopod I; **28:** II; **29:** III.

3 with 5 recurved spines and peduncles of pleopods 1-3 with four hooks does not agree with Vasiliu and Carasu (1948) and Kussaskin (1979). Vasiliu and Carasu (1948) observed three hooks on pleopod 2 while Kussaskin (1979) doesn't mention hooks on pleopod 2. The specimens examined by these authors may be of uncertain identity as the drawings and figures given do not allow a specific assessment. In appearance *Mothocya taurica* is very similar to *M. belonae*, from which 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).

References

- 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, 2ème série*, **2**: 128-129.
- Borcea, I.: 1933b, *Livoneca pontica* nov. Sp., Cymothoide parasite des Aloses et Sardines de la Mer Noire. *Annales Scientifiques de l' Université de Jassy*, **17**: 481-502
- Bruce, N.L.: 1986, Revision of the Isopod crustacean genus *Mothocya* Costa, in Hope, 1851 (Cymothoidae: Flabellifera), parasitic on marine fishes. *Journal of Natural History* **20**: 1089-1112.
- Brusca, R.C.: 1981, A monograph of the Isopoda Cymothoidae (Crustacea) of the eastern Pacific. *Zoological Journal of the Linnean Society* **73**: 117-199.
- Carasu, A.: 1959, Contribution à l' étude des Cymothoïnae (Isopodes Parasites) de la Mer Noire. 2) Un cas d'infestation massive avec *Livoneca punctata* (Ulj.) chez *Caspialosa pontica* (Eichw.). *Travaux de la Station Zoologique Maritime d'Agigea* **5**: 349-351.
- Czerniavsky, V.: 1868, Materiala ad Zoographiam Ponticam comparatum. Transactions of the First Meeting of the Russian Naturalists in Saint Petersburg, 1868, 19-136.
- Dollfus, R.P. and Trilles, J.P.: 1976, A propos de la collection R. Ph. Dollfus, mise au point sur les Cymothoïdiens jusqu' à présent récoltés sur des Téléostéens du Maroc et de l' Algérie. *Bulletin du Muséum national d' Histoire naturelle de Paris* **272**: 821-830.
- Josipa, F., Mirela, P., Sanja, M. and Jakov, D.: 2007, An occurrence of isopode parasitism on black

- scorpion fish, *Scorpaena porcus* (Perciformes, Scorpaenidae) in the eastern part of Adriatic Sea. Book of abstracts 12th European Congress of Ichthyology (ECI-12) / Buj, Ivana; Zanella, Linda; Mrakovčić, Milorad (ed). - Zagreb: Tipomat 91.
- Kussakin, O.G.: 1979, *Marine and Brackish Water Isopod Crustacea. Suborder Flabellifera*. Leningrad: Academy of Science, USSR, 295-297.
- Lester, R.J.G. and Roubal, F.R.: 1995, Phylum Arthropoda. In: (Ed. P.T.K. Woo) *Fish diseases and disorders*. Vol. 1. *Protozoan and metazoan infections*, CAB International, Wallingford, pp. 475-598.
- Markewitsch, A.P.: 1934, Skorupiaki pasorzytnieczy ryb. Ukrainy. Die Schmarotzerkrebse der Fische der Ukraine. *Annales Musei Zoologici Polonici* **10**: 223-249.
- Monod, T.: 1931, Crustaces de Syrie. In: A Gruvel, Les etats de Syrie. *Bibliographie Faune Française* **3**: 397-435.
- Nikolaeva, V.M.; 1963, La faune parasite de quelques bancs locaux de poissons de la Mer Noire. Trudy Sevastopol' biological Station, 16, 1-46 (In Russian; Translated version by CNRS, France).
- Öktener, A. and Trilles, J.P.: 2004, Report on the Cymothoids (Crustacea, Isopoda) collected from marine fishes in Turkey. *Acta Adriatica* **45**: 145-154.
- Öktener, A., Trilles, J.P., Alaş, A., Solak, K.: 2009, New hosts for species belonging to the genera *Nerocila*, *Anilocra*, *Ceratothoa*, *Mothocya* and *Livoneca* (Crustacea, Isopoda, Cymothoidae). *Bulletin of the European Association Fish Pathologists* **29**: 49-54.
- Popov, M.A.: 1933, Ueber parasitische Isopoden von Fischen aus dem Schwarzen Meer. *Zoologische Anzeiger*, Bd. **101**: 193-198
- Rathke, H.: 1837, Zur fauna der Krym. Mémoire des Savants étrangers. *Académie des Sciences de St. Pétersbourg* **3**: 291-454.
- Trilles, J.P.: 1976, Les Cymothoidae (Isopoda, Flabellifera) des collections du Muséum national d'Histoire naturelle de Paris. IV. Les Lironecinae Schioedte et Meinert, 1884. *Bulletin du Muséum National 'Histoire Naturelle* **272**: 773-800
- Trilles, J.P.: 1994, Les Cymothoidae (Crustacea, Isopoda) du Monde (Prodrome pour une Faune). *Studia Marina* **21/22**: 1-288.
- Uljanin, V.N.: 1872, Data on the fauna of the Black Sea. *Izvestiya Moskovskogo Obshchestva Lyubitelei Estestvoznaniya, Antropologii i Etnografii* **9**: 79-132.
- Vasiliu, G. and Carausu, M.A.: 1948, Contribution A l'étude des *Cymothoinae* (Isopodes parasites) de la Mer Noire. *Annales Scientifiques de l'Université de Jassy* **31**: 175-188.