
ИЗУЧЕНИЕ БИОРАЗНООБРАЗИЯ И ЭКОЛОГИЧЕСКИЙ МОНИТОРИНГ

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FIRST FINDING OF *CAPRELLA* CF. *EQUILIBRA* SAY, 1818 (AMPHIPODA, CAPRELLIDAE) IN COASTAL ZONE SOUTH-WEST OF CRIMEA (BLACK SEA)*

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Specimens from genus *Caprella* (Amphipoda, Caprellidae) were revealed in fouling of constructions of oyster sea farm near coastal zone of Sevastopol (Crimea, the Black Sea) in 2018. Morphologically specimens of this species are close to the species *C. equilibra* Say, 1818. Earlier specimens of this species were not found in the Black Sea. Stable population of this species (adult males, adult females, juvenile specimens) were investigated from 2018 till 2020. Morphology of adult males, adult females including microtrichs was investigated. Information on ecology of this species is present.

Keywords: Amphipoda, *Caprella* cf. *equilibra*, morphology, coastal zone of Crimea.

Introduction

Four species of the genus *Caprella* have been recorded in the coastal zone of Crimea: *C. acanthifera* Leach, 1814; *C. danilevskii* Czerniavski, 1868; *C. liparotensis* Haller, 1879; *C. mitis* Mayer, 1890. The species *C. equilibra* Say, 1818 was recorded only for the coastal zone of Turkey [Sezgin, Kosatas, Katagan, 2001]. In 2018–2021 a species from the genus *Caprella*, morphologically very close to the species *C. equilibra*, was discovered in the coastal zone of Sevastopol. The taxonomic status of the discovered species was designated as *Caprella* sp. cf. *equilibra*. During the research many specimens of this species were noted among stolons of hydroid polyps from the genus *Aglaophenia* Lamouroux, 1812. This article provides information on the morphology and ecology of the species *Caprella* sp. cf. *equilibra*.

Material and methods

In 2018 specimens were collected monthly from February to August. In 2019–2021 specimens were collected in March — May. More than 3000 specimens were identified. Specimens were collected from stolons of hydroid polyps of the genus *Aglaophenia* in dishes and fixed with 75 % ethanol. In laboratory specimens were observed with the use of stereomicroscope MBS-9 and SEM Hitachi SU3500 for further morphological studies. A standard ocular-micrometer for stereomicroscope MBS-9 was used for measurement of the specimens. Pictures to demonstrate the coloration of specimens were taken using a camera stereomicroscope Leica DM2500 and a Leica 36D stereomicroscope. To describe the morphology, we chose an adult male and female with all the morphological features.

Results

Figure 1 shows the habitus and coloration of the adult male and female of *Caprella* sp. cf. *equilibra* (fig. 1. A, B — colours and habitus, C — habitus) collected from stolons of a hydroid polyp of the genus *Aglaophenia*, that populated the collector of a mussel farm. Location of the collector was the coastal zone of Sevastopol. Depth — 4 m. Data of collection — April 04, 2018.

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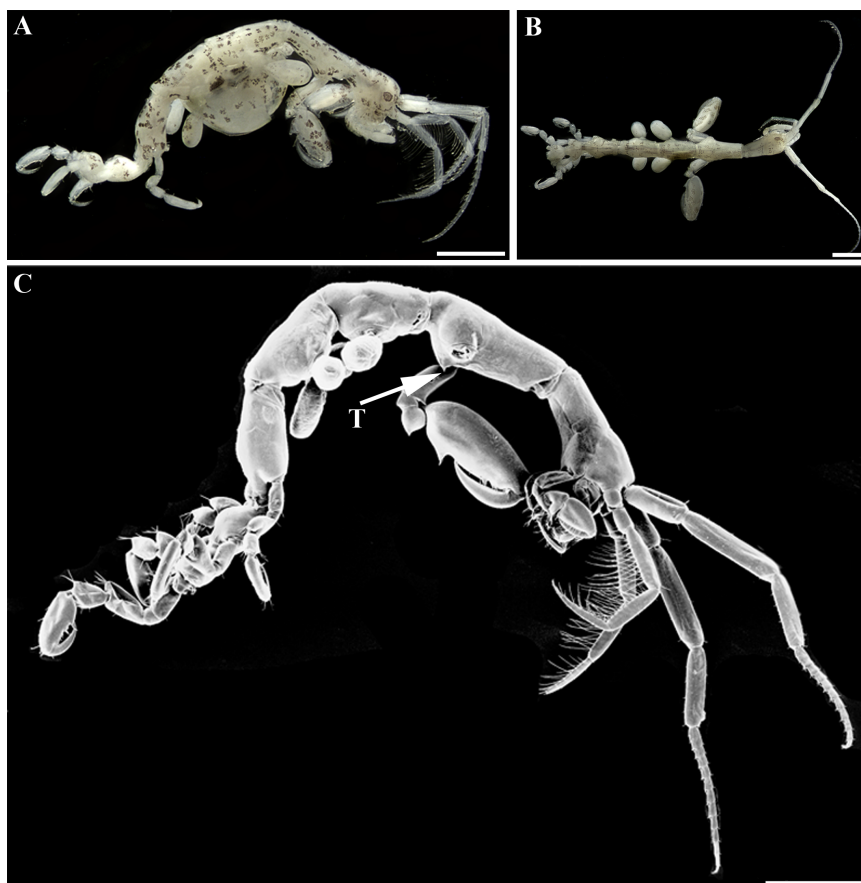


Fig. 1. *Caprella* sp. cf. *equilibra*. A — adult female with marsupium, lateral view; B — adult male, superior view; C — adult male, lateral view. Scale lines 1 mm. Designations: A, B — stereomicroscope Leica DM2500; C — SEM Hitachi SU3500. Notice: figure «C» — left gnathopod II is missing; «T» — tooth.

Description of morphology. Male. Length 15 mm. Coloration; groups of small spots by surface of body (fig. 1, B). Length of antennae I — 8.6 mm. Length of antennae II — 3.2 mm. Gnathopod I, basipodit length 0.7 mm, width 0.2 mm. Gnathopod II; basipodit; length 1 mm, width 0.4 mm; ischium, length 0.3 mm; merus, length 0.5 mm; propodus, length 3.0 mm, width 1.0 mm. Length of pereonite I + cephalon 3.2 mm, length of pereonite II 4.0 mm.

Cephalon; rostrum small, eyes oval-shaped, dark in ethanol. Antennae I: peduncle; first article shortest, second and third article much longer with rare tiny rounder spines; flagellum, 20 articles, 4 proximal articles fused. Antennae II: peduncle; second article shorter than third, third article about 2.5 times shorter than fourth, fourth and fifth articles are equal ventrally with groups long setae; flagellum with 2 articles, first article much longer than second and ventrally with long comb-shaped setae, second article distally with two curved spines. Cephalon only dorsally has traces of suture with the first pereonites. Mouthparts typical for genus (Fig. 2).

Gnathopod I (fig. 2, I, J): basis dorso-distally with wide small lobe, merus disto-ventrally with wide rounded tooth, carpus about half of propodus length and ventrally stretched wide lobe, with groups of setae, propodus near triangle, palm with teeth and two strong spines, dactylus slightly longer than palm with small teeth by inner site. Gnathopod II (fig. 2, H): basis slightly expanded distally, serrate dorsally, dorso-distally with lobe, reaching middle ischium, inner site distally with wide curve lobate process. Ischium dorso-distally with a little process, serrate from the basipodite side. Propodus, palm proximally with process ending in a strong spine and distally with two process, proximally process narrow and shorter distally process, proximally process with a blunted tip, distally process triangle, dactylus strong with tiny teeth by inner site, proximally with roller expansion by inner site.

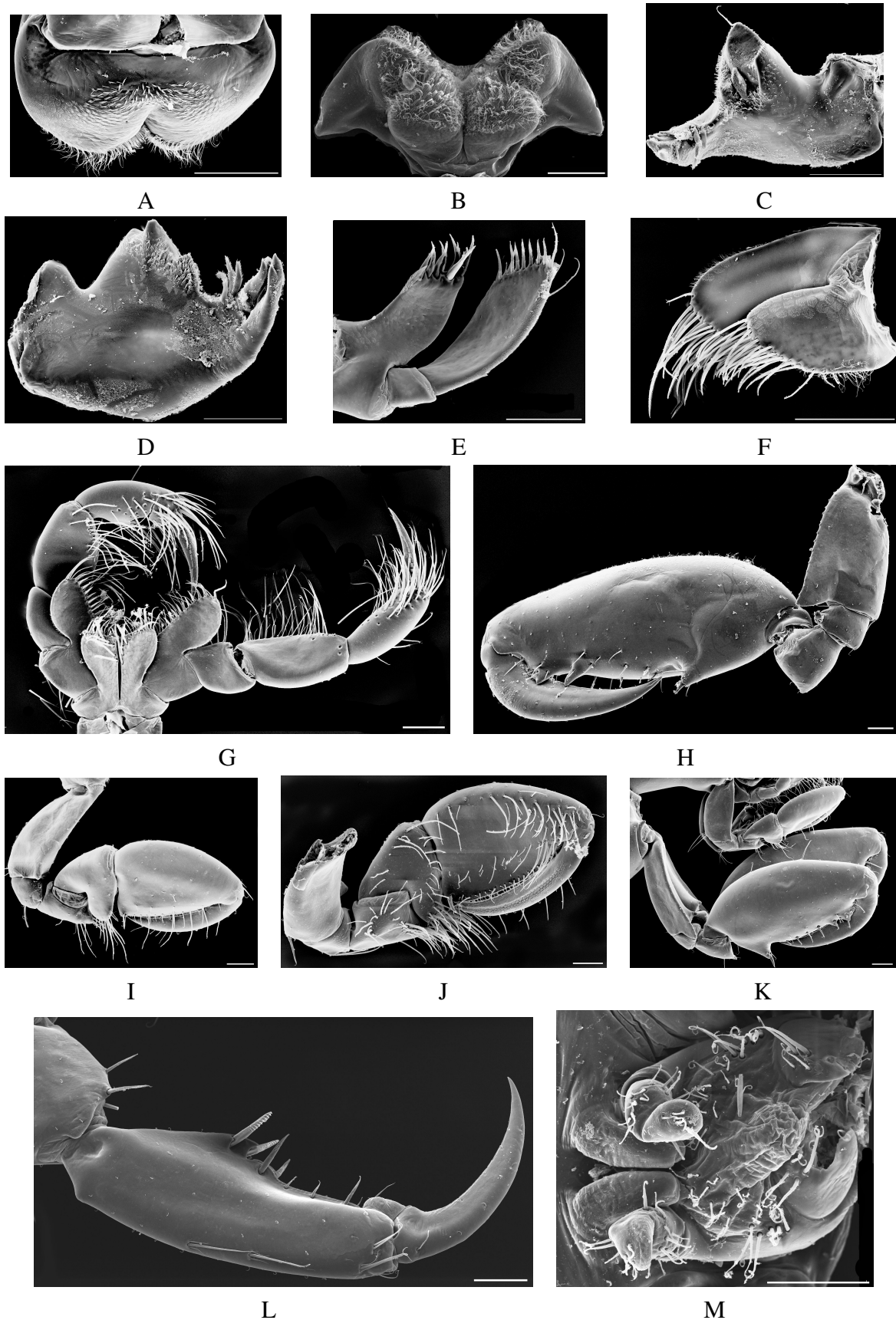


Fig. 2. *Caprella* sp. cf. *equilibra*. A — upper lip; B — lower lip; C — mandible left; D — mandible right; E — maxilla I; F — maxilla II; G — maxilliped; H — gnathopod II; I — gnathopod I; J — gnathopod I, interior view; K — gnathopodes I and II; L — pereopod VII, propodus and dactylus; M — abdomen. Male — A, B, C, D, E, F, G, H, I, M. Female — K, L. Scale lines 0.1 mm.

Pereonite II (Fig. 1) with strong conical process pointed at the tip. Branchiae oval attached in the middle pereonites III and IV. Pereonites III and IV, ventro-laterally with lobate processes. Pereonite V ventro-proximally with two tubercles, latero-proximally with two more massive tubercle, than the ventrally tubercles. Surface pereonites VI and VII ventrally uneven, bumpy. Pereopodes V: basis and merus expanding distally, in outer site distally with process, carpus with process in the middle of the outside side, propodus similar in length to carpus and merus together, palm concave with two rows spines increasing from proximally to distally, two latest distally spines are largest, dactylus curve and longer palm. Pereopodes VI longer than pereopodes V, basis, merus, carpus, propodus and dactylus morphologically similar to pereopodes V. Pereopodes VII (Fig. 2, L) the largest, morphologically similar to pereopodes V and VI. Urosome with pair one segmented appendages and medial penes.

Female. Length 7.0 mm. Antennae I, length 4.4 mm. Sexually distinctive features: pereonite I, length + length of head — 1 mm, pereonites II, length — 1.4 mm, pereonites III + IV, length 2.7 mm. Pereonites III and IV with marsupium. Gnathopod II (fig. 2, K); propodus near to oval.

Additionally, to study macro-morphological parameters, micro-structure of body surface was investigated [microtrichs, term. Richards, 1951]. Groups of plain (fig. 3, A, B, C) and complex (fig. 3, D) microtrichs were revealed. Groups of microtrichs dispose preliminary inner site of gnathopods I and mouthparts. By assumption of Vasilenko S. V. microtrichs can be important as additional elements by feeding [Vasilenko, 1974].

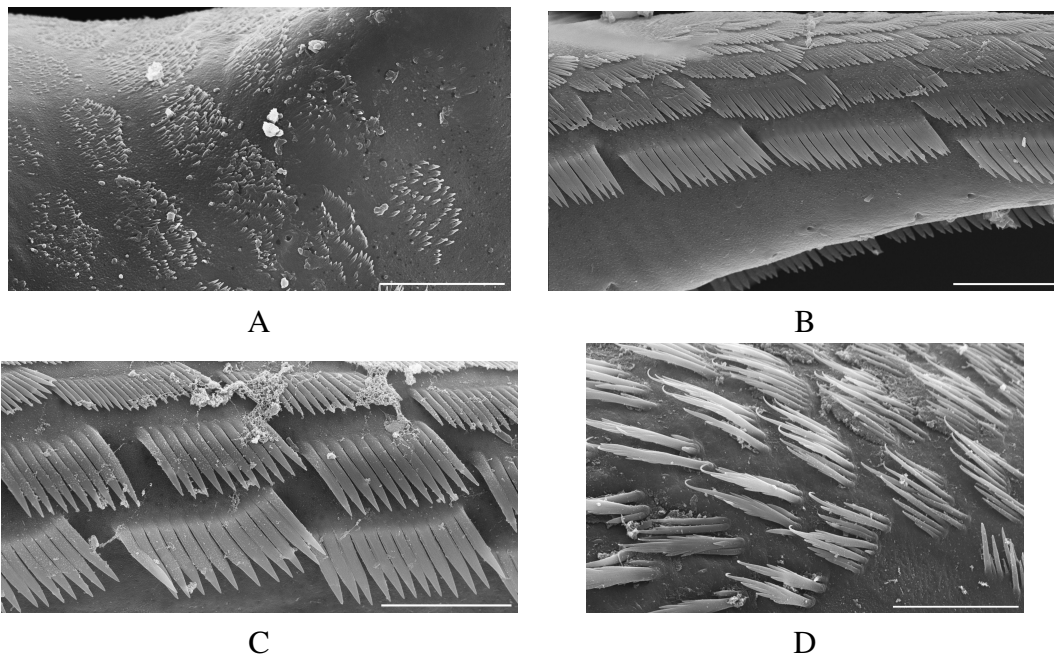


Fig. 3. *Caprella* sp. cf. *equilibra*. A — groups of plain microtrichs on inner site maxilla I; B — groups of plain microtrichs on dactylus of maxilliped; C — groups of plain microtrichs on dactylus of gnathopods I; D — groups of complex microtrichs on upper lip. Scale lines 0.01 mm.

Ecology. Specimens of *Caprella* sp. cf. *equilibra* in investigated habitats found among other species of amphipods: *Ampithoe ramondi* Audouin, 1826, *Apohyale perieri* (Lucas, 1846), *C. acanthifera* Leach, 1814, *Erichthonius difformis* H. Milne Edwards, 1830, *Jassa ocia* (Spence Bate, 1862), *Stenothoe monoculoides* (Montagu, 1813). Preferred habitat is periphyton with colonies of hydroid of the genus *Aglaophenia* Lamouroux, 1812. Specimens are also found among algae, specimens of *Mytilus galloprovincialis* Lamarck, 1819 and *Crassostrea gigas* (Thunberg, 1793). Specimens of *Caprella* sp. cf. *equilibra* marked in diapason of depth from 0 to 8 m. Specimens of *Caprella* sp. cf. *equilibra* were found also in periphyton of onshore concrete hydrotechnical constructions.

Discussion. The following morphological differences between the species, founding in south-western part of Crimea and morphologically closest to *C. equilibra* (*C. equilibra* by description Krapp-Schickel, 1993) were noted: palm gnathopodes II male and female of species from Crimea near proximally part of dactylus with two teeth — wide and narrow (fig. 2, H), whereas in the description and pictures of *C. equilibra* [Krapp-Schickel, 1993] 1 wide tooth is noted. Inner edge of gnathopodes II dactylus male in illustrations [Krapp-Schickel, 1993] strongly serrate, but, in species from Crimea this morphology element is practically without serration (Fig. 2, H). The above differences do not allow us to be sure that the species found in the south-western part of the Crimea is exactly *C. equilibra* and in this time taxonomical status of species from south-western part of Crimea can be denoted as *Caprella* sp. cf. *equilibra*.

Type location of the *C. equilibra* — coast of North America [McCain, Steinberg, 1970]. Besides *C. equilibra* was registered in coast of Brazil [Lacerda, Takeuchi, Masunari, 2011], South Korea, New Zealand [Guerra-Garcia, 2003], Bermuda islands [Gable, Lazo-Wasem, Baldinger, 2010], coast of Argentina [Castro et al., 2020], Caribbean Sea [Miloslavich et al., 2010], south Pacific [Guerra-Garcia, 2003], Mediterranean Sea [Koukouras, 2010], North Sea, coast of south Africa [Griffiths, 1974]. In the Black Sea *C. equilibra* was recorded only along the coast of Turkey [Sezgin, Kosatas, Katanagan, 2001]. Possibly detected in south-western part of Crimea this species is subspecies or morph of *C. equilibra* but this requires further research.

There can be 2 ways of settling the Crimean coast by specimens of *Caprella* sp. cf. *equilibra*: natural migration of individuals with a common cyclonic cycle of the Black Sea waters [Knipovitch, 1932], or through human activity, primarily shipping. Both ways are possible, since the Black Sea is regularly replenished by various invaders from the Mediterranean and other seas.

Ecological information indicates the ability of specimens of *Caprella* sp. cf. *equilibra* survive in different environmental conditions of periphyton, as substrates, located at a distance from the shore, as on near shore habitats, but preferable substrate with dominance hydroid polyp of the genus *Aglaophenia* on constructions was located at a distance from the shore. According to the data [Krapp-Schickel, 1993] specimens morphologically closest to the species *C. equilibra* in Mediterranean were registered between Hydroids, Ascidia, Spongia, Bryozoa, different species of green and red algae, sea grass *Posidonia*. Noted, that the specimens of this species live in big groups [Fiorencis, 1940] as the specimens of *Caprella* sp. cf. *equilibra*. Number of specimens in places of the greatest concentration of *C. cf. equilibra* can reach more than 1000 spec·m⁻² on the surface of the substrate.

Below there are the taxonomical keys to all species of *Caprella* Lamarck, 1801 known to date for coastal zone of Crimea:

1. Antennae II without long setae *C. acanthifera*
– Antennae II with rows long setae 2
2. Pereopodes VI-VII, palm of propodus with strong spines 3
– Pereopodes VI-VII, palm of propodus without strong spines *C. danilevskii*
3. Pereonite II with a sharpened spine between basis of gnathopod II *Caprella* sp. cf. *equilibra*
– Pereonite II without a sharpened spine between basis of gnathopod II 4
4. Pereopodes V-VII, carpus with row small teeth, basis gnathopod II short, merus slightly bigger than carpus, rostrum present *C. liparotensis*
– Pereopodes V-VII, carpus without row small teeth, basis gnathopod II long, merus much more than carpus, rostrum missing *C. mitis*

Conclusion

Taking into account the regular large collections in 2018–2021, *Caprella* sp. cf. *equilibra* successfully populated the structures of the mussel farm in the south-west of Crimea. Thus, 5 species of the genus *Caprella*, including the new species *Caprella* sp. cf. *equilibra*, have been recorded in the coastal waters of Crimea.

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ПЕРВАЯ НАХОДКА *CAPRELLA CF. EQUILIBRA* SAY, 1818 (AMPHIPODA, CAPRELLIDAE) В ПРИБРЕЖНОЙ ЗОНЕ ЮГО-ЗАПАДА КРЫМА (ЧЁРНОЕ МОРЕ)

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Особи из рода *Caprella* (Amphipoda, Caprellidae) были обнаружены в 2018 г. в обрастании конструкций устричной фермы вблизи прибрежной зоны Севастополя (Крым, Чёрное море). Морфологически особи этого вида близки к виду *Caprella equilibra* Say, 1818. Ранее особи этого вида не были зарегистрированы в Чёрном море. Выборки из поселений этого вида, включающие взрослых самцов, взрослых самок и ювенильных особей, исследовали с 2018 по 2020 г. Исследовали морфологию взрослых самцов, взрослых самок, включая микротрихи. Представлена информация об экологии этого вида.

Ключевые слова: амфиподы, *Caprella cf. equilibra*, морфология, прибрежная зона Крыма.

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