
ИЗУЧЕНИЕ БИОРАЗНООБРАЗИЯ
И ЭКОЛОГИЧЕСКИЙ МОНИТОРИНГ

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**FIRST FINDING OF *CENTRALOECETES* CF. *NEAPOLITANUS* (SCHIECKE, 1978)
(ISCHYROCERIDAE, AMPHIPODA) IN COASTAL ZONE OF SEVASTOPOL
(CRIMEA, BLACK SEA)***

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Specimens of genus *Centraloecetes* (Ischyroceridae, Amphipoda) were revealed in coastal zone of Sevastopol in 15.08.2018, from sand, from 16 m depth. Morphologically specimens clear to species *Centraloecetes neapolitanus* (Schiecke, 1978) and different from *Centraloecetes dellavallei* (Stebbing, 1899) finding earlier in Black Sea [Greze, 1985]. Detail analysis of morphology educed elements of body, earlier not describe for species of this genus. Presumably this species or invasive species, or not registered earlier. Further clarifications of taxonomy are required, as well as studies of the ecology and biology of this species. Since many individuals have been found (>100 spec.), it is possible that they be found in the protected waters of the Crimea.

Keywords: Amphipoda, *Centraloecetes*, morphology, Black Sea.

Introduction

Species list of Amphipoda in the Black Sea all time increase, despite good knowledge. In this time in the Black Sea registered 111 species of this order Amphipoda [Revkov, 2003]. Species list of Amphipoda replenished in 2011 y. with 11 new species and 2 genera [Grintsov, Sezgin, 2011]. Genus *Centraloecetes* in the Black Sea represent of 1 species — *Centraloecetes dellavallei* (Stebbing, 1899) [Greze, 1977, 1985; Grintsov, Sezgin, 2011]. In World Ocean genus *Centraloecetes* represent of 6 species: *Centraloecetes bulborostrum* De-la-Osso-Carretoro & Marti, 2014; *Centraloecetes dellavallei* (Stebbing, 1899); *Centraloecetes kroyeranus* (Spence Bate, 1857); *Centraloecetes neapolitanus* (Schiecke, 1978); *Centraloecetes pallidus* (G.O. Sars, 1883); *Centraloecetes striatus* (Myers & McGrath, 1979). In this work reveal specimens morphologically different from all species of genus, but more close to species *C. neapolitanus*. Before specimens with these morphological parameters were not known in the Black Sea. In this work is reported about first finding specimens of *C. cf. neapolitanus* in coastal water of north of the Black Sea, giving circumstantial morphological description and discussed elements of morphology earlier not descript for species of this genus.

Material and methods

Specimens with sand were taken by a diver from 16 m depth near to Sevastopol (Crimea, the Black Sea) in 15.08.2018. Specimens were separate from sand and fixed 96% ethanol. In this work were analyzed 50 adult specimens with used stereomicroscope MBS-9, and microscope Micmed-5. A standard ocular-micrometer for stereomicroscope MBS-9 was used for measurement. Photos of elements of morphology were making with use SEM Hitachi SU 3500. Elements of morphology male and female were described with use adult specimens. Photos were making on some of adult males and females additionally.

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Results

Taxonomy, morphology and ecology:

Species *Centraloecetes* cf. *neapolitanus* belong to:

Phylum Arthropoda

Subphylum Crustacea

Class Malacostraca

Order Amphipoda

Suborder Senticaudata

Family Ischyroceridae

Tribe Siphonocetini

Genus *Centraloecetes*

Species *Centraloecetes* cf. *neapolitanus*

Description of morphology.

Male. Length of body — 3.2 mm. Body without teeth or spines on pereon, pleon and urosome. Coxae not overlapping. Antennae I; length — 1.6 mm, peduncle longer than flagellum, second article of peduncle is longest, flagellum with 5 articles with long, but not numerous setae. Antennae II; length — 2.3 mm, peduncle longer than flagellum, fourth article of peduncle is longest, flagellum with 3 articles, second article with 1 spine, third article with 2 spines. Rostrum longer than eye lobes.

Mouthpart. Upper lip with incise in middle part of distally. Right mandible; palp 1-articulate with plumose setae, incisor with 5 teeth, lacinia mobilis with 1 big tooth and many small teeth distally, molar of triturative. Left mandible; palp 1-articulate with plumose setae, incisor with 5 teeth, lacinia mobilis with 4 similarity teeth, molar of triturative. Lower lip with outer and inner lobes, distally with numerous tiny setae. Maxilla I; inner plate vestigial without setae or spines, outer plate well develop with 6 spines, palp 2-articulate, second article is bigger with spines and setae distally. Maxilla 2; inner plate smaller than outer plate, both plates with plumose setae by inner side and distally. Maxilliped; outer plates reaching apex of palp article 2 with plumose setae and spines distally, inner plates reaching half of outer plates length with plumose setae on inner site and distally, palp 4-articulate, third article smaller then 1 and 2 article with plumose setae, 4 article claw-chaped.

Gnathopods. Gnathopod I; coxa slightly produced forward with setae distally, basipodit slightly expanded distally with setae, merus and ischium near to size with setae, carpus and propodus near to size and longer than merus and ischium with setae, carpus with big spine disto-ventrally, palm of propodus with 2 spines, not carpocheate, dactylus with small teeth by inner side and equal to length of palm. Gnathopod II; coxa with setae distally, basipodit slightly expanded distally with setae, ischium small with setae, merus longer than ischium with setae, carpus near triangular with setae disto-ventrally, palm of propodus with 1 spines, carpocheate, 2 spines additionally near to palm, dactylus with small teeth by inner side and slightly longer than palm.

Pereopodes. Pereopodes III and IV similar; basipodit expanded, anterior site expanded with setae, posterior site near to rectilinear; ischium small near to quadrangular; merus expanded with cavity distally; carpus small, rounded; propodus narrow distally with setae; dactylus longer than propodus and carpus together. Pereopodes V and VI similar, but pereopodes VI bigger by size; basipodit expanded, posterior

site with setae; ischium small; merus in 3 time longer than ischium, expanded distally with small lobe near connect to carpus; carpus small, rounded with groups of tiny setae near to propodus; propodus longer than carpus; dactylus small with additional tooth by outer site. Pereopodes VII; basipodit expanded but narrow distally with long plumose setae anteriorly and posteriorly; ischium small, rectangular; merus longer than ischium near to rectangular with setae; carpus equal by length to merus, slightly incurved with setae; propodus longer than carpus slightly incurved with setae; dactylus small with additional tooth by outer site.

Epimers. Epimers rounded distally, increase from I to III; Epimers I and II with plumose setae; epimers III with seta posteroventrally and seta posteriorly.

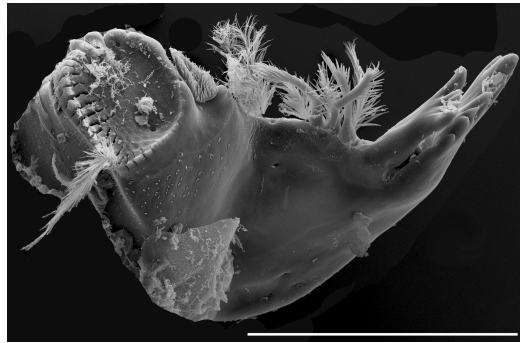
Urosome. Uropods I: peduncle much longer than rami with spines by outer site, with 1 spine by inner site distally, conical groups of big microtriches on 1/3 length of distally site and group of small microtriches on 2/3 length of distally site; outer ramus longer than inner ramus with spines by outer site and distally and small group of microtriches distally and outer site; inner ramus expanded, lobe-shaped, with spines distally and small group of microtriches by inner site. Uropods II smaller than uropods I; peduncle much longer than rami with conical groups of microtriches distally; outer ramus longer than inner ramus with spines distally, 1 spine on outer site and groups of microtriches distally; inner ramus expanded, with 2 spines distally, 1 spine on inner site and groups of microtriches distally. Uropods III smaller than uropods I and II; peduncle short and expanded, with 3 long plumose setae and 1 spine distally, and 1 spine on inner site; ramus one, small, with 3 long plumose setae and 1 spine distally. Telson near hexagonal with some setae medially and laterally and groups of small serrate distally.

Female very close by morphology with male. Gnathopods II smaller than by male concerning length of body size. Morphology of adult males and females additionally present on fig. 1–5.



Fig. 1. Habitus *Centraloecetes* cf. *neapolitanus*, male. A — specimen 1, dorsal view (damage — the fifth segment is mechanically pressed down), B — specimen 2, lateral view. Scale — 1 mm.

Рис. 1. Внешний вид самца *Centraloecetes* cf. *neapolitanus*. А — особь 1, вид со спины (повреждение — пятый сегмент вдавлен внутрь), В — особь 2, вид сбоку. Шкала — 1 мм.



A



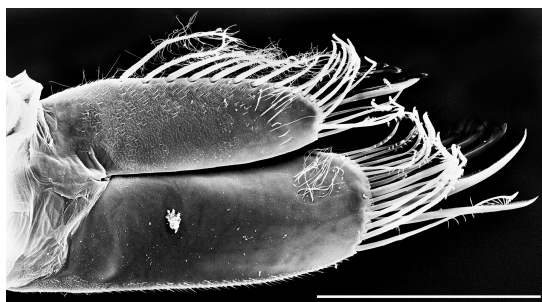
B



C



D



E



F

Fig. 2. Mouthparts of *Centraloecetes* cf. *neapolitanus*, male, specimen 3. A — right mandible, B — left mandible with palp, C — lower lip, D — maxilla I, E — maxilla II, F — maxilliped. Scale — 0.1 mm.

Рис. 2. Ротовые органы самца *Centraloecetes* cf. *neapolitanus*, особь 3. А — правая мандибула, В — левая мандибула с пальпом, С — нижняя губа, D — максилла I, E — максилла II, F — максиллипод. Шкала — 0.1 мм.

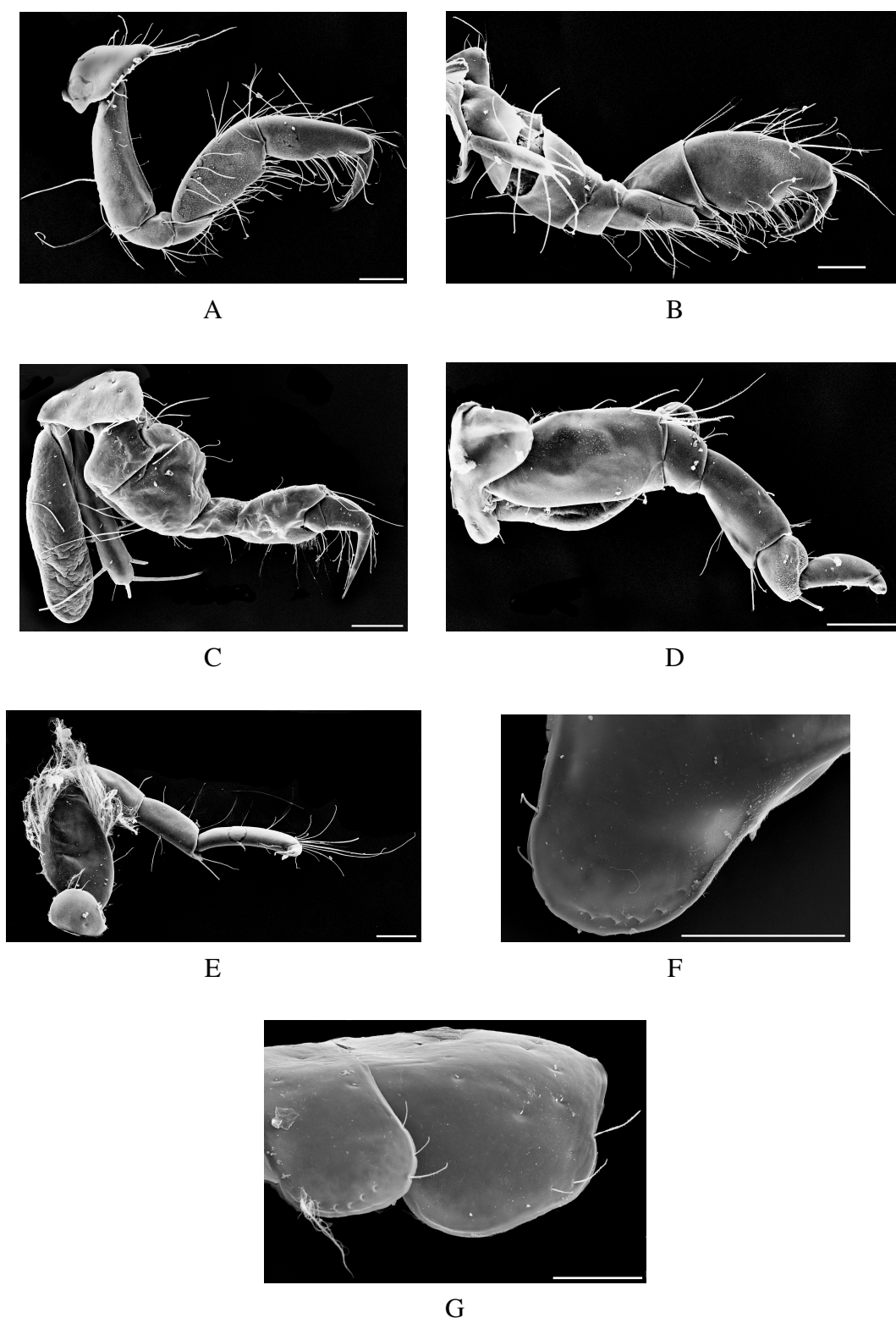


Fig. 3. Gnathopods, pereopodes and epimers of *Centraloecetes* cf. *neapolitanus*, female.
A — gnathopod I, B — gnathopod II, C — pereopod IV, D — pereopod VI, E — pereopod VII,
F — epimer I, G — epimers II (left) and III (right, biggest). Scale — 0.1 mm.
Notice. On epimeral plate II save one plumose seta, five setae are lost.

Рис. 3. Гнатоподы, переоподы и эпимеры самки *Centraloecetes* cf. *neapolitanus*. А — гнатопод I, В — гнатопод II, С — переопод IV, D — переопод VI, E — переопод VII, F — эпимеральная пластинка I, G — эпимеральная пластинка II (слева) и III (справа, наибольшая). Шкала — 0.1 мм.
Замечание. На эпимеральной пластинке II сохранилась одна перистая щетинка, пять щетинок потеряны.

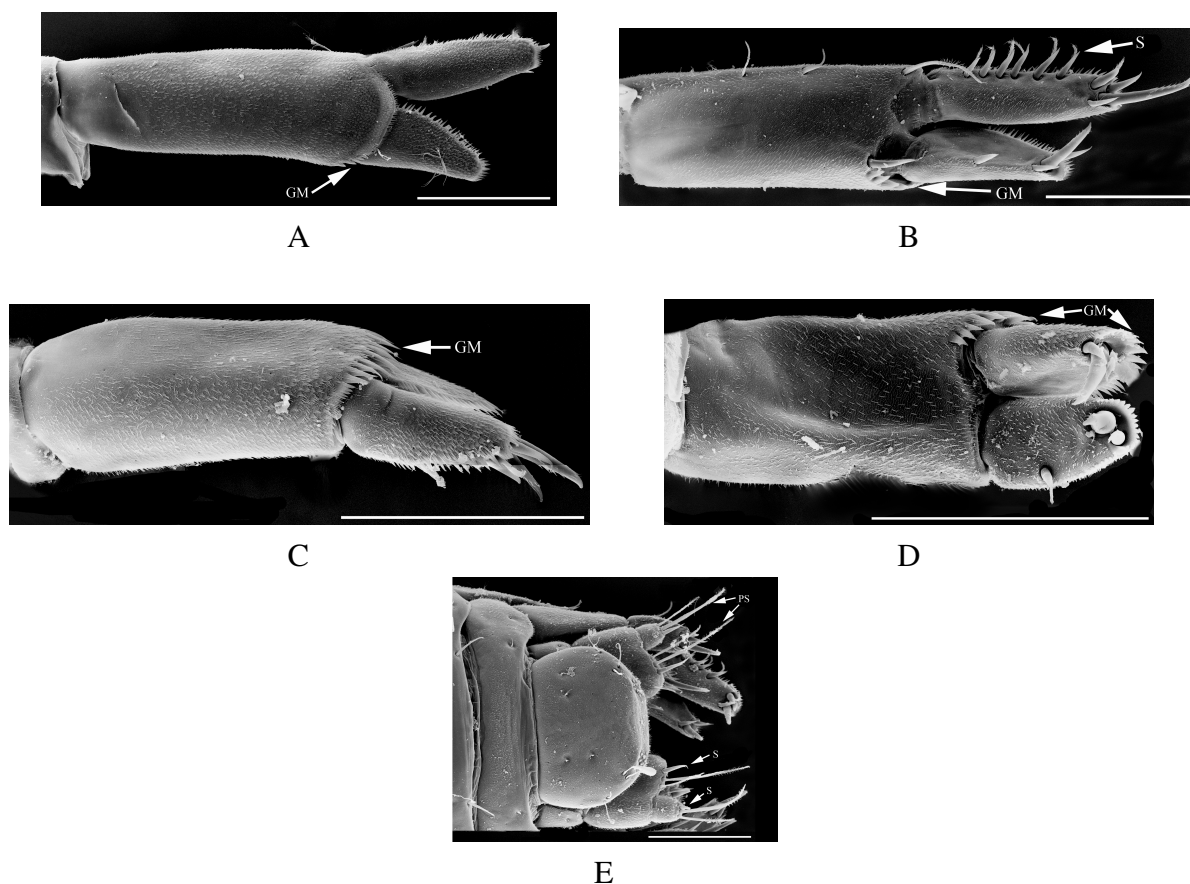


Fig. 4. Uropods and telson of *Centraloecetes* cf. *neapolitanus*, female. A — uropod I, ventral view, B — uropod I, dorsal view, C — uropod II, lateral view, D — uropod II, dorsal view, E — uropods III and telson, dorsal view. Scale — 0.1 mm. Designations: GM — groups of microtriches, S — spine, PS — plumose setae on peduncle and ramus of uropod III.

Рис. 4. Уроподы и тельсон самки *Centraloecetes* cf. *neapolitanus*. А — уропод I, вид с брюшной стороны; В — уропод I, вид со спинной стороны; С — уропод II, вид сбоку; D — уропод II, вид со спинной стороны; E — уроподы III и тельсон, вид со спинной стороны. Шкала — 0.1 мм. Обозначения: GM — группы микротрих, S — шип, PS — перистые щетинки на стебельке и ветвях уропода III.

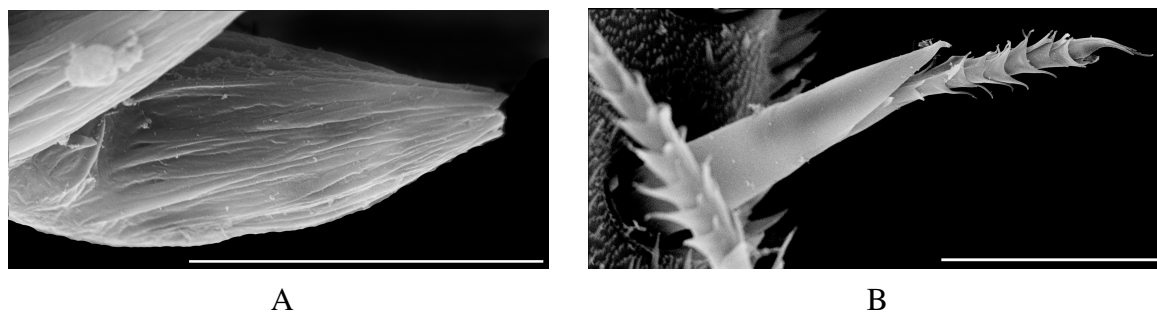


Fig. 5. New morphological elements of uropods I and II of *Centraloecetes* cf. *neapolitanus*, female. A — groups of fused microtriches of conical form, B — spine with complexity seta. Scale — 0.01 mm.

Рис. 5. Новые морфологические элементы уропод I и II самки *Centraloecetes* cf. *neapolitanus*. А — группа микротрих, соединённых в форме конуса, В — шип со сложной щетинкой. Шкала — 0.01 мм.

New elements of morphology for genus *Centraloecetes*. Early in description of species morphology of genus *Centraloecetes* use term “teeth” to elements on distal site of uropod 1 peduncle [Greze, 1977; Greze, 1985; De-La-Osso-Carretero, Marti, 2014; Myers, 1982; Myers, McGrath, 1979]. But by investigation of these elements with used SEM to see what really it other constructions. Morphology of these constructions is more complexity. They consist of microtriches [term. see Richards, 1951] which fused in conical form («GM» — fig. 4A, 4B, 4C, 4D, 5A). These microtriches look like as other microtriches of uropods I and II surface, but microtriches on surface form small of groups in flat-shaped. Morphological elements on outer site of outer ramus of uropod I, which early named as “teeth” («S» — fig. 4B, 4E) on photos SEM (fig. 5B) has more complexity structure. On spine have complexity seta in the form of nested segments. These complexity setae not were documented earlier in descriptions of species morphology of *Centraloecetes* genus.

Ecology. Specimens *Centraloecetes* cf. *neapolitanus* were founded in sand with detritus, on 16 m depth together with other species: *Ampelisca diadema* (Costa, 1853), *Nototropis massiliensis* (Bellan-Santini, 1975), *Periculodes longimanus* (Spence Bate & Westwood, 1868), *Synchelidium maculatum* Stebbing, 1906.

Discussion. In stereomicroscope specimens of *Centraloecetes* cf. *neapolitanus* closed to *C. neapolitanus* by follow parameters: uropod I with comb-toothed distal margin; rostrum longer than eye lobes; uropod III peduncle with 2–3 pectinate setae and spine; uropod III ramus with 2–3 pectinate setae and spine. From specimens of *C. neapolitanus* this species different specific combination size of «teeth» (in SEM «teeth» by structure are groups of fused microtriches) — bigger «teeth» dispose on 1/3 length of distal margin («GM» — fig. 4A, 4B), smaller «teeth» dispose on 2/3 length of distal margin. Distal margin of uropod I of *C. neapolitanus* with teeth the same size on all length [Myers, 1982, p. 206, fig. 140, «UI»]. Uropod II *Centraloecetes* cf. *neapolitanus*, inner ramus more than 3/4 length of outer ramus (uropod II *C. neapolitanus* less than 2/3 length of outer).

From *Centraloecetes* cf. *neapolitanus* specimens of *C. dellavallei* different follow parameters [Myers, 1982]: uropod I distal margin smooth, uropod II peduncle with minutely fimbriate disto-ventral margin, uropod III peduncle with 5 strong distal setae, uropod III ramus with 6–8 strong distal setae. Specimens of *C. pallidus* are different from *Centraloecetes* cf. *neapolitanus* by eyes missing. Specimens of *C. kroyeranus* are different from *Centraloecetes* cf. *neapolitanus* by follow parameters: uropod I distal margin of peduncle without teeth [Myers, McGrath, 1979, p. 215, fig. 2–7, 2a–7a], uropod III peduncle with 5 long setae, uropod 3 ramus with 4–6 of long distal setae. Specimens of *C. striatus* are different from *Centraloecetes* cf. *neapolitanus* by follow parameters: uropod I distal margin of peduncle without teeth [Myers, McGrath, 1979, p. 219, fig. 12–16, 12a–16a], uropod III, uropod 3 ramus with 4–5 long distal setae. Specimens of *C. bulborostrum* are different from *Centraloecetes* cf. *neapolitanus* by presence of bulbous subrostral projection.

Analysis of ultra-structure «teeth» from distal margin of uropods I and other articles of uropods revealed, what “teeth” in really are fused microtriches of conical form (fig. 5A). Unfortunately in descriptions of other species of *Centraloecetes* genus missing analysis ultra-structure teeth, and not possible make comparison other species with *Centraloecetes* cf. *neapolitanus*. The same goes for comparison of *Centraloecetes* cf. *neapolitanus* with other species by complex seta on spines of margin outer ramus of uropod I (fig. 5B). But, presence fused microtriches of conical form and complex setae, not give basis for claiming uniqueness *Centraloecetes* cf. *neapolitanus*. Maybe by analysis on SEM ultra-structure these elements for other species of this genus will have of similar structure.

Conclusion

Thus, specimens founding in coastal zone near Sevastopol (Crimea, Black Sea) in sand, belong to genus *Centraloecetes* (Ischyroceridae, Amphipoda). In result investigations taxonomical status of this species is *Centraloecetes* cf. *neapolitanus*. In morphology of this species found elements not describe in earlier articles with descriptions species of this genus.

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**ПЕРВАЯ НАХОДКА CENTRALOECETES CF. NEAPOLITANUS (SCHIECKE, 1978)
(ISCHYROCERIDAE, AMPHIPODA) В ПРИБРЕЖЬЕ СЕВАСТОПОЛЯ (КРЫМ,
ЧЁРНОЕ МОРЕ)**

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В районе внешнего рейда Севастопольской бухты 15.08.2018 обнаружены особи из рода *Centraloecetes* (Ischyroceridae, Amphipoda), морфологически близкие к виду *Centraloecetes neapolitanus* (Schiecke, 1978). Материал собран из песка, поднятого водолазом с глубины 16 м. Особи, найденные в данном местообитании, отличаются по ряду морфологических признаков от известного в Чёрном море вида *Centraloecetes dellavallei* (Stebbing, 1899). Подробный анализ морфологии с использованием электронного микроскопа выявил признаки, не известные для рода по другим видам. Предположительно вид является либо вселенцем, либо не учтённым ранее. В связи с этим важно отслеживание распространения данного вида с целью прогноза последствий для прибрежных экосистем. Поскольку найдено множество особей данного вида (более 100), возможно их нахождение в заповедных акваториях крымского побережья.

Ключевые слова: Amphipoda, *Centraloecetes*, морфология, Чёрное море.

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