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NEW REPORTS OF GASTROTRICHA FOR THE NORTH-EASTERN UKRAINE

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New Reports of Gastrotricha for the North-Eastern Ukraine. Trokhymchuk, R. R. — Gastrotricha is poor known phylum of small metazoans. Information about Ukrainian gastrotrichs' fauna is outdated. Altogether nine species are reported in this paper. Seven taxa are new to the fauna of Ukraine: *Chaetonotus (Hystricochaetonotus) hystrix*, *Chaetonotus (Primochaetus) heideri*, *Chaetonotus (Zonochaeta) bisacer*, *Lepidodermella minor minor*, *Lepidodermella squamata*, *Ichthydium maximum* and *Haltidytes festinans*. This investigation gives an additional morphological information on *Chaetonotus (Chaetonotus) maximum* and *Chaetonotus (Hystricochaetonotus) macrochaetus*, which have been earlier reported to the Ukraine fauna but currently they recorded in Kharkiv Region for the first time. We provide short morphological description of all species and give some ecological notes.

Key words: Gastrotricha, meiofauna, Ukraine, biodiversity.

Introduction

Gastrotricha Metschnikoff, 1865 are minute vermiform, acoelomate invertebrates. Metschnikoff classified these organisms as a Phylum (Metschnikoff, 1865) but some present investigations defined this group as a clade of Lophotrochozoa (Hejnol, 2015). Gastrotrichs are cosmopolitan species and can be found in all aquatic environments (Balsamo et al., 2008). However, we receive information about new species for science every year. In the sea gastrotrichs can rank third in abundance after nematodes and harpacticoid and in freshwater habitats they are among the top five most common taxa encountered. Gastrotricha is divided into two orders: Macrodasysida Remane, 1925 which is almost exclusively marine and Chaetonotida Remane, 1925, with both marine and freshwater representatives (Balsamo et al., 2014). Classification of Gastrotricha is mainly based on morphology and ultrastructure (Schwank, 1990). Morphometry of the body and in particular of some structures, such as the furca and the pharynx are important characters for species identification as well as distribution and shape of scales and spines (Känneby, 2011).

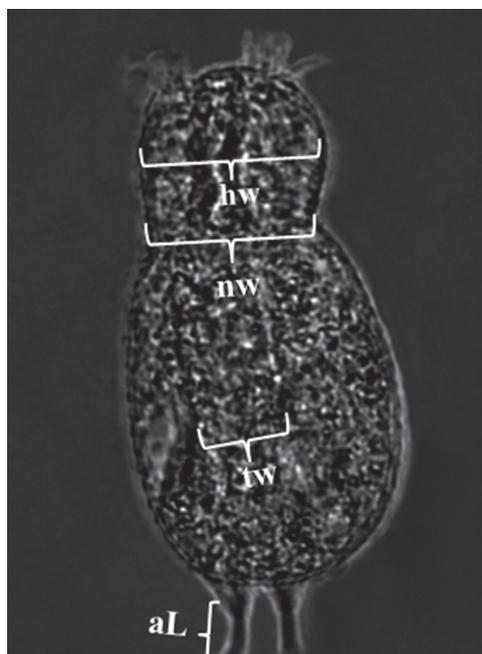


Fig. 1. Gastrotrichs' measurements using in this study. Scale bar 30 μ m.

equipped with a TouPCam UHCCD05100KPA digital camera. Traditional body measurements were made with aid of the TopView program. The description and measuring of species follows Swank and Kiesielewski with changes (Schwank, 1990 & Kiesielewski, 1991). The part of samples stored in V. N. Karazin Kharkiv National University, Faculty of Biology, Department of zoology and animal ecology in glycerol-ethanol suspension. In the classification of higher taxa we follow to Balsamo et al. (2014).

Abbreviations used in the text: L — length, TL — total length, md — mouth diameter, w — width, h — head, n — neck, ph — pharynx, t — trunk, a — adhesive tube (fig. 1).

Results

In this study we identified 9 species of 4 genera and 2 families (Balsamo et al., 2014). The morphology and ecology of gastrotrichs was analyzed according to previous studies (Schwank, 1990; Kiesielewski, 1991; K anneby, 2011).

Order Chaetonotida Remane, 1925

Suborder Paucitubulatina d'Hondt, 1971

Family Chaetonotidae Gosse, 1864

Genus *Chaetonotus* Ehrenberg, 1830

Subgenus *Chaetonotus* Ehrenberg, 1830

Chaetonotus (Chaetonotus) maximus Ehrenberg, 1838 (fig. 2, A)

Material. 7 specimens. TL 185–188 μ m, aL 14 μ m pL 44–46 μ m, md 8 μ m, hw 35–37 μ m, nw 28–30 μ m, tw 28–30 μ m.

Description. The morphology and the dimensions of the animals collected correspond to the literature data (Schwank, 1990). Slender body. Five-lobed head with two pairs of cephalic sensory ciliary tufts. Large cephalion, epi- and hypopleurae. Hypostomium developed. Two pairs of dorsal sensory bristles present. Dorsal body surface covered by arrowhead-shaped three-lobed scales. In the head and neck regions the proximal parts of the scales are more rounded than in the trunk region. Scales bear simple spines that increase

Species from the order Chaetonotida are also epibenthic or periphytic, but there is family Dasydytidae adapted to semiplanktonic living. Gastrotrichs are also available to water bodies' saprobic biondication (Slade ek, 1976; Kiesielewski, Kiesielewska, 1986).

The Ukrainian gastrotrich fauna is poorly studied so far. Only few species are founded from Ukraine over century ago by Jakubski (1919). The aim of this paper is to update the knowledge of gastrotrichs' biodiversity and their ecology in Ukraine.

Material and methods

Material of Gastrotrichs was collected from September 2018 to February 2019 in Karyakiv ravine pond (49,6157 N 36,3148 E) (a territory of National park "Homilshanski lisy" and a part of V. N. Karazin National University Biological station Zmiiiv District) in the Kharkiv Region, North-East of Ukraine. Gastrotrichs were sampled with using a plastic cylinder for benthic sampling at depth between 0.1 to 1 m. Vegetation was collected by hand (K anneby, 2011). Samples were taken back to the laboratory of V. N. Karazin National University where they left thawing with ice for a few days. Then samples were treated with lidocaine to anaesthetize the animals. Individual gastrotrichs were extracted with a micropipette and studied alive. Thirty species were examined. Images of animals were made with a Carl Zeiss microscope

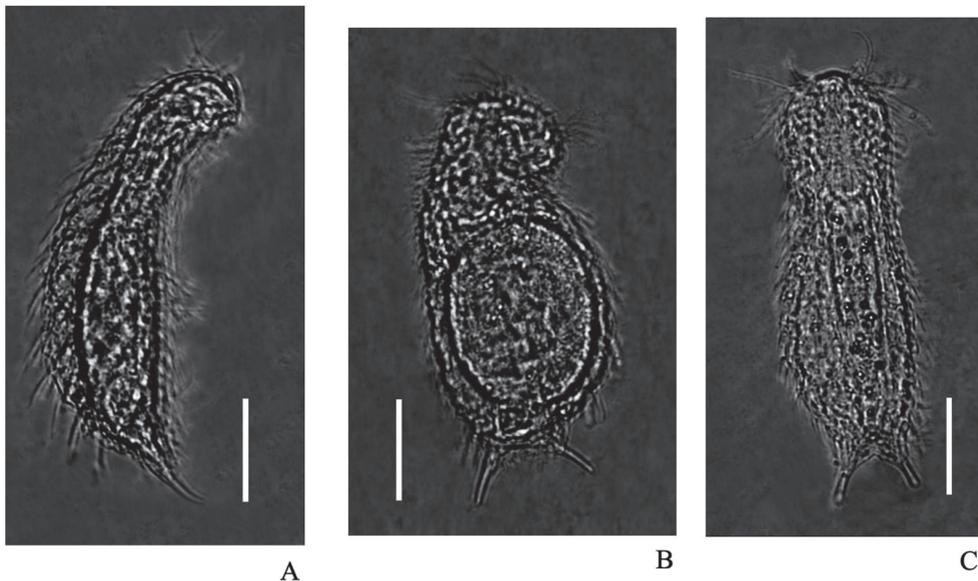


Fig. 2. Gastrotrichs of the Karyakiv ravine pond: A — *Chaetonotus (Chaetonotus) maximus*; B — *Chaetonotus (Hystricochaetonotus) hystrix*; C — *Chaetonotus (Hystricochaetonotus) macrochaetus*. Scale bars 30 μm .

in length from anterior to posterior. Five stout spines present on the base of the furcal branches and at the caudal incision. One to two pairs of thick parafurcal spines. Ventrolateral scales and spines similar to those of the dorsal surface. Ventral interciliary field with transverse scale plates in the pharynx region. Mouth subterminal.

Distribution and ecology. Cosmopolitan species (Balsamo et al., 2008). Reported from Europe: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, France, Germany, Great Britain, Hungary, Iceland, Italy, Poland, Romania, Russia, Spain, Sweden, Switzerland; Algeria, Canada, Japan, New Guinea and USA (K anneby, 2011). Long time ago the species was reported from Ukrainian Carpathians (Jakubski, 1919). This species usually reported from oligosaprobic water bodies but also is common from all types of saprobity (Slade ek, 1976).

Remarks. This species is reported in Kharkiv Region for the first time.

Subgenus *Hystricochaetonotus* Schwank, 1990

Chaetonotus (Hystricochaetonotus) hystrix Metschnikoff, 1865 (fig. 2, B)

Material. 2 specimens. TL 160–171 μm , aL 15 μm .

Description. The morphology and the dimensions of the animals collected correspond to the literature data (Schwank, 1990). Stout body. Head weakly five-lobed with two pairs of cephalic sensory ciliary tufts. Cephalion and pleurae weakly developed. Hypostomium absent. Two pairs of dorsal sensory bristles present. Dorsal body surface covered by three-lobed scales with deep posterior incision. Scales with barbed spines that increase in size towards the posterior end. An area of the dorsal posterior trunk region with scales that lack spines. Two pairs of thicker parafurcal spines present. Ventrolateral areas with scales with barbed spines, similar in shape to those of the dorsal surface but finer. Mouth subterminal.

Distribution and ecology. Cosmopolitan species (Balsamo et al., 2008). Reported from Europe: Austria, Bulgaria, Denmark, Estonia, France, Great Britain, Hungary, Poland, Romania, Russia, Sweden; Brazil, Israel, Paraguay (K anneby, 2011). Epibentic and periphytic species.

Remarks. This species is reported in Ukraine for the first time.

Chaetonotus (Hystricochaetonotus) macrochaetus Zelinka, 1889 (fig. 2, C)

Material. 2 specimens. TL 170–177 μm , aL 12 μm , pL 43–45 μm , md 8–9 μm , hw 41 μm , nw 35–37 μm , tw 18–19 μm .

Description. The morphology and the dimensions of the animals collected correspond to the literature data (Schwank, 1990). Stocky body. Head rounded to weakly five-lobed with two pairs of cephalic sensory ciliary tufts. Cephalion and pleurae weakly developed. Hypostomium present. Two pairs of dorsal sensory bristles. Dorsal surface covered by three-lobed scales with barbed spines. In the mid-trunk region both scales and spines suddenly increase in length. Posterior trunk region with three-lobed scales that lack spines. Ventrolateral scales and spines similar to those of dorsal surface but smaller in size. A pair of keeled ventral terminal scales with short spines present. Interciliary area covered by rounded usually keeled scales. Mouth subterminal.

Distribution and ecology. Cosmopolitan species (Balsamo et al., 2008). Reported from Europe: Austria, Bulgaria, Denmark, Estonia, Germany, Great Britain, Hungary, Italy, Poland, Romania, Russia, Switzerland, Sweden, Brasil, Canada, Israel (K anneby, 2011). Typical periphytic species for oligo- and mesosaprobic water bodies (Slade ek, 1976).

Remarks. More than century ago this species is reported from Ukrainian Carpathians (Jakubski, 1919). This species is reported in Kharkiv Region for the first time.

Subgenus *Zonochaeta* Remane, 1927***Chaetonotus (Zonochaeta) bisacer*** Greuter, 1917 (fig. 3, A)

Material. 1 specimen. TL 209 μm , aL 13 μm , pL 33,4 μm , md 5 μm , hw 30.8 μm , nw 29 μm , tw 15,7 μm .

Description. The morphology and the dimensions of the animal collected correspond to the literature data (Schwank, 1990). Slender body. Head five-lobed with two pairs of cephalic sensory ciliary tufts. Cephalion and pleurae well developed. Hypostomium developed. Two pairs of dorsal sensory bristles. Anterior to the spine girdle the dorsal surface is covered by elongated weakly three-lobed scales with very short simple spines. A pair of longer terminal spines. A pair of long parafurcal spines. Interciliary field covered by small elongated keeled scales. Mouth subterminal. Pharynx with anterior and posterior swellings, the posterior larger than the anterior.

Distribution and ecology. Cosmopolitan species (Balsamo et al., 2008). Reported from Europe: Denmark, Germany, Great Britain, Italy, Poland, Romania, Russia, Switzerland; Argentina, Brazil, Canada, USA, Japan, Corea (K anneby, 2011).

Remarks. This species is reported in Ukraine for the first time.

Subgenus *Primochaetus* Kisielewski, 1997***Chaetonotus (Primochaetus) heideri*** Brehm, 1917 (fig. 3, B)

Material: 1 specimen. TL 217 μm , aL 18 μm , pL 55 μm , md 12 μm .

Description. The morphology and the dimensions of the animal collected correspond to the literature data (Schwank, 1990). Head rounded to weakly five-lobed with two pairs of cephalic sensory ciliary tufts. Cephalion and pleurae weakly developed. Two pairs of dorsal sensory bristles. Furca relatively short. Dorsal surface covered with heart-shaped to pentagonal scales, sometimes with more or less well developed double anterior edge. Scales increase in size from the head region to mid-posterior trunk region with a subsequent decrease towards the caudal end. Barbed spines originate from approximately the center of each scale, increasing in length from anterior to posterior. The posteriormost spines can overshoot the furca. The medial spines can be longer than the furca. Mouth large.

Distribution and ecology. Cosmopolitan species (Balsamo et al., 2008). Reported from Europe: France, Germany, Great Britain, Italy, Poland, Romania, Russia, Sweden; Brazil, Canada and USA (Kånneby, 2011).

Remarks. This species is reported in Ukraine for the first time.

Genus *Lepidodermella* Blake, 1933

***Lepidodermella minor minor* Remane, 1936 (fig. 3, C)**

Material. 1 specimen. TL 138 μm , aL 9 μm , pL 32 μm , md 4,5 μm , hw 40 μm , nw 38 μm , tw 18,3 μm .

Description. The morphology and the dimensions of the animal collected correspond to the literature data (Kisielewski, 1991). It is an insufficiently described species. The head is indistinctly five-lobed with two pairs of cephalic sensory ciliary tufts, the posterior pair

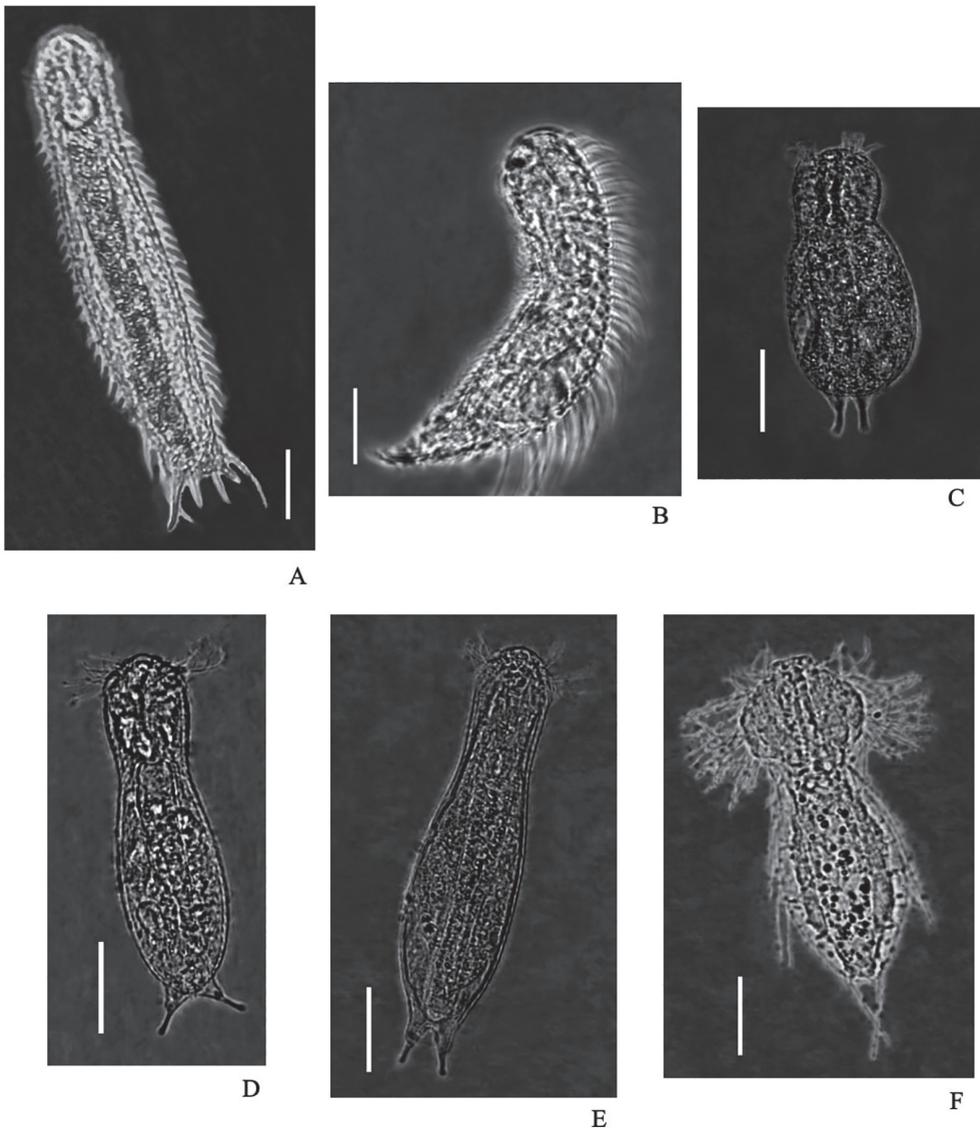


Fig. 3. Gastrotrichs of the Karyakiv ravine pond: A — *Chaetonotus (Zonochaeta) bisacer*, B — *Chaetonotus (Primochaetus) heideri*, C — *Lepidodermella minor minor*, D — *Lepidodermella squamata*, E — *Ichthydium maximum*, F — *Haltidytes festinans*. Scale bars 30 μm .

longer than the anterior pair. Two pairs of sensory bristles are present. The dorsal side is covered by rounded pentagonal to hexagonal scales. Mouth subterminal, pharynx is thick. Unlike the Brazilian subspecies *L. m. chaetifer*, the European form doesn't have a paired lateral spine located at furca base.

Distribution and ecology. Reported from Germany, Poland and Sweden (Kånneby, 2011).

Remarks. This subspecies is reported in Ukraine for the first time.

***Lepidodermella squamata* (Dujardin, 1841) (fig. 3, D)**

Material. 4 specimens. TL 150–180 µm, al 10–11 µm, pl 37–54 µm, md 7–8 µm, hw 36–39 µm, nw 29–34 µm, tw 15–18 µm.

Description. The morphology and the dimensions of the animals collected correspond to the literature data (Schwank, 1990). Stocky body. The head is weakly five-lobed. Hypostomium developed. Dorsal head and trunk surface covered by smooth scales with either rounded or squared posterior edge; in the neck region the scales are more rectangular. Ventral interciliary field with transverse scale plates in the pharynx region. Mouth subterminal, pharynx gradually widens towards the pharyngeal intestinal junction.

Distribution and ecology. Cosmopolitan species (Balsamo et al., 2008). Reported from Europe, India, Japan, Korea, Israel, East Africa, Canada, USA, Brazil, Uruguay and Argentina (Kånneby, 2011). Usually reported from oligo- and mesosaprobic water bodies (Sladec̣ek, 1976).

Remarks. This species is reported in Ukraine for the first time.

Genus *Ichthydium* Ehrenberg, 1830

***Ichthydium maximum* Greuter, 1917 (fig. 3, E)**

Material. 3 specimens. TL 207–220 µm, al 9–11 µm, pl 63–65 µm, md 8 µm, hw 36–38 µm, nw 33 µm, tw 13,5 µm.

Description. The morphology and the dimensions of the animals collected correspond to the literature data (Schwank, 1990). Slender body. Head five-lobed with two pairs of cephalic sensory ciliary tufts. Two pairs of dorsal sensory bristles. Furca is short. Both dorsal and ventral sides are naked. Mouth subterminal.

Distribution and ecology. Reported from Europe: Great Britain, Poland, Romania, Russia, Switzerland and Japan. Usually reported from eutrophic water bodies (Kånneby, 2009).

Remarks. This species is reported in Ukraine for the first time.

Family Dasydytidae Daday, 1905

Genus *Haltidytes* Remane, 1936

***Haltidytes festinans* (Voigt, 1909) (fig. 3, F)**

Material. 1 specimen. TL 126 µm, pL 37 µm, md 7.8 µm, hw 45 µm, nw 22 µm, tw 20 µm.

Description. The morphology and the dimensions of the animal collected correspond to the literature data (Schwank, 1990). Stocky body. Triangular head. Cephalic ciliature composed by 3 paired tufts. Dorsal side has 5 pairs of long crossing spines. Ventrally, beyond the trunk end, saltatorial and caudal spines do not cross. Mouth terminal.

Distribution and ecology. Usually reported from mesosaprobic water bodies (Sladec̣ek, 1976). Reported from Poland and Brazil (Kisielewski, 1991). Typical semiplanktonic species.

Remarks. This species is reported in Ukraine for the first time.

Table 1. Gastrotrich species currently recorded in Ukraine

No.	Species	Records/Source
1.	<i>Chaetonotus (Chaetonotus) maximus</i>	Jakubski, 1919
2.	<i>Chaetonotus (Hystricochaetonotus) hystrix</i>	Present study
3.	<i>Chaetonotus (Hystricochaetonotus) macrochaetus</i>	Jakubski, 1919
4.	<i>Chaetonotus (Zonochaeta) bisacer</i>	Present study
5.	<i>Chaetonotus (Primochaetus) heideri</i>	Present study
6.	<i>Lepidodermella minor minor</i>	Present study
7.	<i>Lepidodermella squamata</i>	Present study
8.	<i>Ichthydium maximum</i>	Present study
9.	<i>Haltidytes festinans</i>	Present study

A list of all species reported from Ukraine is presented in table 1.

Discussion and conclusion

Altogether nine species of Gastrotricha belonging to two families are reported in the present study for Kharkiv Region. Seven species are registered in the fauna of Ukraine for the first time: *Chaetonotus (Hystricochaetonotus) hystrix*, *Chaetonotus (Primochaetus) heideri*, *Chaetonotus (Zonochaeta) bisacer*, *Lepidodermella minor minor*, *Lepidodermella squamata*, *Ichthydium maximum* and *Haltidytes festinans*. This investigation contributes an additional distribution information for *Chaetonotus (Chaetonotus) maximus* and *Chaetonotus (Hystricochaetonotus) macrochaetus*; these species have been earlier reported in the Ukrainian fauna, namely from Carpathian (Jakubski, 1919) but currently they recorded in Kharkiv Region for the first time.

However, there are some interesting features in their biology, e.g., longlivity, remarkable ability in adaptations, bioindication etc. (Manylov et al., 2004). Further study is required to increase knowledge in fauna, zoogeography and phylogeny of gastrotrichs.

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