Keratella cochlearis hispida (Lauterborn, 1898): a new record for Turkish Rotifer fauna

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Abstract. Rotifera species collected from Keban Dam Lake 65 km far away from Elazığ were surveyed taxonomically and fifteen taxa were identified. One of these taxa Keratella cochlearis hispida (Lauterborn, 1898), is new record for Turkish rotifer fauna.

Key words: Rotifera, Keratella cochlearis hispida, Keratella cochlearis, diagnostic differences.

The phylum Rotifera is mainly represented by freshwater species, widely distributed in all types of inland waters and a by few marine species. Rotifera consists of approximately 2030 described species Segers (2007). The Turkish rotifer is relatively known (Dumont & De Riddar 1987, Emir 1991, Segers et al. 1992, Altındag & Yigit 1999, Yigit 2002, Ustaoğlu 2004, Yalın 2006, Kaya & Altındag 2010, Ustaoğlu 2015) resulting in a total 417 taxa recorded from the country. Inventories of rotifers are important for evaluating environmental changes and understanding functional properties of fresh-water ecosystems. Some rotifer species morphologically similar to each other and the diagnosis is difficult. Keratella cochlearis hispida was identified as Keratella cochlearis in many studies. In this study, in order to avoid confusion between Keratella cochlearis hispida and Keratella cochlearis differences in both species under light and electron microscope have been submitted.

The samples were collected using a plankton net (55 μm mesh size) from Keban Dam Lake on 20.10.2014 (38°52´45.22˝, 40 μm altitude). The samples were fixed in 4 % formalin, analysed under Leitz inverted microscope and identified under Nikon compound microscope. All measurements were made with an ocular micrometer. Photographs were taken using an image analyser computer system connected to Nicon Eclipse 86i microscope. The specimens were prepared for scanning electron microscope (SEM) following the procedure described by De Smet (1998). Electron photographs were performed using a Jeol JSM-7001F Field Emission Scanning Electron Microscope and Denton vacuum Desk VHP Cold Sputter Coater was used to coat them with gold. For species identification, the keys by Koste (1978) and Koste and Shiel (1980) were used.

From Keban Dam Lake 15 rotifer taxa were identified. The family Brachionidae was found to be the most dominant group (with one subspecies, Keratella cochlearis, Keratella cochlearis hispida, Keratella quadrata, Keratella tecta, Keratella valga and Notholca squamula). List of Rotifer taxa recorded in Keban Dam Lake on 10.20.2014.

Ascomorpha saltans Bartsch, 1870
Asplanchna priononta Gosse, 1850
Asplanchna sieboldi (Leydig, 1854)
Cephalodella forficula (Ehrenberg, 1830)
Keratella cochlearis (Gosse, 1851)
Keratella cochlearis hispida (Lauterborn, 1898), Keratella quadrata (Müller, 1876)
Keratella tecta (Gosse, 1851)
Keratella valga (Ehrenberg, 1834)
Lecane (M) lunaris (Ehrenberg, 1832)
Lepadella ovalis (Müller, 1786)
Notholca squamula (Müller, 1786)
Polyarthra doliciptera Idelson, 1925
Synchaeta pectinata Ehrenberg, 1832
Trichocerca capucina (Wierzejski and Zacharias, 1893)

In recent years many new rotifer taxa were observed in Turkish inland waters as; Dicranophorus epicharis, Lecane rhityda, Lecane obtusa and Testudinella parva (Altındag et al. 2005); Anuraeopsis navicular, Ascomorpha volvocicola, Conochilus coenobias, Encentrum putorius, Euchlanisdeflexa, Lepadella ehenbergi, Notholca caudata, Paradicranophorus hudsoni and Synchaeta longipes Abkulut and Yildiz (2005); Asplanchnopus hioplumis, Lecane donneri, Dissotrocha aculeata, Proladestentaculatus and Itura meryeri Erdogon and Guher (2005); Aspelta labri, Dicranophorus robustus, Encentrum uncinatum, Encentrum wiszniewski, Eothinia lanellate, Itura aurita, Lindia torulosa, Lecane arcula, Lecane hornemanni, Lecane inopitana, Proales theodorus and Wulfertia kivuensis (Kaya et al. 2007); Cephalodella delicata Wulfert, C. cf. forceps Donner, C. misgurnus Wulfert, Diplenchuslanus propatula (Gosse), Encentrum limicola Otto, E. mustela (Milne), Lecane aculeate (Jakubski), L. paradoxo (Steinecke), Notomnata glyphura Wulfert, and Proales similis de Beauchamp. C. cf. forceps Donner and L. paradoxo (Kaya and Altındag, 2010), Trichocerca bicristata (Gosse, 1887), Gastropius minor (Rousselet, 1892), Erignatha clastopsis (Gosse, 1886) and Encentrum kulmatyckyi Wiszniweski, 1953, (Erdogan and Guher, 2012).

According to the check-list by Ustaoğlu et al. (2012) 341 taxa, were given from Turkey. Also inland zooplankton species biodiversity has been updated by Ustaoğlu (2015). He reported 417 rotifers from Turkey. Among these rotifer species Keratella cochlearis hispida has not been mentioned. This study is the first record for this subspecies (taxon) in inland water systems of Turkey.

Remarks: Keratella cochlearis hispida (Lauterborn, 1898). The dorsal pattern is almost entirely obscured by the heavy pustulation called hispid. This taxon has showed markedly hispid loricae. This pustulated form occurred in the studied lake (Fig. 1).

Syn: Anuraea cochlearis hispida Lauterborn, 1898 (ref. ID; 1350); Anuraea cochlearis var. hispida Lauterborn, 1900 (ref. ID; 2284); Anuraea stipitata hispida Bartos, 1946 (ref. ID; 3688)

Ecology: Ecological preferences of this subspecies are still not known although this subspecies is widely distributed. The dissolved oxygen value was measured as 9.7 mg/L and pH 7.5, water temperature 16.3°C in Keban Dam Lake where this subspecies was collected. Kolisko (1974),
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Figure 1. Dorsal view of Keratella cochlearis and Keratella cochlearis hispida under light microscope.

mentioned that K. cochlearis has got hispid forms and mainly appears in wavy, shallow and small habitats.

Description: Pejler (1980) remarked that Keratella has shown different morphological variations depending on season and depth of the layer. The lakes containing two or three separate forms of K. cochlearis are deep enough to be stratified during the summer, and possibly the long-spined forms have developed in the hypolimnion (also if they later on can be encountered in the epilimnion as well). As the length of caudal spine Keratella cochlearis hispida generally surpassed than Keratella cochlearis. The dorsal pattern is almost entirely obscured by the heavy pustulation and the posterior spine is successively reduced. The variation of the total length of Keratella cochlearis hispida in Keban Dam Lake’s specimens were between 147-168 µm. Length of maximum body 81-88 µm; body width 62-65 µm; length of posterior spine 29-32 µm; length of anterior spines (median 26-23 µm, intermediate 9-11 µm, lateral 8-10 µm. The posterior spine was usually about half as long as the body (in some specimens may be nearly as long) posterior spine. Its posterior spine length was longer than Keratella cochlearis’ posterior spine.

Total length of Keratella cochlearis specimens were ranged between 138-145 µm. Length of maximum body 62-78 µm; body width 58-60 µm; length of posterior spine 18-22 µm; length of anterior spines (median 18-20 µm, intermediate 8-10 µm, lateral 7-9µm

Dorsal view of Keratella cochlearis hispida and Keratella cochlearis, K. cochlearis hispida’s hispids under electron microscope given Figure 2.

Comments: Ahlstrom (1943), describes this form as: Lorica terminates in a moderately thin median posterior spine, usually about half as long as the body (may be nearly as long). The lorica is wider than typical cochlearis. Pejler (1962) recorded Keratella cochlearis hispida from central Sweden and he indicated that the subspecies has got a pronounced hispid loricae. However, in the forms found in Ontario the hispidity, though variable in different specimens, was found not to be as thick as in the European forms, as noted by Ahlstrom (1943), for North American material. In Keban Dam Lake the hispids on the lorica of K. cochlearis were also observed very clearly even with light microscope. And also K. cochlearis’ length of body, width, length of posterior spine, length of anterior spines were measured shorter than K. cochlearis hispida. Hofmann (1980), compared the body length of K. cochlearis, K. cochlearis hispida and K. tecta. He declared K. cochlearis as the smallest one, K. cochlearis hispida the largest one and K. tecta in between.

In conclusion, a total of 15 taxon from Rotifera were observed in Keban Dam Lake. One of these taxon, Keratella cochlearis hispida (Lauterborn, 1898) was firstly recorded for Turkish rotifer fauna.

References


