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Rotifers in Turkish inland waters

by Murat Kaya, Sibel Yiğit and Ahmet Altındağ

Abstract. From a survey of 36 freshwater sites in Turkey, 12 species of Rotifera were recorded as new to Turkey: *Aspelta labri*, *Dicranophorus robustus*, *Encentrum uncinatum*, *E. wiszniewskii*, *Eothinia lamellata*, *Itura aurita*, *Lecane arcula*, *L. hornemanni*, *L. inopitana*, *Lindia torulosa*, *Proales theodora*, and *Wulfertia kivuensis*. These include four genera found in Turkey for the first time (*Aspelta*, *Eothinia*, *Itura* and *Wulfertia*).

Kurzfassung. Im Zuge einer Felderhebung in 36 Süßgewässern der Türkei wurden 12 Rotifera-Arten als neu für die Türkei nachgewiesen: *Aspelta labri*, *Dicranophorus robustus*, *Encentrum uncinatum*, *E. wiszniewskii*, *Eothinia lamellata*, *Itura aurita*, *Lecane arcula*, *L. hornemanni*, *L. inopitana*, *Lindia torulosa*, *Proales theodora* und *Wulfertia kivuensis*. Darunter sind auch vier Gattungen (*Aspelta*, *Eothinia*, *Itura* und *Wulfertia*), die in der Türkei erstmals gefunden wurden.

Key words. Rotifera, taxonomy, Turkey, new records.

Introduction

Although the environmental conditions of Turkish lakes have been described by many authors, the zooplankton including the rotifer fauna has only received close attention during the last two decades, and significant progress has been made (e.g. DUMONT & DE RIDDER 1987, SEGERS et al. 1992, ALTINDAĞ & YİĞİT 1999, EMİR 2004). In this study, we record 12 species of Rotifera new to the Turkish fauna.

Material and methods

Rotifer samples were collected between 2003 and 2005 by using a standard plankton net (aperture 55 µm). The material was fixed with 4% formaldehyde, soon after collection. Trophi were isolated by dissolving the soft body parts in dilute NaOCl, and were prepared for scanning electron microscopy (SEM) following the procedure of DE SMET (1998). SEM study was performed using a JEOL JSM-60 60 LV and using a POLARON SC 502 SPUTTER COATER to gold cover. For identification we used EDMONDSON (1959), KOSTE (1978), DE SMET (1996), DE SMET & POURRIOT (1997), SEGERS (1995), and NOGRADY & POURRIOT (1995).

The material was collected at 36 freshwater sites in Central Anatolia, the Mediterranean Region, West Anatolia and Eastern Anatolia (Fig. 1). The localities are given below together with the provinces (in parentheses) and collecting dates.

1. Homurlu Stream (Develi-Kayseri): 3.vi.2005, 27.vii.2005, 6.viii.2005. - 2. Ekiz Stream (Develi-Kayseri): 2.vi.2005. - 3. Zamantı River (Develi-Kayseri): 3.iv.2005, 3.vi.2005, 9.viii.2005, 7.ix.2005. - 4. Tekir Pond (Erciyes Mountain-Kayseri): 10.viii.2005. - 5. Çayırözü Pond (Develi-Kayseri): 3.iv.2005. - 6. Topçu Dam Lake (Sorgun-Yozgat): 18.ix.2004. - 7. Mogan

Lake (Ankara): 14.v.2005. - **8.** Kirmir Stream (Kazan-Ankara): 21.v.2005. - **9.** Sarıyar Dam Lake (Ankara): 3.x.2003, 2.vi.2003. - **10.** İkizce Pond (Ankara): 7.v.2003. - **11.** Lake Beyşehir (Isparta): 12.v.2003, 21.vii.2003. - **12.** Takmak Pond (Eşme-Uşak): 19.vii.2005, 8.x.2005. - **13.** Üçpınar Pond (Eşme-Uşak): 19.vii.2005, 8.x.2005. - **14.** Göksu Stream (Kumluca-Antalya): 19.viii.2005, 9.xi.2005. - **15.** Alakır Stream (Kumluca-Antalya): 19.viii.2005, 9.xi.2005. - **16.** Gavur Stream (Kumluca-Antalya): 20.viii.2005, 9.xi.2005. - **17.** Akmaç Stream (Kumluca-Antalya): 20.viii.2005, 9.xi.2005. - **18.** Alara Stream (Alanya-Antalya): 13.v.2005. - **19.** Lake Titreyen (Manavgat-Antalya): 10.v.2005. - **20.** Oymapınar Dam Lake (Manavgat-Antalya): 10.v.2005. - **21.** Seyhan River (Seyhan-Adana): 10.vii.2003. - **22.** Birecik Dam Lake (Şanlıurfa): 11.vii.2003. - **23.** Erçek Lake (Van): 12.vii.2003. - **24.** Van Lake (Van): 12.vii.2003. - **25.** Gönderme Stream (Van): 13.vii.2003. - **26.** Taşırnak Village (Van): 13.vii.2003. - **27.** Dicle River (Şırnak): 14.vii.2003. - **28.** Habur Stream (Şırnak): 14.vii.2003. - **29.** Hezil River (Şırnak): 14.vii.2003. - **30.** Uludere (Şırnak): 14.vii.2003. - **31.** Yüksekova Stream (Yüksekova-Hakkari): 15.vii.2003. - **32.** Zap River (Hakkari): 14.vii.2003. - **33.** Sumbul Mountain Stream (Hakkari): 14.vii.2003. - **34.** Karasu River (Erzincan): 15.vii.2003. - **35.** Ergüder Stream (Iğdır): 16.vii.2003. - **36.** Digor Stream (Kars): 17.vii.2003.

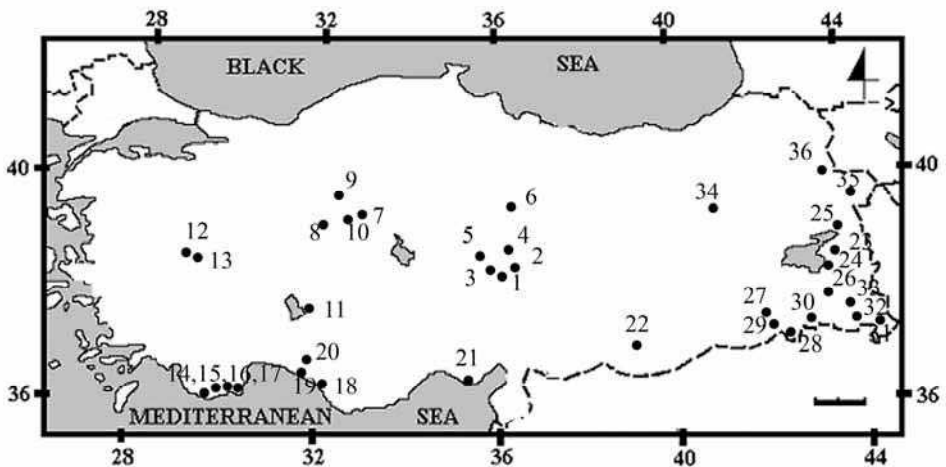


Fig. 1. The collection localities. The numbers refer to the localities given in the text.

Results and discussion

During our survey, we recorded 119 species of Rotifera. Four genera (*Aspelta*, *Eothinia*, *Itura*, *Wulfertia*) and twelve species are new to the Turkish fauna. USTAOĞLU (2004) reported 229 rotifer taxa in 53 genera from Turkey. Subsequently, *Asplanchnopus multiceps* (Schrank) and *Notholca salina* (Focke) (USTAOĞLU et. al. 2004), *Dicranophorus epicharis* Harring & Myers, *Epiphanes macroura* (Barrois & Daday), *Lecane rhytida* Harring & Myers, *Lecane obtusa* Murray, and *Testudinella parva* (Ternetz) (ALTINDAG et. al. 2005) were added to the list of Turkish rotifer species. The total number of Rotifera now known from Turkey increases with this study to 249. The number of rotifer genera in Turkey increases from 53 to 57.

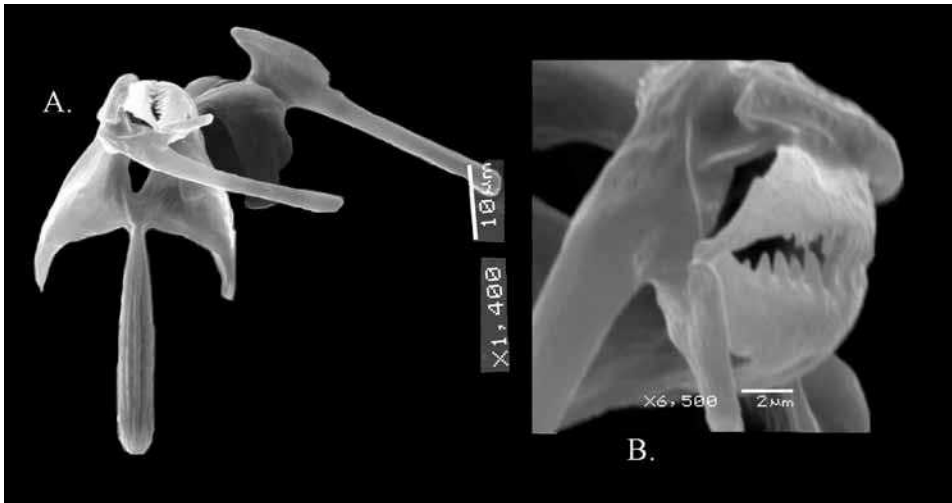


Fig. 2. *Eothinia lamellata* from Uludere (Şırnak). A. Dorsal view of trophi (scale bar: 10 µm), B. uncus (scale bar: 2 µm).

Asplanchna priodonta, *Brachionus* spp., *Cephalodella catellina*, *C. gibba*, *Colurella adriatica*, *C. colurus*, *C. uncinata*, *Dicranophorus grandis*, *Euchlanis dilatata*, *Keratella cochlearis*, *K. quadrata*, *Lecane* spp. and *Trichocerca* spp. were found to be the most abundant species. *Lecane* species were found to be more abundant in the Mediterranean region compared to other regions of Turkey.

***Aspelta labri* Harring and Myers, 1928**

Cuticle flexible, outline somewhat variable; usually transparent. Rostrum rather long, broad base, rounded anteriorly, decurved, not projecting beyond buccal field. Trunk without lateral sulci. Toes broad at base, tapering gradually, points acute; slightly S-shaped in lateral view. Brain relatively small. Two minute eyespots at base of rostrum. Retrocerebral sac and sub-cerebral glands apparently absent. Trophi almost symmetrical. Rami parallel-sided for 2/3 of their length, anteriorly with circular median opening, alulae absent. Fulcrum 2/3 of ramus length. Unci rudimentary, somewhat asymmetrical, T-shaped. Manubria straight for the greater part of their length, abruptly expanded anteriorly, incurved and slightly knobbed posteriorly. Length 225 µm, toes 35 µm, trophi 30 µm (DE SMET & POURRIOT 1997). – This species was found only at Uludere (Şırnak) on 14.vii.2003. New to Turkey. It belongs to a genus new to Turkey.

***Dicranophorus robustus* Harring and Myers, 1928 (Fig. 4D)**

Body elongate, fusiform; cuticle moderately flexible, outline rather constant; semi-opaque, orange-brown, also transparent with greyish-brown corona and orange-red stomach. Rostrum short, narrow, strongly decurved. Length 275–500 µm, toes 45–75 µm, trophi 40–55 µm (DE SMET & POURRIOT 1997). – Collection site: 15. New to Turkey.

***Encentrum uncinatum* (Milne, 1886) (Fig. 4E)**

The trophi unambiguously identify this species. Supramanubrium distally rounded, with drawn out, needle-like tip; tail prominent, often lying over foot (DE SMET & POURRIOT 1997). – Collection site: 8. New to Turkey.

***Encentrum wiszniewskii* Wulfert, 1939**

Trophi large. Rami outline rectangular; rami robust, bases broad, a single, acute, incurved terminal tooth each, before it a broad triangular tooth. Fulcrum short, 1/4 of manubrium length. Unci single-toothed. Intramellei long, club-shaped. Length 160-250 μm , toes 13-16 μm , trophi 28-33 μm (DE SMET & POURRIOT 1997). – Collection site: 34. New to Turkey.

***Eothinia lamellata* Berzins, 1949 (Fig. 2)**

General trophi length 50.2 μm , fulcrum 30.3 μm , manubrium 41.7 μm , ramus 30.5 μm . According to NOGRADY et al. (1995), rami symmetrical, usually three teeth, large alulae, covered by small oral plates. Small sharp epipharynx present. As the body is contracted in our material, we could not draw it. Total length 340 μm , toes 26-33 μm , trophus 53-60 μm (NOGRADY et al. 1995). – Collection site: 30. New to Turkey, belonging to a genus also new to Turkey.

***Itura aurita* (Ehrenberg, 1830)**

Total length 180-220 μm , toes 9-18 μm , trophi 38-45 μm , ramus 19 μm , fulcrum 17-20 μm , uncus 18-19 μm , manubrium 30-33 μm (DE SMET & POURRIOT 1997). – Found in Göksu Stream (Kumluca-Antalya) (site no. 14). New to Turkey, belonging to a genus also new to Turkey. *Itura aurita* is a cosmopolitan species.

***Lecane arcula* Harring, 1914 (Fig. 4A)**

The species is distinguished from *L. aculeata* by its relatively shorter lorica and antero-lateral spines. The species has been confused with *L. verecunda*, but is characterised by the antero-lateral spines being separated from the ventral plate, and by the shape of its foot pseudosegment (SEGRS 1995). – Collecting locality: 14. New to Turkey.

***Lecane hornemanni* (Ehrenberg, 1834) (Fig. 4B)**

This can hardly be confused with any other *Lecane*. Its relatively short toes with asymmetrical tips and its lorica without lateral sulci distinguish the species from *L. nelsoni*, *L. latissima* and *L. abanica* have toes bearing incompletely separated claws (SEGRS 1995). – Collecting site: 14. New to Turkey.

***Lecane inopinata* Harring and Myers, 1926**

(Fig. 3, 4C)

Loricata *Lecane*. Dorsal plate anteriorly narrower, medially wider than ventral plate, smooth or ornamented. Head aperture margins nearly coincident or parallel, straight or slightly convex, antero-lateral corners angulate. Ventral plate slightly

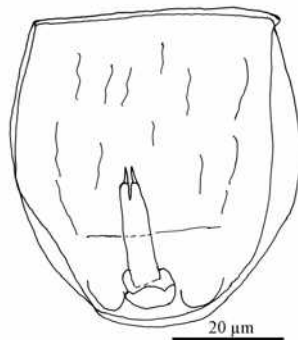


Fig. 3. Ventral view of *Lecane inopinata* (scale bar 20 μm).

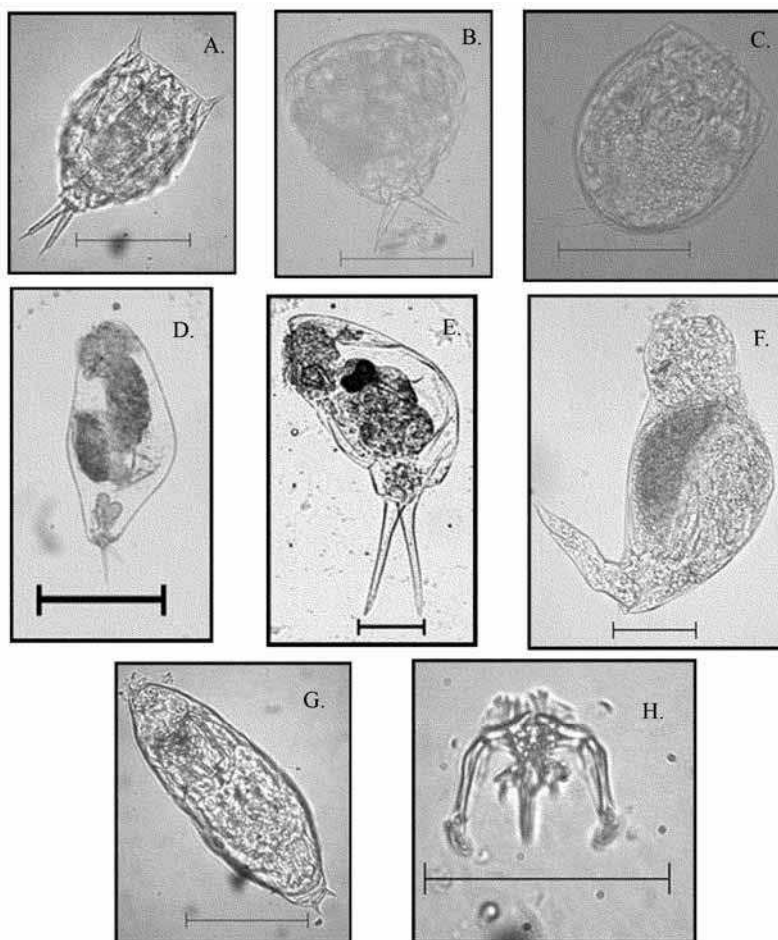


Fig. 4. A. *Lecane arcula*, B. *L. hornemanni*, C. *L. inopinata*, D. *Dicranophorus robustus*, E. *Encentrum uncinatum*, F. *Proales theodora*, G. *Wulfertia kivuensis*, H. Trophi of *Wulfertia kivuensis* (all scales 50 μ).

longer than wide, with incomplete transverse and longitudinal folds, occasionally ornamented (SEGERS 1995). – Collecting site: 14. New to Turkey.

***Lindia torulosa* Dujardin, 1841**

Body elongate, vermiform and transparent, lorica very thin and highly flexible. The dark red pigmented retrocerebral organ behind the brain appears very distinctive in the otherwise transparent animal. The species is recognised by the combination of the vermiform body shape, the pigmented retrocerebral organ, and the special jaws with conspicuously bifurcated manubria. – The species is cosmopolitan, not rare, and lives epibenthically or periphytically. It was found in Akmaz Stream (Kumluca-Antalya) in summer (site no. 17). New to Turkey.

***Proales theodora* (Gosse, 1887) (Fig. 4F)**

Body fusiform, elongate, slender; hyaline. Head offset by a distinct neck fold, completely retractable. Tail small, prominent. Length 265–500 µm, toe 27–39 µm, trophi 22–29 µm (DE SMET 1996). – Collection sites: 2, 3, 30. New to Turkey.

***Wulfertia kivuensis* De Smet, 1992 (Fig. 4G, 4H)**

There are only three known *Wulfertia* species (*Wulfertia ornata*, *W. kindensis* and *W. kivuensis*). – Found in Kirmir Stream in Ankara province (site no. 8). New to Turkey, belonging to a genus also new to Turkey.

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