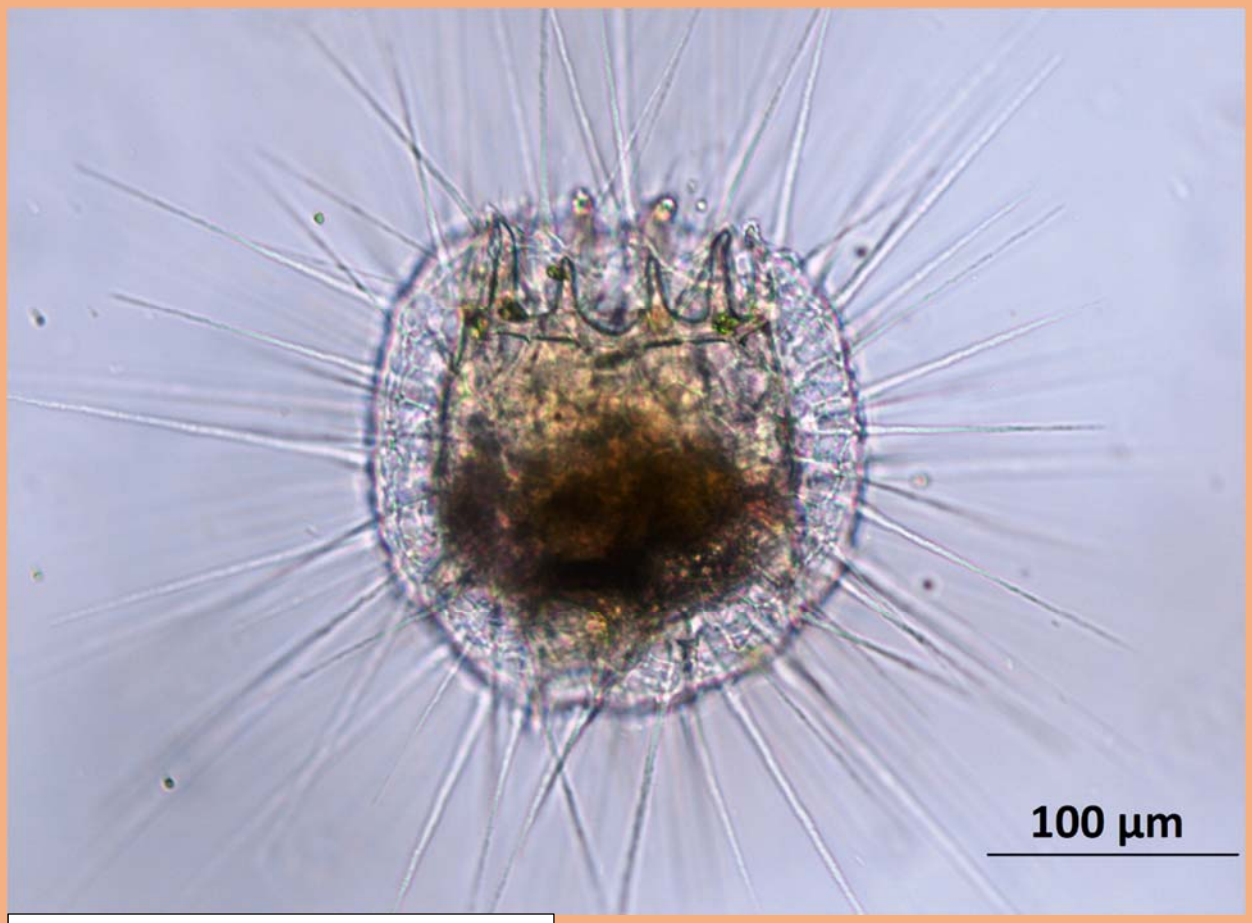
Rotifer News

A newsletter for rotiferologists throughout the world



Heliozoan predation on rotifers. See p. 18

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In this issue:

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National Autonomous University of Mexico (UNAM)-Faculty of Higher Studies (FES) Iztacala, Mexico

Editorial: *New additions in Rotifer News (May, 2022)*

With tremendous growth in world literature, especially in scientific research, it is becoming increasingly difficult to obtain relevant information. Conventional sources of published literature (journals, books and book chapters, extended abstracts and abstracts of conferences and newsletters) are complemented with a great variety of virtual sources (social media channels such as blogs, and twitters, uploads in YouTube, personal or institutional websites, preprints in journals etc.). Yet, it is often difficult to separate quality literature from popular or irreproducible results. In addition, in most cases quality literature is also masked by easily downloadable but unverified data sources. Some of the quality sources of rotifer literature that receive less recognition in citations are dissertations and theses.

To promote coverage of the hidden wealth of knowledge on rotifer research present in dissertations and theses, Rotifer News (RN) of issue 36 onwards includes bibliographic details. Although some secondary sources such as ProQuest Dissertations and Theses and Indexing services by different universities offer such information, these are generally restricted. Dissertations and Theses especially at postgraduate level may carry important information that has not been formally published. This is more so for theses / dissertations on rotifer research. In this issue, Dissertations / Theses containing substantial information about rotifers have been included. Information about the Thesis in Turkish universities has been provided by Meral Apaydın Yağcı. It is hoped that such initiatives from other countries would be available for the future issues of the newsletter.

As indicated in the previous editorial, some photos of historical importance of prominent rotifer workers who gave talks in different workshops are included in this issue.

Availability of rotifer identification keys is essential for the studies on taxonomy and ecology of this group. Specialized guides on different Families of Rotifera, which were initiated by HJ Dumont, still serve for rotifer identification and a few more guides are yet to appear. Other sources such as chapters on rotifers in general zoology reference works such as the Thorp and Covich's Freshwater Invertebrate volumes are also valuable for both ecology and taxonomy of Rotifera. Some regional guides on Rotifer Identifications can be also useful, although the text may be in languages other than English language. The front pages of two such Identification guides are included in this issue. If such guides from other regions are available, the authors are encouraged to submit front pages for inclusion in the future RN issues. Beautiful artwork using rotifers as the subject is on the lighter side of our research in this group.

Updated information on the XVI International Rotifer Symposium is

now available in the Rotifer News website and in this issue. The Abstracts from the VRC (from January to April 2022) have been included in this issue.

RN publishes full programmes (and Abstracts) of International Rotifer Symposia (IRS) after they are held. For example, Abstracts from the VIIIth IRS, 1997 appeared in RN no. 29. From Issue 36 onwards, programmes and/or Abstracts of previous IRS that were not included in previously in the RN will be added. In this issue (RN 36), a detailed programme of the XIth IRS, 2006 has been included.

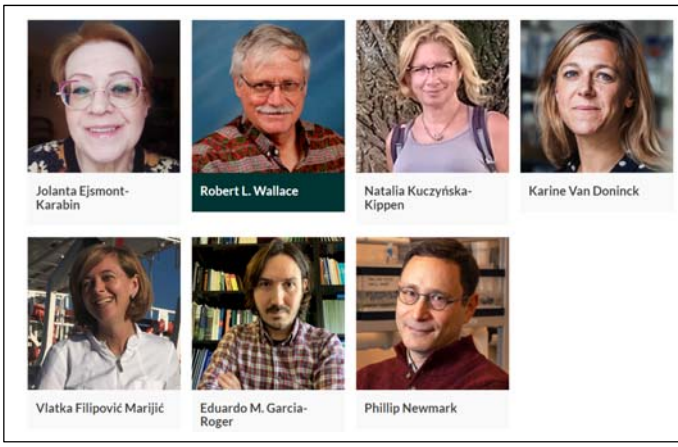
Supply of all previous issues of RN in digital form has been pending for a long time. All published issues of RN are now available as pdfs from the official website of ***Rotifer News***. With this, our long-term project has been completed. While I had scanned some issues of RN, many have been supplied by "Rotifer Family" including Bob Wallace, Russ Shiel and Christian Jersabek. Based on the RN Website restrictions, the max. capacity of each file should not exceed 15 MB and therefore, all the scanned versions have been maintained in low density and non-searchable form. If anyone has searchable versions of PDFs, please send the files to *xirotifera@iztacala.unam.mx* for replacing the previous versions.

S.S.S. Sarma
Editor

XVI International Rotifer Symposium: update

The official website of the XVI IRS 2022 is being updated from time to time. Interested participants are advised to visit the website directly:

https://www.rotiferaxvi.biol.pmf.hr/



Keynote Speakers

Jolanta EJSMONT-KARABIN
Robert L. WALLACE
Natalia KUCZYŃSKA-KIPPEN
Karine Van DONINCK
Vlatka FILIPOVIĆ MARIJIĆ
Eduardo M. GARCIA-ROGER
Phillip NEWMARK

Maria Špoljar
Organizer, Rotifera XVI
Email: *maria.spoljar@biol.pmf.hr*

Contemporary rotifer workers

The poineers of rotifer research in Türkiye (Turkey)

Retiring from Ege University in 2020, *Prof. Dr. M.Ruşen Ustaoğlu* is well known as a zooplankton expert in Türkiye. He has prepared a checklist (especially Rotifera), contributed to zooplankton biodiversity in many inland water areas, and trained zooplankton experts. *Prof. Dr. Kemal Çelik* from Balıkesir University is an expert in rotifera ecology and their use as potential indicator species for trophic case studies in temperate lakes in Türkiye. *Prof. Dr. Ertunç Gündüz* from Hacettepe University is an expert contributing to the zooplankton fauna in brackish water and delta areas and presenting a checklist on the fauna of Cladocera and Copepoda. *Prof. Dr. Ahmet Bozkurt* from Iskenderun Technical University studies the zooplankton fauna in high mountain lakes, as well as in rivers and reservoirs; he also studies ecosystems and in interested in data of the first record of species diversity in Türkiye. *Prof. Dr. Ahmet Altındağ* from Ankara University is a zooplankton expert who contributes to Rotifera biodiversity as a new species in Türkiye. *Prof. Dr. Murat Kaya* from Aksaray University is an active researcher who contributes to the Bdelloid Rotifera and Rotifera checklist in Türkiye. He also continues to biotechnological studies on the extraction of chitin and chitosan from Cladocera eggs in a multidisciplinary field. *Prof. Dr. Serap Sal*er from Fırat University works in the fields of zooplankton systematics and species distribution in many ecosystems in inland waters. *Assoc. Prof. Dr. Hilal Bulut* from Fırat University studies the relationship between zooplankton species and water quality parameters; she also uses electron microscopy in the identification of Rotifera*. Prof. Dr. Aysel Bekleyen* from Dicle University is a researcher who contributes to the diversity of Rotifera in the Tigris region and the fauna of Cladocera and Copepoda, especially in the Eastern region of Türkiye. *Prof. Dr. Yasemin Saygı* from Hacettepe University works on the zooplankton community structure in the lagoon lake and delta areas. *Dr. Didem Özdemir Mis* from Ege University carries out research that contributes to the zooplankton fauna (especially Rotifera) in high mountain lakes, ponds, and reserviors. *Prof. Dr. Nuray Emir Akbulut* from Hacettepe University conducts research on nanoscopic studies on zooplankton species found in different aquatic ecosystems. *Assoc. Prof. Dr. Meral Apaydın Yağcı* from Ministry of Agriculture and Forestry (Sheep Breeding Research Institute, Fisheries Department, Bandırma, Balıkesir) studies shallow and deep inland water ecosystems, the distribution of zooplankton (predominantly Rotifera) in drinking water source areas, and the relations of species with water quality parameters and their trophic status. *Assoc. Prof. Dr. Cem Aygen* from Ege University works on high mountain lakes Cladocera, Copepoda, and Rotifera species.

*Prof. Dr. Hüseyin Güh*er from Trakya University studies on the determination of Rotifera composition, Cladocera and Copepoda fauna in lakes, reservoirs, and rivers of the Thrace region. *Prof. Dr. Sibel Yiğit Atasagun* from Ankara University is a researcher who contributes to the

Rotifera diversity and check-list information from reserovirs and natural lake ecosystems. *Associate Professor Dr. Zeynep Dora*k from Istanbul University contributes to studies on Rotifera and zooplankton fauna in man-made reservoirs, Golden Horn estuary (İstanbul) and eutrophic resorvoirs. *Dr. Sevil Erdoğan* from Trakya University works on Thrace Rotifera fauna, Bdelloid Rotifera biodiversity, new record studies on Turkey Rotifera fauna. *Dr. F. Banu Yalım* from Ministry of Agriculture and Forestry Mediterranean Fisheries Research Institute (Antalya) contributes to the zooplankton in the lakes, ponds and streams of the Taurus Mountains Antalya Region.

Meral Apaydın Yağcı
Republic of Turkey Ministry of Agriculture and Forestry. Sheep Breeding Research Institute, Bandırma, Balıkesir, Turkey
Email: *meralyagci@gmail.com*

Little known works on Rotifera

Some works are less known to rotiferologists than others. The aim is to provide bibliographic information related to less known rotifer literature.

Mamaril AC. 2001. Zooplankton diversity in Philippine lakes, pp. 81-93. In: Santiago CB, Cuvin-Aralar ML & Basiao ZU (eds.). Conservation and Ecological Management of Philippine Lakes in Relation to Fisheries and Aquaculture. Southeast Asian Fisheries Development Center, Aquaculture Department, Iloilo, Philippines; Philippine Council for Aquatic and Marine Research and Development, Los Baños, Laguna, Philippines; and Bureau of Fisheries and Aquatic Resources, Quezon City, Philippines. 187 pp.

Email: augustus.c.mamaril@gmail.com

Regional Guides on Rotifera

Rotifer species from Philippines. 1986. Zooplankton, Volume VII, included a chapter on rotifers and two microcrustacean taxa, Cladocera and Copepoda.

Scanned versions sent by AC Mamaril
Email: *augustus.c.mamaril@gmail.com*

Rotifera in dissertation / Thesis

Dissertations or theses with rotifers as theme of research are indexed here. The bibliographic details are provided by authors in most cases. Email addresses, where available, are also provided.

Alış, N. İ. 2015 [Determination of zooplankton fauna and seasonal changes of Keban Dam lake Yurtbaşi Region, Hazar Lake and Dedeyolu Pond]. Doctoral Thesis, Fırat Unıversıty, Elazığ, Turkey, 156 pp. (in Turkish).

Bulut, H. 2014 [Zooplanton of Maryap, Kaldirim and Halikan ponds in Malatya]. Doctoral Thesis, Fırat Unıversıty, Elazığ, Turkey, 171 pp. (in Turkish).

Buyurgan, Ö. 2013. [Determination of five different fresh water ecosystems's (natural lake, dam lake, stream, pond) zooplankton fauna and seasonal changes and comparison with canonical correspondence analysis (CCA)]. Doctoral Thesis, Ankara University, Ankara, Turkey, 135 pp. (in Turkish).

Çankaya, Ş. 2015. [Seasonal investigation of alg flora and zooplankton fauna found in some streams of Siirt, Batman and Diyarbakir provinces], Master's Thesis, Harran University, Şanlıurfa, Turkey, 123 pp. (in Turkish).

Cieplinski, A. 2018 Cryptic diversity of *Keratella cochlearis*– genetical, morphological and demographic aspects. Doctoral Thesis, University of Innsbruck (Innsbruck, Austria), Edmund Mach Foundation (San Michele all'Adige, Italy). 105 pp., 11 figures, 1 table.

PhD supervisors: Dr Ulrike Obertegger (Edmund Mach Foundation), Dr Thomas Weisse (University of Innsbruck)

Summary: Biodiversity is under threat in recent decades, with many natural habitats irreversibly disappearing due to global warming and human activity. Our perception of species loss highly depends on an accurate species estimate. However, occurrence of cryptic species (i.e. distinct species that are impossible or difficult to distinguish based on their morphology) hinders a correct assessment of biodiversity. Cryptic species have been described for rotifers of the class Bdelloidea and Monogononta. Rotifers of the class Monogononta are widespread in freshwater lakes all over the world and can serve as model organisms for speciation and adaptation. The main aim of this thesis was to investigate and describe the genetic diversity of one of the most common freshwater rotifer - *Keratella cochlearis* - in relation to its morphological variability. Beside the assessment of genetic diversity, a detailed study of *K. cochlearis* life cycle and reproductive strategy was performed. The results of the first study demonstrated that based on the cytochrome c oxidase subunit 1 (COI) gene different putative evolutionary significant units (ESU; a.k.a. cryptic species) can be delimited in *Keratella cochlearis* (l).

Based on morphology, two ESUs can be delimited from the other six ESUs found. We also reported on co-occurrence of different putative ESUs of *K. cochlearis* in the same lakes, and presented the first SEM pictures of *K. cochlearis* females showing some detailed morpho-logical characteristics. Life histories and demographic parameters differences between various haplotypes of *K. cochlearis* were determined in the second study (II). Several differences between life history traits and demographic parameters of haplotypes were found corroborating their status as cryptic species and demonstrating that genetic diversity of *K. cochlearis* is also reflected in demographic diversity. Additionally, morpho-logically deformed females occurring during the life table experiment were documented and photographed for the first time in this species. Moreover, the first case of an amphoteric female (producing both males and females) in *K. cochlearis* was reported. In the third study (III), mitonuclear discordance in three rotifer species complexes was assessed. Mitonuclear discordance hinders the assessment of species delimitation based on only one gene (single-locus). Discordance between mitochondrial and nuclear phylo-genies was reported for three rotifer species complexes (*K. cochlearis, Polyarthra dolichoptera, Synchaeta pectinata*) with different levels of discordance between the mitochondrial COI and the nuclear ITS gene. The results corroborated the previous description of two ESUs in *K. cochlearis*. During our studies on *K. cochlearis* males, we developed a method to film zooplankton in general and rotifers specifically (IV). We connected a commercial single-lens reflex camera to a microscope and presented an affordable system with widely available components for filming. In filming male-female interactions of *Brachionus angularis*, our film showed a thread-like structure linking male and female. However, the purpose of this structure remained unclear. 8 In conclusion, this PhD provided evidence for a high genetic and morphological diversity of *K. cochlearis*. Existence of a species complex of *K. cochlearis* was corroborated by mitochondrial and nuclear genetic information. This high genetic diversity in *K. cochlearis* was reflected to some extent in life histories and morphology. First videos of *K. cochlearis* males and of *B. angularis* males interaction with females were presented.

Email: adam.cieplinski@nhm.ac.uk

Çolak, K. 2019. [Seasonal investigation of the zooplankton fauna of Hacıhıdır Dam Lake (Siverek)] Master's Thesis, Harran University, Şanlıurfa, Turkey,71 pp. (in Turkish).

Çolak, Ş. 2015. [Zooplankton fauna (Rotifera, Cladocera, Copepoda) of Süloğlu Dam Lake (Edirne)], Master´s Thesis, Trakya University, Edirne, Turkey. 71 pp. (in Turkish).

Çolak, S. 2020. [Cladocera and Copepoda (Crustacea) fauna of Balya district (Balikesir/Turkey)],

Master´s Thesis, Balıkesir University, Balıkesir, Turkey, 120 pp. (in Turkish).

Demir, Y. 2017. [Zooplankton fauna (Rotifera, cladocera, copepoda) of Tunca river (Edirne) and their seasonal distribution], Master's Thesis, Trakya University, Edirne, Turkey, 85 pp. (in Turkish).

Durmaz, O. 2019. [Zooplankton fauna and seaseonal changes of Meyil and Kızören Sinkhole Lakes (Konya/Turkey)], Master's Thesis, Ankara University, Ankara, Turkey, 64 pp. (in Turkish).

Erdoğan, S. 2015 [Taxonomical and limnoecological investigation of Rotifera fauna in Bayindir dam lake (Ankara)], Doctoral Thesis, Ankara University, Ankara, Turkey, 272 pp. (in Turkish).

Figueroa-Sánchez, M.A. 2015 [Zooplankton community determination in presence of cyanobacteria: Impact of piscivorous fish on zooplankton as an alternative in the management of freshwater lakes in Mexico]. Master's thesis. Universidad Nacional Autónoma de Mexico, Mexico City, Mexico. 91 pp. (In Spanish).

Figueroa-Sánchez, M.A. 2020 [Invertebrates, fish and macrophytes: biotic factors involved in the decline of Microcystis spp. (cyanobacteria) in a eutrophic system]. Universidad Autónoma de México, Mexico City, México. 179 pp. (In Spanish).
Email: mafis.19061989@gmail.com

Giritlioğlu, E. 2013. [Manyas Dam zooplankton ecology], Master´s Thesis, Balıkesir University, Balıkesir, Turkey, 150 pp. (in Turkish).

Gómez Martínez E. B. 2021. [Monitoreo del estado trófico de salud de los Lagos Zempoala y Tonatiahua: Evaluación de la calidad del agua, estado trófico y comunidad zooplactónica]. Tésis de Maestría. Universidad Autónoma del Estado de Morelos, Cuernavaca. 74 pp. (In Spanish).
Email: umizumi.bg@gmail.com

Gürbüzer, P. 2018. [Investigation of the zooplankton fauna and phylogenetic analysis of *Daphnia* in alpine lakes of Kackarlar and Aladaglar mountain regions]. Doctoral Thesis, Ankara University, Ankara, Turkey. 120 pp. (in Turkish).

Gürel, Ö. 2013. [Orduzu lake (Malatya) fauna zooplankton]. Master's Thesis, Fırat University, Elazığ, Turkey, 72 pp. (in Turkish).

Gürleyen, N. 2013. [The zooplankton fauna and its seasonal variations in standing water of basin of Gönen streamlet], Master's Thesis, Ege University, İzmir, Turkey, 102 pp. (in Turkish).

Jiménez-Santos, M.A. 2017 [Seasonal variation of monogonont sessile rotifers (Rotifera) in the Ramsar Site, Lake Xochimilco, (Mexico) during an annual cycle (2015-2016)]. Master's thesis. Universidad Nacional Autónoma de Mexico, Mexico City, Mexico,

Mexico City, Mexico. 62 pp. (In Spanish).

Jiménez-Santos, M.A. 2021 [Analysis of the sessile rotifers of the genus *Limnias* (Rotifera: Flosculariidae) from Lake Xochimilco using different sources of taxonomic information]. Doctoral Thesis. Universidad Nacional Autónoma de Mexico, Mexico City, Mexico. 116 pp. (In Spanish).
Email: antoniojimenez@comunidad.unam.mx

Kar, M. 2016. [Rotifera fauna and seasonal changes of Nevsehir provience]. Doctoral Thesis, Erciyes University, Kayseri, Turkey.102 pp. (in Turkish).

Kaya, İ. 2014. [Zooplankton of Atatürk Dam lake barrage with inlet of tunnel], Master's Thesis, Harran University, Şanlıurfa, Turkey, 79 pp. (in Turkish).

Martinez Zavala, A. 2021 [Application of bioindicators and biological and ecological indexes to assess the health status of the Amacuzac River]. Master's thesis. Universidad Autónoma del Estado de Morelos, Cuernavaca, Mexico. 88 pp. (In Spanish).
Email: *tuksi310@gmail.com*

Özgül, N. 2014. [Determination of zooplankton fauna of Köyceğiz lake (Muğla) and their relationship with physico-chemical properties]. Doctoral Thesis, Muğla Sıtkı Koçman University, Muğla, Turkey. 205 pp. (in Turkish).

Öztürk, M. 2021. [Seasonal investigation of zooplankton fauna of Siverek district of Sanliurfa], Master's Thesis, Harran University, Şanlıurfa, Turkey, 92 pp. (in Turkish).

Tuğyan, C. 2019. [Investigation of the effects of fish cage farm on water quality and zooplankton fauna in Kozan Dam Lake (Adana)], Master's Thesis, İskenderun Teknik University, Hatay, Turkey, 79 pp. (in Turkish).

Türkmen, E.I. 2018 [Zooplankton Community Structure of Manyas Bird Lake]. Doctoral Thesis, Balıkesir University, Balıkesir, Turkey.169 pp. (in Turkish).

Zamora-Barrios, C.A. 2020 [Cyanotoxins: effect on zooplankton, bioaccumulation and, food chain transfer]. Doctoral Thesis, National Autonomus University of Mexico (UNAM), Mexico. 206 pp. (in Spanish). Supervisor: Dr. Nandini Sarma.

Scientific Programmes of Previous International Rotifer Symposia *IRS*

As indicated in the Editorial, full scientific programmes of previous IRS will be included in the RN starting from this issue.

IRS XI, March 11-18, 2006. Mexico
Scientific Programme

11th March, 2006 (Saturday)
Arrival of participants, arrangements of accommodation

12th March (Sunday)
Registration 10:00 A.M. to 5:00 P.M.
6:00 P.M. to 7: 30 Informal get together

13th March (Monday)
9:30 A.M. to 10:45 A.M. Inauguration

10:45 A.M. to 11:00 A.M. Coffee Break

Technical Session 1.
Morphology, Taxonomy, Zoogeography & Field Ecology

Chairperson: H. J. Dumont.
11:00 A.M. to 11:30 A.M. Wilko H. Ahlrichs: Challenges and opportunities of different techniques of preparation of rotifer specimens

11:30 A.M. to 11:50 A.M. Christian D. Jersabek: Diversity and zoogeography of Mongolian rotifers

11:50 A.M. to 12:10 P.M. G. Melone, C. Ricci, D. Fontaneto, R. Marotta & M. Caprioli: Water loss and morphological changes during desiccation in *Macrotrachela quadricornifera* (Rotifera, Bdelloidea)

12:10 P.M. to 12:30 P.M. Jim Green: Morphological variation of *Keratella cochlearis* in Myanmar in relation to zooplankton community structure

12:30 P.M. to 12:50 P.M. Scott Mills: The future of rotifer taxonomy: Genetics or Morphometrics? A cautionary tale from the *Brachionus plicatilis* species complex

12:50 P.M. to 13:10 P.M. Alois Herzig: The long-term aspect of the winter rotifer community of Neusiedler See (Austria), with special reference to the development of *Rhinoglena fertöensis*

13:10 P.M. to 14:10 P.M. Lunch

Technical Sessions 2 & 3
Session 2
Morphology, Taxonomy, Zoogeography & Field Ecology (continued)

Chairperson: Jim Green
14:10 P.M. to 14:30 P.M. S. Nandini, Martín Merino & S.S.S. Sarma: Seasonal and depth-related zooplankton distribution in the reservoir Valle de Bravo (State of Mexico, Mexico) with emphasis on rotifers

14:30 P.M. to 14:50 P.M. Miloslav Devetter: Seasonal development and vertical distribution of soil rotifer populations in South-Bohemian beech forest

14:50 P.M. to 15:10 P.M. Jolanta Ejsmont-Karabin: Rotifer abundance and diversity in benthic microhabitats of a littoral zone in Lake Mikołajskie (North-eastern Poland)

15:10 P.M. to 15:30 P.M. Heike Zimmermann-Timm, Henry Holst & Hartmut Kausch: Spatial Dynamics of Rotifers in a Large Lowland River, the Elbe, Germany - How important are retentive shoreline habitats for the plankton community?

15:30 P.M. to 15:50 P.M. E.J. Walsh, T. Schröder, M.L. Bonilla & R.L. Wallace: Rotifera of Big Bend National Park, Texas (USA): species richness, turnover, and interannual variation among selected sites

15:50 P.M. to 16:10 P.M. Coffee break

Session 3
Morphology, Taxonomy, Zoogeography & Field Ecology (continued)

16:10 P.M. to 16:30 P.M. Wilko H. Ahlrichs, Ole Riemann,Sabrina Fiedler, Eike Wilts & Claus Fischer: The labium of the Rotifera – a morphologically and phylogenetically interesting structure of the rotatory organ.

16:30 P.M. to 16:50 P.M. Gustavo Emilio Santos-Medrano, Saraí Hernández-Flores & Roberto Rico- Martínez: An analysis of the factors Influencing the presence of males in the freshwater rotifer *Lecane quadridentata* (Rotifera: Monogononta)

16:50 P.M. to 17:30 P.M. Group photograph

17:30 P.M. to 19:00 P.M.
Workshop Session 1
Chairperson: C. William Birky, Jr.
Bar coded DNA: Application to rotifer phylogeny, evolution and systematics

14th March (Tuesday)
8:30 A.M. to 10:00 A.M. Drive to UAM-X

10:00 A.M. to 14:30 P.M. Poster Session (Technical Session 4) Chairpersons:
S. Nandini, Maria Elena Castellanos-Paez, M.R. Miracle & Marcelo Silva-Briano

Details of poster presentations (i.e., serial number and / or the order) will be available on Monday, 13th March, 2006

14:30 P.M. to 18:00 P.M. Lunch, Boat Trip to Lake Xochimilco
18:00 P.M. to 20:00 P.M. Return to hotel/residence

15th March (Wednesday)
Technical Session 5
Feeding, Trophic Interactions, Behaviour, Autecology & Population Ecology
Chairperson: Norbert Walz
9:00 A.M. to 9:30 A.M. Peter Starkweather: Rotifères du sel: salinity and rotifer ecology

9:30 A.M. to 9:50 A.M. Morten Omholt Alver: Individual-based modelling for the prediction of rotifer population dynamics

9:50 A.M. to 10:10 A.M. Jorge Ciros-Pérez, Elizabeth Ortega- Mayagoitia, Mayeli Sánchez-Martínez, & Javier Alcocer: Are deep, oligotrophic lakes inhospitable environments for rotifers?

10:10 A.M. to 10:30 A.M. Gregor F. Fussmann, Gregory Kramer & Mahmoud Labib: Incomplete induction of mixis in *Brachionus calyciflorus*: patterns of reproduction at the individual level

10:30 A.M. to 10:50 A.M. E.M. García-Roger, M.J. Carmona & M. Serra: Rotifer diapausing egg banks: past studies and recent findings

10:50 A.M. to 11:20 A.M. Coffee break

11:20 A.M. to 19:00 P.M. Visit to Pyramids and return to hotel

16th March (Thursday)
Technical Session 6
Feeding, Trophic Interactions, Behaviour, Autecology & Population Ecology (continued)
Chairperson: Robert L. Wallace

9:00 A.M. to 9:30 A.M. Irene van der Stap, Matthijs Vos & Wolf M. Mooij: Inducible defenses and community dynamics

9:30 A.M. to 9:50 A.M. Atsushi Hagiwara & Lena H. Asano: The relationship between trophi and body size of rotifer Brachionus plicatilis
9:50 A.M. to 10:10 A.M. S.S.S. Sarma & S. Nandini: Small prey size is an effective deterrent against predation: a case study on two species of *Asplanchna* and three brachionid prey.
10:10 A.M. to 10:30 A.M. M.R. Miracle, M.T. Alfonso & E. Vicente: Fish and nutrient effects on rotifers in a shallow lake. A mesocosm experiment.

10:30 A.M. to 10:50 A.M. Rick Hochberg: 3-D Cerebral Architecture and innervation in *Asplanchna* (Rotifera: Asplanchnidae)

10:50A.M. to 11:10 A.M. H. J. Dumont: Representatives of freshwater jelly rotifers: Asplanchna (title tentative)

11:10A.M. to 11:30 A.M. Coffee break

Technical Session 7
Feeding, Trophic Interactions, Behaviour, Autecology & Population Ecology (continued)
Chairperson: Hendrik Segers

11:30 A.M. to 11:50 A.M. Terry W. Snell, Jerry Kim, Edgar Zelaya & Rachel Resop: Mate choice in *Brachionus*: Male ability to discriminate female fitness

11:50 A.M. to 12:10 P.M. Claus-Peter Stelzer, Jennifer Härting & Mathilde Bénard: Unilateral induction of sex between freshwater and saline *Brachionus* spp. (Monogononta, Rotifera).

12:10 P.M. to 12:30 P.M. Norbert Walz, Ines Jäger & Franz Hölker: Chaoborus predation on zooplankton: no preference for rotifers

12:30 P.M. to 12:50 P.M. M. Yúfera: Swimming behaviour of *Brachionus plicatilis* in response to food concentration and its relation to feeding rates.

12:50 P.M. to 13:10 P.M. Guntram Weithoff & Alexander Wacker: The mode of nutrition of mixotrophic flagellates determines their food quality for rotifers.

13:10 P.M. to 13:30 P.M. S. Campillo, E. M. García-Roger, M. J. Carmona & M. Serra: Genetic and ecological differentiation among rotifer populations in Eastern Spain.

13:30 P.M. to 14:30 P.M. Lunch
Technical Session 8
Molecular biology, Evolution, Genetics and Biochemistry

Chairperson: David Mark Welch
14:30 P.M. to 14:30 P.M. Martin V. Sørensen: Molecular phylogeny of rotifers: recent advances

14:30 P.M. to 14:50 P.M. C. William Birky, Jr.: Genetic diversity in sexual and asexual rotifers

14:50 P.M. to 15:10 P.M. Martín García-Varela & Steven A. Nadler: Phylogenetic relationships among syndermata inferred from nuclear and mitochondrial gene sequences

14:50 P.M. to 15:10 P.M. Elizabeth J. Walsh & Racquel L. Garcia: Genetic variation in *Plationus patulus* and its relationship to brachionid rotifers

15:10 P.M. to 15:30 P.M. Thomas Schröder & Elizabeth J. Walsh: Cryptic speciation in the cosmopolitan *Epiphanes senta* complex (Monogononta, Rotifera)

15:30 P.M. to 16:00 P.M. Coffee break

Technical Session 9
Molecular biology, Evolution, Genetics and Biochemistry (Contd.)
Chairperson: G. Melone

16:00 P.M. to 16:20 P.M. David B. Mark Welch: Phylogenetics and ribosomal gene evolution in Bdelloidea

16:20 P.M. to 16:40 P.M. Alan Tunnacliffe, Brian McGee & Natalia N. Pouchkina-Stantcheva: Doing it differently: the bdelloid rotifer's approach to anhydrobiosis

16:40 P.M. to 17:00 P.M. Martin V. Sørensen: Rotifer phylogeny inferred from a combined approach of four molecular loci and morphology.

17:00 P.M. to 17:20 P.M. Jinqiu Wang & Tianyu Wang: The clone and primary analysis for meiosis related genes (BpDMC1) of the rotifer *Brachionus plicatlis*

17:20 P.M. to 18:50 P.M.
Workshop session 2
Chairperson: A. Hagiwara
High Density Rotifer Cultures: Advantages and Applications

Workshop Session 3
Chairpersons: S.S.S. Sarma & R. Rico-Martínez

Rotifer Stock-Culture Centres
17th March (Friday)
Technical Session 10
Chairperson: RD Gulati

9:00 A.M. to 9:30 A.M. T. Ramakrishna Rao: Rotifer research in India: An overview

9:30 A.M. to 9:50 A.M. M. Strojsova, J. Vrba & J. Seda: Rotifer digestive enzymes: Progress in their direct detection using the ELF method

9:50 A.M. to 10:10 A.M. John J. Gilbert / Thomas Schröder: Intraclonal variation for propensity to produce mictic daughters in several rotifer species: variation among replicate females and with maternal age

10:10 A.M. to 10:30 A.M. Célia Joaquim-Justo& Terry W. Snell: Effect of anti-androgenic substances on the sexual reproduction of the rotifer *Brachionus calyciflorus*

10:30 A.M. to 10:50 A.M. Isidoro Rubio-Franchini & Roberto Rico- Martínez: Determination of lead in zooplankton, water and sediments from El Niágara reservoir in Aguascalientes (Mexico)

10:50 A.M. to 11:20 A.M. Coffee break

11:20 P.M. to 13:00 P.M.
Workshop Session 4.
Chairperson: Terry Snell
Population parameters: Application to rotifer ecology & ecotoxicology

13:00 P.M. to 14:00 Lunch

14:00 P.M. to 16:30 P.M. General Discussion, Proposals for Rotifera XII & Conclusion of the Symposium

18:00 P.M. to 22:00 P.M. Symposium Dinner

18th March (Saturday)

7:30 A.M. Post-Symposium Excursion / Departure

Review on *Keratella*

Keratella species in Aguascalientes State, Mexico

Marcelo Silva-Briano & Araceli Adabache-Ortiz

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Introduction

The genus *Keratella* Bory de St. Vincent, 1822, a rotifer of the family Brachionidae, is represented by 4 species (Kutikova & Silva-Briano, 1995; Silva-Briano & Adabache-Ortiz, 1999) &, unlike the genus *Brachionus*, which has 11 representatives (Silva-Briano & Adabache-Ortiz, 2000). Aguascalientes State is located in the central part of Mexico (Figure 1).

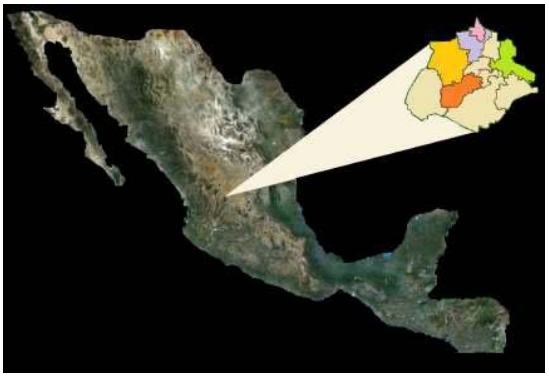


Figure 1. Map of Aguascalientes State, located in central part of Mexico.

This rotifer has a feeding habit of being bacterivorous, so its cultivation is sometimes a bit difficult due to the type of food it requires. It inhabits the plankton of the Aguascalientes water bodies, which are generally small ponds and temporary puddles, although there are some large-volume dams such as the Presidente Calles Dam, located in the municipality of Calvillo.

Objectives

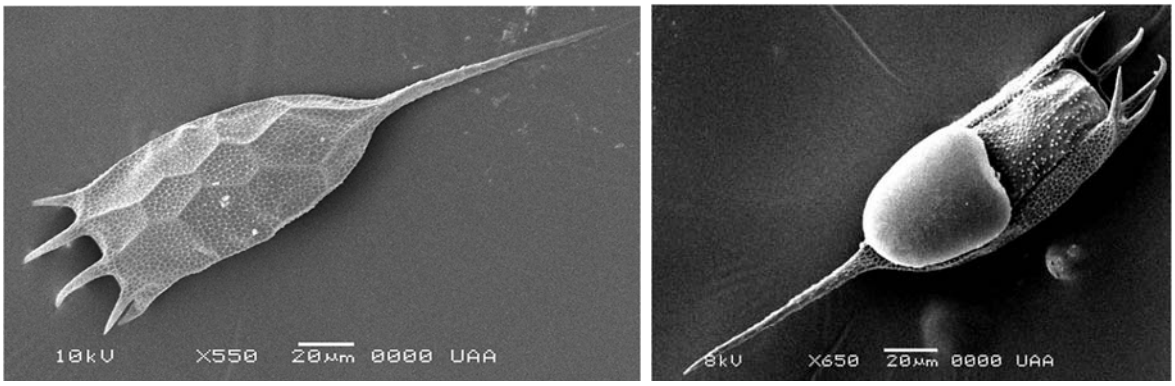
The purpose of this work is to make known the species that occur in the state, in order to know the biodiversity of the Brachionidae family, such is the case of the genus *Keratella*. In addition, show some morphological characters through the SEM and digital images; and the comparison of the species using taxonomical keys (Ahlstrom, 1943; Koste, 1978).

Material and Methods

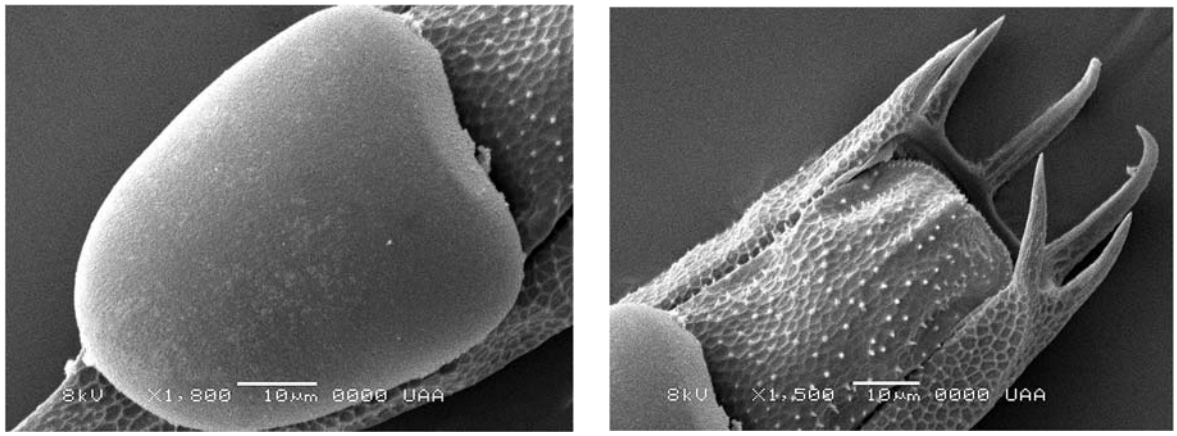
Since 1987 zooplankton samples have been taken in the state, a little more than 1000 localities have been sampled. The samples are stored in Laboratory No.1, Ecology. The samples were fixed formalin at 4%. The images have been obtained using the JEOL LV 5900 scanning electron microscope. These have been saved in folders with the name of each locality.

Results

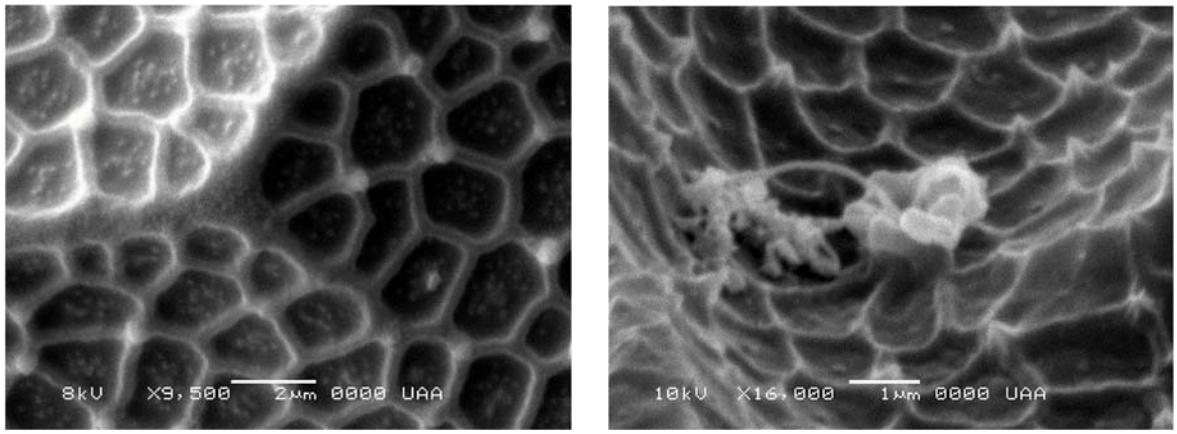
After an extensive review, four species of *Keratella* have been found in the state, these are: *Keratella americana*, *K. cochlearis*, *K. mexicana* and *K. tropica*. These species are shown below with their diagnostic characters that differentiate them from the others.



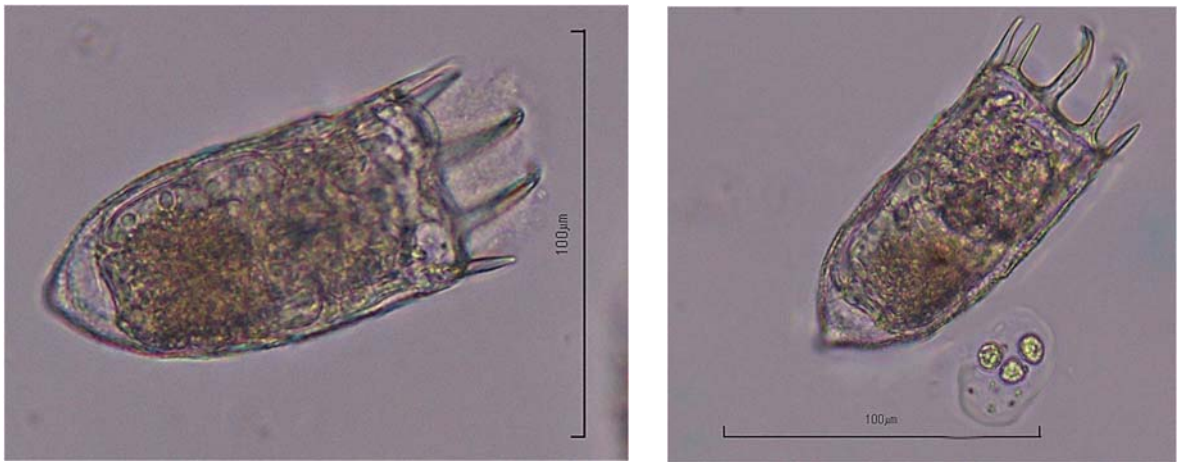
Keratella americana Carlin, 1943. Left image showing the dorsal view of the habit, with the characteristic facets of the species. Right image showing the ventral view with the sexual egg located in the lower part, and the plate in the upper part with granulated ornamentation. SEM JEOL LV 5900.



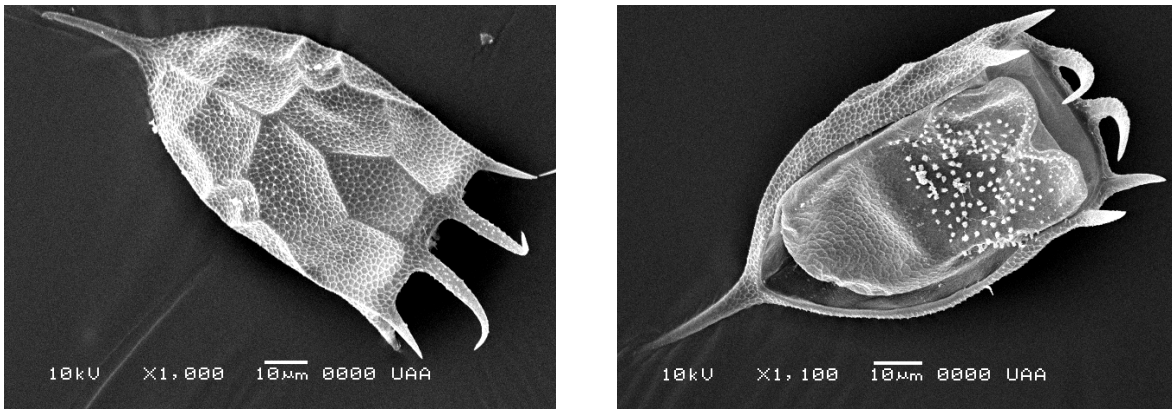
K. americana. Left image, close-up of the sexual egg that has a flattened shape. Right image, close-up of the upper plate showing its ornamentation in granular form. SEM JEOL LV 5900.



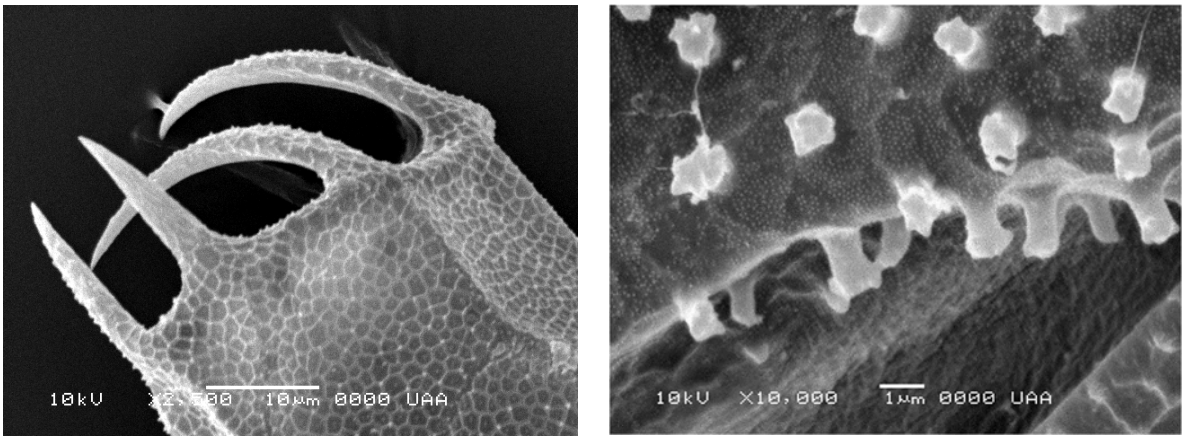
K. americana. Left image, close-up of the facet edges showing irregular reticulation and granules on the mentioned edges. Right image showing the lateral antenna emerging from a type of opening with small cylinders in a circular formation. SEM JEOL LV 5900.



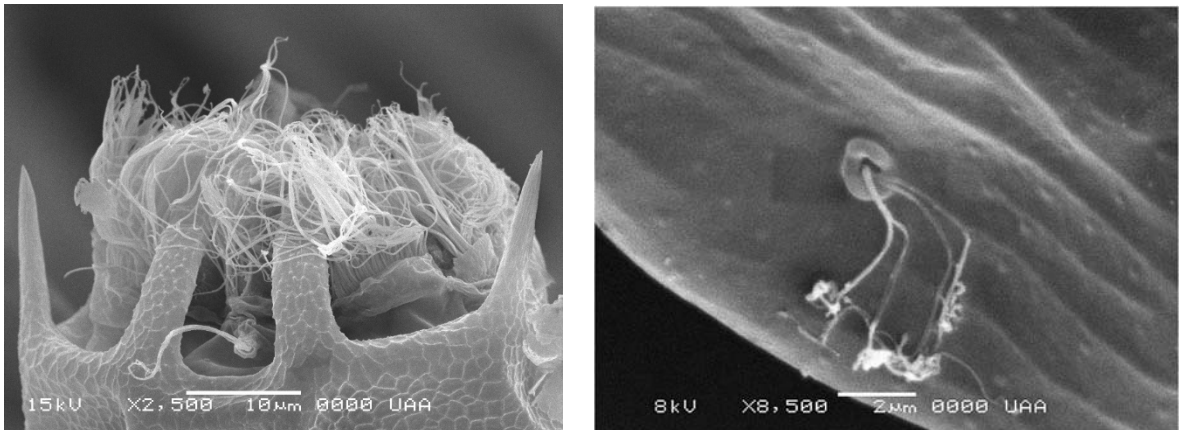
K. americana. The two images show the absence of the terminal spine of this species, which is very similar to f. *tecta* of *K. cochlearis*. Nikon Eclipse. Cámara digital Sight D5-F12.



Keratella cochlearis Gosse 1851. Left image, habitat in dorsal view showing the facets with the characteristics of the species. Right image, ventral view of the habitus showing the ornamentation on the upper part of the plate in the form of granules. SEM JEOL LV 5900.

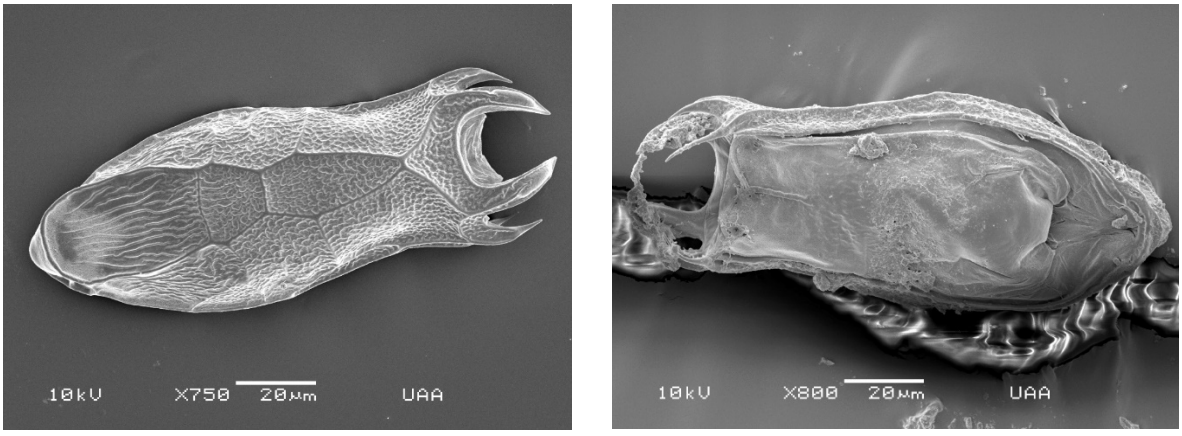


K. cochlearis. Left image, anterodorsal and anteroventral spines of this species. Right image, showing the ornamentation of the ventral plate in the form of cylindrical projections with spiny tips. SEM JEOL LV 5900.

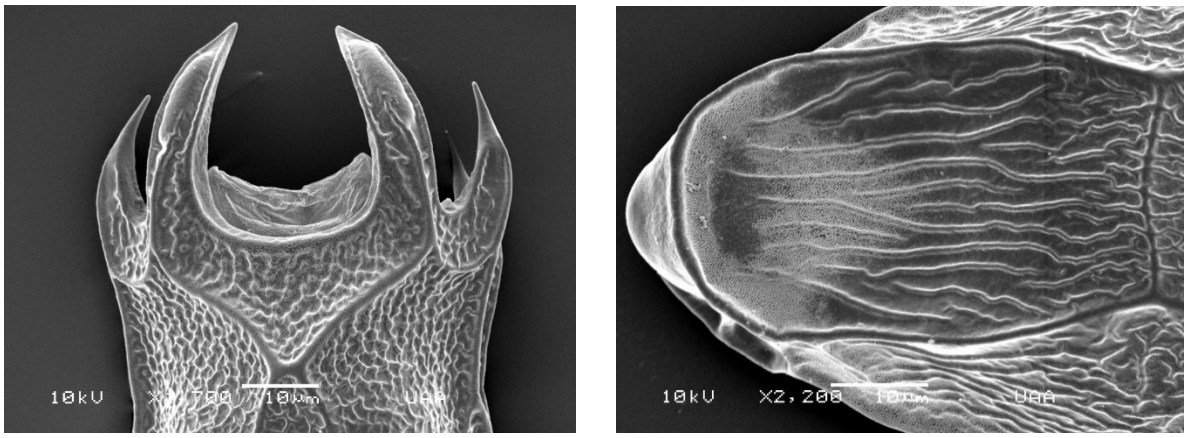


K. cochlearis. Left image, dorsal view showing the four spines, in the center the ciliated crown and between the two central dorsal spines the dorsal antenna is observed emerging. Right image, close-up of the lateral antenna showing four sensillae emerging from a circular opening. SEM JEOL LV 5900.

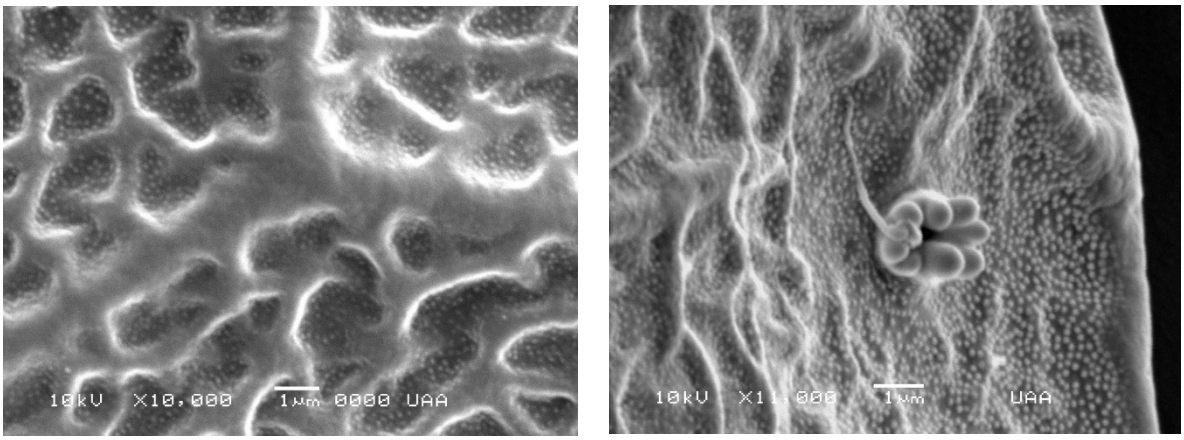
Left image, in dorsal view habitus of *K. cochlearis* f. *tecta*, showing the typical facets of this species. SEM JEOL LV 5900. Right image: three specimens of *K. cochlearis*, the two that do not have spines are of the f. *tecta*. Nikon Eclipse. Cámara digital Sight D5-F12.



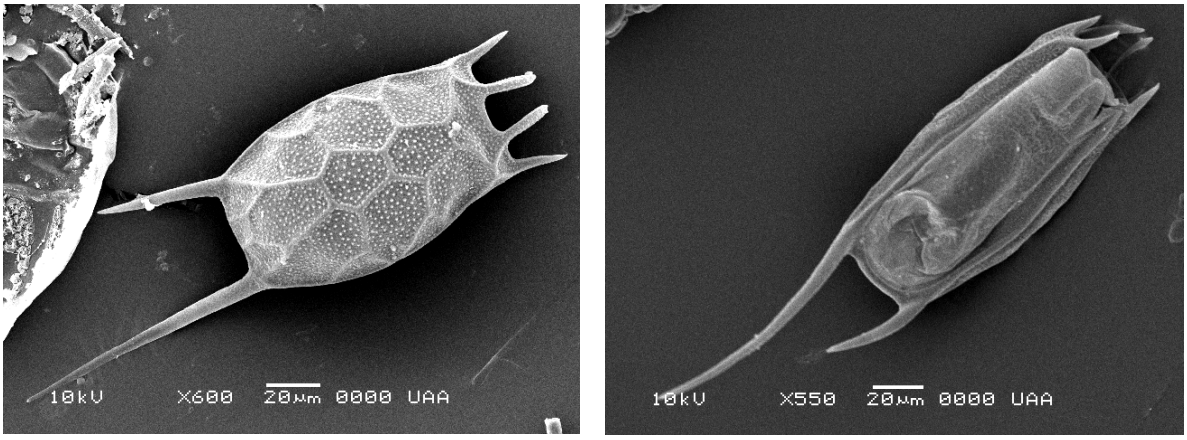
Keratella mexicana Kutikova & Silva-Briano, 1995**.** Left image, dorsal view of the lorica habitus, showing the typical facets of the species. Right image, ventral view of the habitus showing the smooth plate, without ornamentation. SEM JEOL LV 5900.



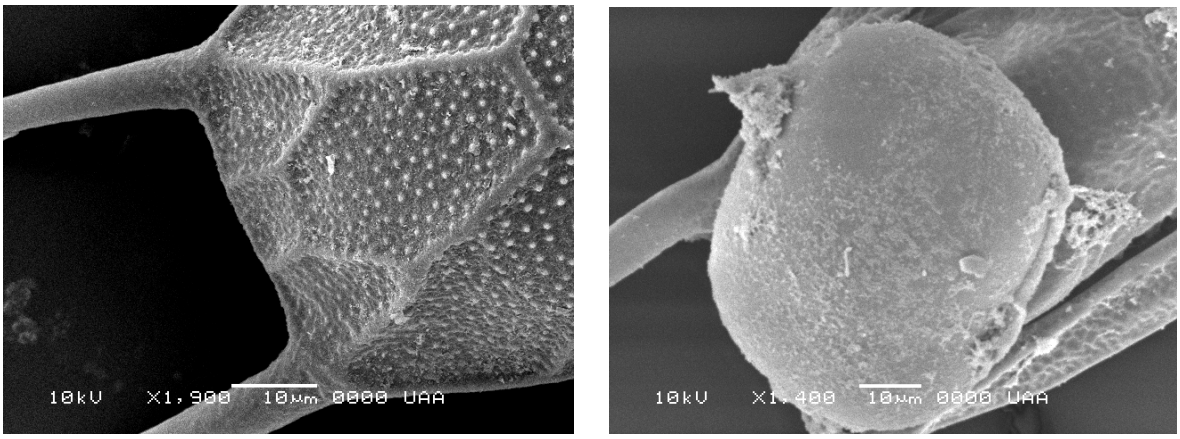
*K. mexicana***.** Left image, upper dorsal view of the lorica showing the four characteristic spines of this species. Right image, showing facet detail showing alveolar network. This facet is the longest of the lorica. SEM JEOL LV 5900.



K. mexicana. Left image, detail of the edges of the facets, showing the ultrastructure of the surface in the form of hollows of irregular shape, with minute granules in them. Right image, showing the lateral antenna in the form of small circular cylindrical projections. SEM JEOL LV 5900.



Keratella tropica (Apstein, 1907). Left image, dorsal view of the habitus showing the facets that characterize this species. Right image, ventral view of the lorica, showing the plate with a very light ornamentation, almost imperceptible. You can see the trace of the egg that was attached to the bottom. SEM JEOL LV 5900.



*K. tropica***.** Left image, lower dorsal view of the habitus showing the facets that determine the. On each side the spines that emerged from the lorica. Right image, close-up of the sexual egg placed in the lower part. SEM JEOL LV 5900.

K. tropica. Image showing the lateral antenna with tubular projections forming a circle. SEM JEOL LV 5900.

Conclusions

Biodiversity in Mexico is very large, so it is necessary to continue with these studies to increase knowledge of rotifer species. In the case of *Keratella*, there will surely be more species in the country, since four have been found in the state of Aguascalientes, one of them new for science.

References

Ahlstrom E. H. 1943. A Revision of the rotatorian genus *Keratella* with descriptions of three new species and five new varieties. Bulletin of the American museum of natural History. Vol., LXXX, Art XII. 411-457.

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Kutikova, L. A. & M. Silva Briano. 1995. A new planktonic rotifer from Aguascalientes, Mexico. Hydrobiologia. 310: 119-122.

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Silva-Briano, M. & Adabache-Ortiz. 1999. On the taxonomy and distribution of the Rotifera *Keratella mexicana* Kutikova & Silva-Briano, 1995. Annals of Limnology. 35 (2): 105-109.

Research work in progress

Heliozoan predation on rotifers

Heliozoans are commonly known as sun animalcules due to their stiff and long axopodia radiating out from cell surface. They are protists belonging to phylum Heliozoa. Their size range varies from <2 to >500 µm. Rotifers in freshwater environment have many predators, both vertebrates and invertebrates. Among the different invertebrates, heliozoan predation on rotifers can be severe but has received much less attention. In our laboratory we have recently started working on heliozoan predation of rotifers, both planktonic and benthic. Surprisingly, rotifers appear to be the excellent prey for heliozoans of the genus *Actinosphaerium*. Rotifers, planktonic (*Brachionus calyciflorus*), tychoplanktonic (*Plationus patulus*) and benthic (*Lepadella patella*), are all vulnerable to predation by heliozoans.

Heliozoans are passive predators. Yet, any prey item that comes in contact with heliozoans is caught by the sticky nature of the axopodia. Rotifers caught in the axopodia contract their corona within the lorica and thus are unable to swim away. Gradually the pseudopodia of the heliozoan surround the prey to engulf it. Depending on the prey size, each heliozoan needs about 1-2 hours to completely engulf the rotifer. Figure 1 shows the different stages of prey (*Plationus patulus*) consumption by *Actinosphaerium* sp.

Results on the population growth of different species of rotifers cultured in the presence of *Actinosphaerium* sp. will be presented during the XVI Rotifer Symposium in Croatia, 2022.

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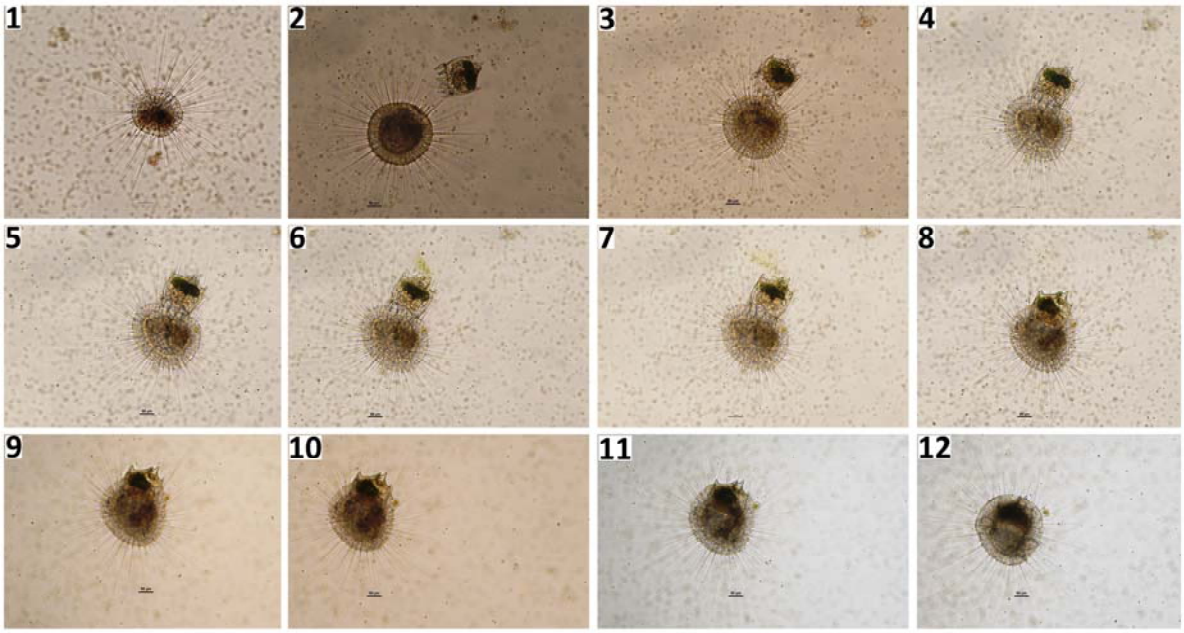

Figure 1. Different stages in the predation by heliozoan on rotifers (see also cover page).

Historical photos

Photos of special talks / workshops / international conferences in which different experts participated as resource persons, who mostly work on rotifers.

1-2. Plankton Ecology: Dr. N. Walz, Institute of Hydrobiology, Germany 3. Aspects of Crustacean Ecology and Diversity': Prof. Victor Alekseev, Zoological Institute, St. Petersburg, Russia Temperate 4. Bdelloid rotifers: Morphology, ecology and phylogeny, Dr. Diego Fontaneto, Italia, 5. Talk on Lake Management by Dr. Linda May, Centre for Ecology & Hydrology, Midlothian, UK. 6. Limnology for Tropics" Dr. Brian Moss, Universidad de Liverpool, U.K.

1&2. Visit to FES Iztacala by Hendrik Segers: Presented talks on Development and birth of the intergovernmental platform on biodiversity and Ecosystem Services (IPBES) and The ultimate standard of rotifer names: ICZN´s list of available names; 3&4. Shallow Lakes conference, Merida (2017): Ramesh Gulati, Linda May, HJ Dumont, Luc de Meester; HJ Dumont, Terry Snell; 5&6. Elizabeth Walsh at the Workshop in FES Iztacala, Selection Criteria of zooplankton for Aquaculture Biotechnology; 7 & 8. Talks on Zooplankton Diversity, S. Nandini & S.S.S. Sarma, Zoological Survey of India, Hyderabad.

1. H.J. Dumont, Linda May, Eduardo Vicente
2. Eduardo Vicente, Patricia Davila
3. H.J. Dumont, Ramesh Gulati, Eduardo Vicente, S. Nandini & S.S.S. Sarma
4. Terry Snell and students
5. Ramesh Gulati, S. Nandini, Eduardo Vicente, S.S.S. Sarma, H.J. Dumont and with participants listing to a talk on zooplankton
6. Students during a workshop
7. Ignacio Peñalos and T. Ramakrishna Rao
8. Diego Fontaneto
9. Terry Snell teaching a course on ecotoxicology
10. S.S.S. Sarma and Elizabeth Walsh

Laboratory visits

Visit to Ripon College

A two-day visit to Ripon College (Wisconsin) to meet Bob Wallace during April 2022 by both of us was inspiring and thought provoking. Bob showed his enormous wealth of rotifer literature in digital form. It was more fascinating to hold and appreciate The Edmondson Statue; photographs do not capture the essence of this beautiful model "The Edmondson Statue" (see Wallace in RN 35 p. 38-41 for full description). There are also many surprises at the entrance of Ripon College as shown in photos here.

Entrance to Ripon College

At the entrance of Biology Department

A bdelloid with Bob's head (made by the students of Prof. Eugene Kain's 1995 ceramics class) at the Biology Department.

"The Edmondson Statue"

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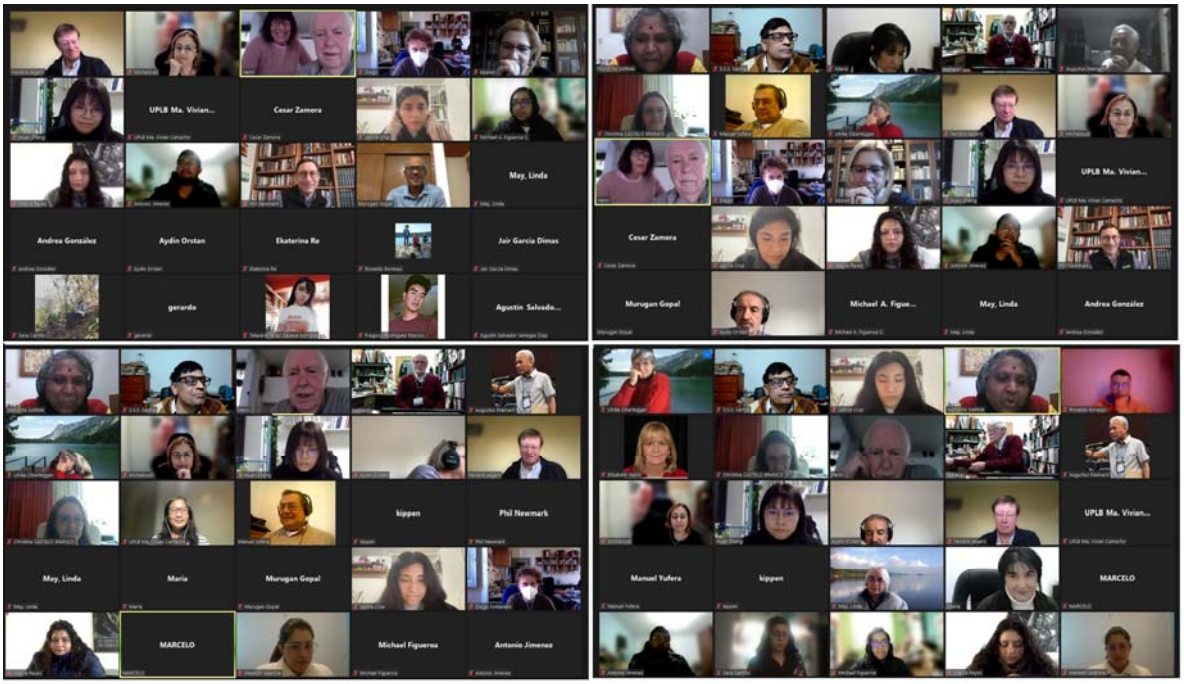
Virtual Rotifer Collaboratorium

We began the year with a very interesting talk by H. J Dumont on protozoan predators of rotifers. His findings show that the testate amoebae, *Difflugia* feeds effectively on rotifers such as *Collotheca mutabilis* and *Keratella* sp. and may have an important impact on the density of these rotifers. These results substantiate the findings of Lane (1979) that invertebrate predators, in terms of populations, have a greater impact on zooplankton than vertebrates. Lane's (1979) findings are based on research in temperate lakes; the situation in the tropics may be different.

In February, Dr. Phil Newmark presented a novel idea on the schistosome paralysis factor produced by bdelloids (*Rotaria rotatoria*). This is a new line of research which will be benefitted by young investigators working in the field with new insights and information.

Maria Špoljar gave us a very interesting talk on rotifers in shallow and deep lakes in the Balkan peninsula and the Adriatic Sea. Her findings showed that with increasing trophic levels in water bodies, small, detritivorous rotifers dominated the system. Also, the presence of submerged macrophytes resulted in an increase in rotifer diversity and an improvement of water quality. Similar trends are observed many in tropical waterbodies and the findings have applications for lake management.

In April, Ulrike Obertegger spoke to us on the methods of filming plankton and easily available computer programs to measure the swimming speeds of rotifers. She was co-author of an award-winning study published in the Rotifera Proceedings from the



XV Rotifer Conference at El Paso, Texas. She also introduced us to the *Global Lake Ecological Observatory Network (GLEON)* and suggested collaborations on Rotifer research across the world.

Over the past year and half, we have now had more than 10 VRC meetings. Our participants and speakers come from 16 countries (*Belgium, Brazil, China, Croatia, Czech Republic, Greece, India, Israel, Italy, Mexico, Philippines, Poland, Spain, Sweden, UK and USA)* and invitations have been select. We hope the VRC is here to stay and plan to invite more participants, preferably personally to ensure that the participants are passionately interested in Rotifer research and will contribute to developments in Rotifer biology, ecology and applications.

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Organizer, Virtual Rotifer Collaboratorium

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Authors are encouraged to submit contributions to *Rotifer News*.
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For details, please visit the website:
https://sitios.iztacala.unam.mx/rotifernews/