

Rotifer News

A newsletter for rotiferologists throughout the world



Participants of the International Rotifer Symposium XVII (2025, Brazil) (Report on P. 2). Photo: courtesy of XVII IRS.

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Editorial: *In this issue*

This issue contains information about the International Rotifer Symposium (IRS-XVII), which was held from August 4 to 8, 2025 in Rio de Janeiro (Brazil). And what a great meeting! Several interesting aspects of rotifers were discussed during this event.

Christina Wyss Castelo Branco, the organizer of the event nicely summarized the different activities of the IRS XVII (see p. 2). Several high density photographs of the meeting were also made available to all the participant (courtesy of XVII IRS). However, not all of them have been included in this issue. Only selected photographs have been presented in this issue. In the future RN issues, some more photographs will be included.

This issue carries all abstracts of the IRS-XVII (p. 14), verbatim, provided by the Organizers of the event. This is intended to provide a holistic view of the recent global developments in different areas of rotifer research.

One of the highlights of the IRS-XVII is the participation by the largest number (25%) of participants from Mexico, higher than the host country. Two of the senior most rotiferologists, Susana B. José de Paggi (Argentina) and Robert L. Wallace (USA) received medals from the Brazilian Association of Limnology for their significant contributions to the biology of rotifers.

Six best presentations (3 oral and 3 poster) received awards. In addition, a young student of Architecture, Yaren Yağci, got an honorary award for the

poster on rotifer species for interior furniture designs.

Venue of the next rotifer meeting (IRS-XVIII) has been decided. It will be held during 2028 in Greece by Evangelia Michaloudi as the Organizer. Details of IRS-XVIII will be available in the next number of RN.

As in the past the proceedings of the IRS-XVII will be published in *Hydrobiologia*. Interested authors are invited to contact the Editorial office of *Hydrobiologia* (p. 71) for manuscript submissions.

Starting from this issue, a new Member (Christina Wyss Castelo Branco) joins the Editorial Board of Rotifer News.

Other features of this issue include Predation-prey vulnerable interactions among rotifers and fish by Moshe Gophen and obituary (Radovan Erben 1943–2025) by Maria Špoljar.

The *Virtual Rotifer Collaboratorium* (VRC) is continued. The next VRC has been scheduled for 24th October 2025 by the organizer, S. Nandini.

The regular feature of “Recent Literature” is not included in this issue but will continue to appear in RN 46. As in the past, authors of published works, including books, are invited to send the bibliographic information for inclusion in the RN.

The next RN issue (No. 46) will be expected during January 2026 or later.

S.S.S. Sarma
Editor

Report: International Rotifer Symposium (IRS-XVII), August 4-8, 2025, Rio de Janeiro (Brazil)

The XVII International Rotifer Symposium was held from August 4th to 8th, 2025 in the city of Rio de Janeiro, Brazil, hosted and organized by the Federal University of the State of Rio de Janeiro (UNIRIO), by the Postgraduate Program in Neotropical Biodiversity (PPGBIO). The symposium had the collaboration of professors from the Federal University of Rio de Janeiro (UFRJ), the State University of Maringá (UEM) and universities from Argentina, Ecuador, Uruguay and Venezuela. With the theme “Challenges for the Study of Rotifers in the Southern Hemisphere”, the symposium brought together professors, scientists, technicians and students from Brazil and abroad to discuss numerous scientific issues related to research with Rotifers. To date, fourteen countries have hosted these symposia, which began in 1977 in Austria (twice): Belgium, Italy, Poland, Spain, Sweden, United Kingdom, United States (twice), Thailand, Mexico, Germany, the Czech Republic, India and Croatia. The general objective of the Rotifer Symposia is to present the latest advances in research on rotifers and to foster partnerships. The specific objectives of the XVII International Rotifer Symposium were to show the state of the art on the taxonomy and biogeography of rotifers in the Southern Hemisphere, highlighting the contribution of local and non-local researchers. Special target was to encourage undergraduate and graduate students from Latin American countries to study Rotifera

under the most diverse aspects, and to discuss strategies to stimulate and reinforce research on this group of metazoans. The symposium consisted of six invited plenary lectures, six workshops, and nine special sessions. Scientific papers were presented in oral and panel sessions.

Ninety-one participants from 22 countries attended the XVII International Rotifer Symposium, the countries with the largest number of representatives being Mexico, Brazil, and the United States. Ninety-three abstracts were submitted, 44 for oral presentations and 49 for posters. Nine thematic sessions were organized for paper presentations: Biodiversity and Ecology (42 abstracts), Ecotoxicology (17), Rotifer Ecology in the Tropics (9), Genomics (8), New Advances in Rotifer Studies (6), Experimental Studies and Aquaculture (4), Rotifer Morphology (3), Rotifers as Bioindicators (2), and Exotic Species or Invaders? (2). Six workshops happened, one of them as pre-congress activity, held on August 2. Within the symposium activities, the Brazilian Association of Limnology awarded the Professor Lejeune de Oliveira Medal to two outstanding researchers in the study of rotifers from South and North Hemisphere. There were awards for the best oral and poster presentations conducted by young scientists and a tribute to Professor Walter Koste, whose work as a taxonomist focusing on monogonont rotifers served as the basis for several studies surveying rotifer taxa. A photography competition took place throughout the symposium, with categories for microscopic and landscape photos. Among the activities for the symposia participants,

there was a technical excursion with a visit to preservation areas within the city of Rio de Janeiro, including a municipal park and the Botanical Garden. As in previous symposia, authors of presentations will be able to submit their complete papers for publication free of charge in a special volume of *Hydrobiologia* (A2 in Qualis CAPES).

Logo



The logo and the visual identity of the symposium was created by the designer Beatriz Ramos (BSc). For the symposium's visual identity, the organizers chose to spotlight the rotifer species *Lecane decipiens* (Murray, 1913), which was described from samples collected in a small pond located in a square in downtown Rio de Janeiro city. The species is found in common bromeliad tanks typically located on UNIRIO campus. The arch below the *L. decipiens* symbolizes to the southern Hemisphere.



Figure 1: *Lecane decipiens* collected from a bromeliad tank in the campus of UNIRIO (Urca, Rio de Janeiro, Brazil).

Acknowledgments

The organizers are deeply grateful for the financial support of CAPES (Processo: 88881.014143/2024-01), FAPERJ (Processo 210.251/2025 – SEI-260003/002423/2025), CRBIO-02 (Processo nº 00659.1.01.2025), Associação Brasileira de Limnologia / Brazilian Limnology Association (ABLIMNO), and to the Tropical Water Research Alliance (TWRA). They are also thankful to Springer and Fleming Material of Laboratory for the awards given to the best oral and poster presentations and to the photo contest.

They would like to thank UNIRIO's administrative department for their support in the auditorium and plenary speakers' transportation. Special thanks to the School of Nursing Administration for providing the school's rooftop space for the symposium working lunches.



Figure 2: Participants of the XVII International Rotifer Symposium and the logo of the sponsors.

Plenary Lectures: Plenary lecture 1: “A State of Art of Taxonomic Research in Rotifera” by Dr Hendrik Segers (Royal Belgian Institute for Natural Sciences, Belgium)



Figure 3: Plenary talk of Dr Hendrik Segers, 4 August (morning) at the XVII IRS (UNIRIO).

Plenary lecture 2: “Overview of Rotifer Studies in the Southern Hemisphere in the Current Century” by Dr Carlos López (Escuela Superior Politécnica del Litoral, Guayaquil, Ecuador).



Figure 4: Plenary talk of Dr Carlos López, 4 August (afternoon) at the XVII IRS (UNIRIO).

Plenary lecture 3: “Diversity and Distribution of Monogononta Rotifers in South America: What We Know and Don’t Know” by Dr Susana Paggi (INALI, Santa Fé, Argentina).



Figure 5: Plenary talk of Dr Susana Paggi, 5 August (morning) at the XVII IRS (UNIRIO).

Plenary lecture 4: “Two Decades of Global Contributions to Rotifer Research: Proxy and Qualitative Analyses” by Dr S.S.S. Sarma (Universidad Nacional Autónoma de México, FES Iztacala, Mexico).



Figure 6: Plenary talk of Dr S.S.S. Sarma, 5 August (afternoon) at the XVII IRS (UNIRIO).

Plenary lecture 5: “Rotifers in Large-Scale Biodiversity Surveys” by Dr Diego Fontaneto (National Research Council, Water Research Institute (CNR-IRSA), Verbania Pallanza, Italy).



Figure 7: Plenary talk of Dr Diego Fontaneto, 7 August at the XVII IRS (UNIRIO).

Plenary lecture 6:

“Does Facet Pattern Morphospace Affect Structural Stability in *Keratella* Bory de St. Vincent (Rotifera, Monogononta, Brachionidae)?” by Dr Robert Wallace (Ripon College, Wisconsin, USA)



Figure 8: Plenary talk of Dr Robert Wallace, 8 August at the XVII IRS (UNIRIO).

Workshops: Six workshops were organized, the first of which was held on August 2 as a pre-symposium activity.

Workshop 1: Bdelloid taxonomy

Coordinator: Dr Diego Fontaneto

Overview: The objective of the workshop was to introduce participants to the details that need to

be checked to identify bdelloid rotifers. These animals need to be observed while alive and the main challenge is in trying to observe their morphology while they move. The workshop started with a general overview of the morphology and ecology of bdelloids, to then explore the most relevant taxonomic features that need to be observed. After the introduction, participants had a few hours to sort samples to extract bdelloids, to prepare temporary slides, and to use compound microscopes at different magnifications to observe the taxonomic features and tried to identify genera and species following dichotomous keys. Samples were collected on site, but participants were also able to analyze their own samples.



Figure 9: Laboratory activities during the workshop on Bdelloid taxonomy (Biosciences Institute, UNIRIO).

Workshop 2: Rotifers Resting Stages: unlocking the secrets of dormant life
Coordinators: Dr Cláudia Bonecker (Brazil), Dr Clarice Casa Nova (Brazil), Dr Elizabeth Walsh (USA)

Overview: Rotifera ability to form resting eggs is key to their survival, dispersal, and ecological resilience. This workshop explored the biology, ecology, and applications of rotifer resting stages, bridging fundamental research with applied perspectives. The objectives of this workshop were to discuss the formation, dormancy, and hatching mechanisms of rotifer resting eggs; to explore Ecological and Evolutionary Significance; examine how resting stages contribute to population dynamics, species persistence, dispersal, and ecosystem stability; review recent breakthroughs in research on rotifer resting eggs; discuss implications for aquaculture, conservation, and environmental monitoring. Future Challenges were addressed: Identify knowledge gaps, emerging research directions, and challenges related to climate change, pollution, and anthropogenic disturbances

Workshop 3: Integrative Taxonomy
Coordinators: Dr Manuel Elias-Gutiérrez (Mexico), Dr Alma Garcia (Mexico), Dr Evangelia Michaloudi (Greece)

Overview: Integrative taxonomy is essential for accurately identifying rotifer diversity, especially in cryptic groups. This workshop discussed that by combining morphology, genetics, and ecology, the integrative taxonomy enables the discovery of hidden species, improves data quality, and strengthens studies on biodiversity, bioindicators, and conservation. It also promotes more effective scientific

networks and environmental policies. Some of the most important molecular tools were presented, along with the importance of moving toward integrating their use with classical taxonomy and ecology.

Workshop 4: Developing Functional Genomic Tools for Rotifers?
Coordinators: Dr Elizabeth Walsh (USA) and Jon Mohl (USA)

Overview: The session included presentations on CRISPR gene editing methods; the resources available in WheelBase and how to use them to design gene editing experiments; and results of recent studies that use gene-editing techniques or other functional genomic tools. The overall goal was to advance outcomes of research involving rotifers by providing the community with tools for functional genomics while integrating education and training of undergraduate and master's students.

Workshop 5: Rotifers and Rotiferologists from Latin America: Challenges and Perspectives.

Coordinators: Dr Roberto Rico-Martínez (Mexico) and Dr Carlos López (Ecuador)

Overview: There is a vast and complex set of ecosystems where new species of rotifers await to be discovered in Latin America, including a variety of biomes from North American deserts in Mexico and Sub American deserts, grasslands, tropical regions, temperate biomes, Mediterranean-type biomes, the Amazonian basin, the Patagonian, and the Antarctic regions in Argentina and Chile. Several questions were addressed by this workshop such as the differences in Rotifera fauna in such a vast region, similarities in the rotifer composition,

humans influencing the region differently, creating an imbalance in the general study of rotifers, factors that determine species' richness in the different habitats in the region, and gaps in knowledge regarding rotifer taxonomy and distribution in Latin America. Other issues were how can the taxonomical and biomonitoring harmonization of rotifers in the region be started, what obstacles will Latin American researchers face, have faced, and will face in the future, and should a network of Latin American experts on zooplankton help in the completion of a thorough list of rotifers/zooplankton for the whole region?

Workshop 6: Emerging consensus and key questions in Rotifera research Coordinators; Dr Rafael Macêdo (Brazil/Germany) and Dr Gissell Lacerot (Uruguay)

Overview: The workshop, using a previous activity with contact by email, conducted an initiative to identify priority research questions of fundamental importance to Rotifera research, focusing on both theoretical and applied challenges across various aspects of the Phylum. There was a round of discussions with all participants of the symposium based on the research-driven questionnaires exploring key questions of interest during the workshop. The study followed well-established consensus methods, combining qualitative and quantitative rounds with online questionnaires sent before the workshop (via email) and in-person dynamics.

Awards:



Figure 10: Professor Lejeune de Oliveira medal.

Prof Lejeune Medal:

The Brazilian Association of Limnology (ABLIMNO) provided medals Professor Lejeune de Oliveira to two researchers that stand out in the study of rotifers. One of the winners was Professor Susana Paggi, from Argentina, for her unparalleled contribution to the study of rotifers in South America, and her efforts in teaching the taxonomy and ecology of rotifers in this region. The other winner was Professor Robert Wallace, from the USA, who has contributed greatly to the study of rotifer biology, taxonomy and morphology and for his fundamental role in organizing rotifer symposia and in the success of the large international family of rotiferologists.

The Lejeune Medal was also awarded to the family of doctoral student Ewerton Fintelman de Oliveira, from the Graduate Program in Neotropical Biodiversity (PPGBIO), who died in a car accident in late July 2025. Ewerton was an enthusiastic rotifer researcher.



Figure 11: Dr Susana José de Paggi (a) and Dr Robert Wallace (b) receiving the Professor Lejeune medal of representatives from ABLIMNO.

Best oral and poster presentations

For young researchers (less than 35 years old) the three best oral and best poster presentations were awarded. In addition to the certificate, the young researcher could choose to receive a plankton net or a Sedgewick-Rafter counting chamber as a prize.

Best presentations:

Oral Presentation

- 1st Carlota Solano Udina (Spain)
- 2nd Antoine Maurice Houtain (Belgium)
- 3rd Ariel Bollinger (USA)

Poster Presentation

- 1st Julieta Cuevas Acosta (Uruguay)
- 2nd Cristina Arenas-Sánchez (Spain)
- 3rd Raphael Corrêa (Brazil)

Koste Homage

Walter Koste, one of the architects of modern rotiferology, had his importance recognized once again, both for its publications that guided several studies and for its taxonomy work in different parts of South America.



Figure 12: The German rotiferologist Walter Koste.





Figure 13: Walter Koste in several activities and with colleagues from various countries. (Courtesy by Susana Paggi and Christina Castelo Branco).

Technical excursion

As with previous rotifer symposia, the XVII IRS featured a mid-week technical excursion. The objective was to present interesting and diverse ecosystems within the city of Rio de Janeiro.

Baixada de Jacarepaguá - The Jacarepaguá lowlands are a coastal plain located in the western part of the city of Rio de Janeiro, originating from marine transgressions that formed sandy ridges and associated lakes and lagoons. Jacarepaguá is an indigenous name meaning "place of alligators" or "valley of alligators", derived from the Tupi-Guarani language. These ancient inhabitants are still found in some lakes and rivers, and the participants could see some. The best studied lagoon in this region is the Jacarepaguá Lagoon, which has presented incredible cyanobacteria blooms over the years due to the intense eutrophication process. The participants were informed about the

dynamics of this lagoon, especially the importance of the connection with the sea. The excursion visited the Chico Mendes Municipal Park, with remnants of the restinga vegetation and containing the Lagoa das Taxas, with hypertrophic characteristics and a refuge for alligators and capybaras.

Lagoa Rodrigo de Freitas (LRF) - Returning to the southern part of the city of Rio de Janeiro, the excursion stopped on the banks of LRF (Rodrigo de Freitas Lagoon), one of the most studied tropical urban lagoons in the world. Since the last century, this lagoon has been an important location for artisanal fishing, sports activities and landscape harmony. However, its waters suffered severe fish-kills, algal blooms and invasions of exotic mollusks. The connection with the sea allows a partial renewal of the lagoon's water, which contributes to improving its water quality. Participants had lunch near an area that serves as a refuge for local capybaras.

Jardim Botânico (JB) - The final part of the tour consisted of a guided visit to the Botanical Garden. The Rio de Janeiro Botanical Garden was founded on June 1808 by the Regent Prince of Brazil, D. João that aimed acclimatizing plant species from other parts of the world to the tropical climate of Rio and to produce tea. First called the Royal Garden, the JB became a place to exhibit native and exotic plants, incorporating research functions and becoming an important center for the study of Brazilian flora. Another interesting aspect is that the JB area is located next to the Tijuca Forest, the largest urban tropical forest in the world.



Figure 14: a) Participants of the technical excursion at the Chico Mendes Municipal Park, b) visiting the eutrophic Taxas lake, in Chico Mendes Park.



Figure 14: c) Participants among the imperial palms of the Botanical Garden

Symposium Kit: All material given to participants was environmentally friendly.

Cups made of rice fiber, notepad made of bamboo, unbleached cotton bag, and Arugula (rúcula) seed badges - after the symposium, they can be planted.



Figure 15: Symposium kit distributed to all participants containing sponsors' logos.



Figure 15: Symposium kit distributed (continued).

Christina Wyss Castelo Branco, Organizer of Rotifera XVII (Brazil, 2025)
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Program of the XVII International Rotifer Symposium:

XVII INTERNATIONAL ROTIFER SYMPOSIUM	
SATURDAY, 2 Aug (Avenida Pasteur 436)	
14:00 - 15:00	Early Registration
15:00 - 18:00	Workshop 1: Bdelloidea Taxonomy
SUNDAY, 3 Aug (Praia Vermelha)	
17:00	Meeting at "Terra Brasilis"
MONDAY, 4 Aug (Avenida Pasteur 296)	
7:30 - 9:00	Registration
9:00 - 9:30	Inaugural Speech: Organizing Committee + Music
9:30 - 10:10	Invited Lecture 1: Dr. Hendrik Segers (Belgium)
10:10 - 10:30	Coffee Break
10:30 - 12:00	ORAL SESSION 1: BIODIVERSITY AND ECOLOGY
12:00 - 13:30	Lunch
13:30 - 14:10	Invited Lecture 2: Dr. Carlos López (Venezuela/Ecuador)
14:10 - 15:55	ORAL SESSION 2: BIODIVERSITY AND ECOLOGY
16:00 - 16:20	Coffee Break

16:20 - 17:50	Workshop 2: Rotifers Resting Stages: unlocking the secrets of dormant life
17:50 - 19:00	POSTER SESSION 1
TUESDAY, 5 Aug	
09:00 - 09:40	Invited Lecture 3: Dra. Susana Paggi (Argentina)
09:55 - 10:10	ORAL SESSION 3: BIODIVERSITY AND ECOLOGY
09:55 - 10:30	Coffee Break
10:30 - 12:00	ORAL SESSION 4: BIODIVERSITY AND ECOLOGY
12:00 - 13:30	Lunch
13:30 - 14:10	Invited Lecture 4: Dr. S.S.S. Sarma (Mexico)
14:10 - 15:55	ORAL SESSION 5: BIODIVERSITY AND ECOLOGY
16:00 - 16:20	Coffee Break
16:20 - 16:50	ORAL SESSION 6: BIODIVERSITY AND ECOLOGY
16:50 - 18:20	Workshop 3: Integrative Taxonomy
18:20 - 19:00	Workshop 4: Developing Functional Genomic Tools for Rotifers?
WEDNESDAY, 6 Aug - TECHNICAL EXCURSION	
THURSDAY, 7 Aug	
09:00 - 09:40	Invited Lecture 5: Dr. Diego Fontaneto (Italy)
09:40 - 09:55	ORAL SESSION 7: BIODIVERSITY AND ECOLOGY
10:10 - 10:30	Coffee Break
10:30 - 12:00	ORAL SESSION 9: GENOMICS
12:00 - 13:30	Lunch
13:30 - 15:00	Workshop 5: Rotifers and Rotiferologists from Latin America: challenges and perspective
15:00 - 15:30	ORAL SESSION 10: EXPERIMENTAL STUDIES AND AQUACULTURE
15:30 - 16:00	ORAL SESSION 11: ECOTOXICOLOGY
16:00 - 16:20	Coffee Break
16:20 - 16:50	ORAL SESSION 12: ECOTOXICOLOGY
17:00 - 19:00	POSTER SESSION 2
FRIDAY, 8 Aug	
09:00 - 09:40	Invited Lecture 6: Dr. Robert Wallace (USA)
09:40 - 09:55	ORAL SESSION 13: ECOLOGY OF ROTIFERS IN THE TROPICS
09:55 - 10:10	ORAL SESSION 14: EXOTIC SPECIES OR INVADERS?
09:55 - 10:30	Coffee Break
10:30 - 11:00	ORAL SESSION 15: MORPHOLOGY OF ROTIFERS
11:00 - 12:00	ORAL SESSION 16: NEW ADVANCES IN THE STUDY OF ROTIFERS
12:00 - 13:45	Lunch
13:45 - 15:15	Workshop 6: Emerging consensus and key questions in Rotifera Research
15:15 - 16:00	Coffee Break
16:00 - 17:30	Rotifera XVII Final Remarks / Awards
18:00 - 20:00	Closing Cocktail / Dinner

Abstracts of Rotifera XVII (2025, Brazil)

Keynote lecture 1:

"A STATE OF ART OF TAXONOMIC RESEARCH IN ROTIFERA"

Segers, Hendrik¹

1. Royal Belgian Institute for Natural Sciences, Belgium

At the end of the first quarter of the 21st Century, taxonomic research on rotifers has gone through numerous shifts in focus and has entered a stage in which diverse techniques are being applied. However, the resulting taxonomic apparatus is as yet quite incomplete. Without dealing too extensively on some well- and a few less well-documented idiosyncrasies of rotifers impeding their study, a brief overview is still warranted: rotifer's small size and lack of useful morphological features; the need to study either well- contracted or living specimens and both external, anatomical as well as trophi features; the sometimes purportedly high intraspecific, phenotypic variability and, consequently, at times confuse nomenclature complicate our understanding of rotifer taxonomy and biogeography. The "taxonomic impediment" and resource scarcity for taxonomic research are obviously constraining progress, but it needs to be acknowledged that addressing this may not be easily accomplished. Yet despite these difficulties the integration of ecological information and information obtained through rotifer culture demonstrate the usefulness of these early approaches to integrative taxonomy. The recent renewed interest in bdelloid taxonomy and the result of the application of molecular techniques have allowed significant progress to be made. Reviewing the present state of rotifer taxonomic research also reveals several hiatuses which would need to be addressed. An integrative approach, relying on broad a comprehensive baseline data, including but not restricted to molecular data, will be needed if rotifer taxonomic research is to deliver an effective toolset that can be used to

address questions and needs from society. For one, the wide range of expertise required to effectively conduct integrative research calls for increased collaboration.

Keynote lecture 2:

"OVERVIEW OF ROTIFER STUDIES IN THE SOUTHERN HEMISPHERE IN THE CURRENT CENTURY"

López, Carlos¹

1. Escuela Superior Politécnica del Litoral. Guayaquil, Ecuador

The global production of publications on freshwater zooplankton has increased steadily over the last 30 years. However, this trend is not homogeneous; protozoa and rotifers are less studied than cladocerans and copepods, and most scientific papers published on freshwater zooplankton correspond to Northern Hemisphere countries. Here, a systematic review of studies on rotifers published between 2000 and 2024 by countries in the Southern Hemisphere was conducted to answer the following question: What are the main features that characterize these studies? How have studies developed historically in the current century? What is the research focus? What gaps and challenges are evident? To understand the current state of the art and guide future regional studies on this group in the region. The assessment of scientific production is a crucial issue for the academic community to identify patterns and trends in the field of studies and enhance the understanding of scientific asymmetries that may occur among different regions worldwide.

Keynote lecture 3:

"DIVERSITY AND DISTRIBUTION OF MONOGONONTA ROTIFERS IN SOUTH AMERICA: WHAT WE KNOW AND DON'T KNOW"

Paggi, Susana¹

1. Nacioal de Limnología, Santa Fé, Argentina

South America is a subcontinent of great latitudinal extension with an important

variety of biomes. To date, over 700 rotifer morphospecies, 26 families and 81 genera are reported. Knowledge of the diversity from different countries is not uniform the greatest species number is recorded from Brazil, Argentina, Bolivia, Ecuador and Venezuela. Species richness decreases towards the South, and the salinity and altitude may be considered as limiting factors for diversity. Most of the recorded species are cosmopolitan and tropicopolitan, some thermophilic genera have greater diversity in Brazil, while cold stenothermic shows greater richness in southern Argentina and Chile, and in the Andean cordillera. Endemism patterns are relatively well defined.

Keynote lecture 4:

"TWO DECADES OF GLOBAL CONTRIBUTIONS TO ROTIFER RESEARCH: PROXY AND QUALITATIVE ANALYSES"

Sarma, S.S.S.¹

1. National Autonomous University of Mexico, FES Iztacala, Mexico
Macroanalysis of rotifer publications retrieved from Web of Science (WoS) during the last 20 years was presented. Rotifer research during this period witnessed exponential phase with about 300 articles per year. The h index of rotifer works is higher than on other groups of zooplankton. Coauthor number per article is about 6. Springer, Elsevier and Wiley accounted for more than 50% of all articles. Hydrobiologia alone made up to 6% of all rotifer articles. WoS recognized 10 publications as most cited. In addition to scientometrics, qualitative analysis of rotifer articles has been discussed.

Keynote lecture 5:

"ROTIFERS IN LARGE-SCALE BIODIVERSITY SURVEYS"

Fontaneto, Diego¹

1. National Research Council, Water Research Institute (CNR-IRSA), Verbania Pallanza, Italy

Rotifers represent a common and often dominant component of biodiversity of microscopic animals in different aquatic and limno-terrestrial habitats in different parts of the planet. Yet, rotifers are often not well represented in large-scale biodiversity surveys and repositories. I will provide examples of this issue screening different sources, and suggest activities that we, as rotifer scientists, could put in place to improve representativity of rotifers in biodiversity repositories.

Keynote lecture 6:

"DOES FACET PATTERN MORPHOSPACE AFFECT STRUCTURAL STABILITY IN *KERATELLA BORY DE ST. VINCENT* (ROTIFERA, MONOGONONTA, BRACHIONIDAE)?"

Wallace, Robert¹

1. Ripon College, Wisconsin, USA

Rotifers possess an intracellular skeleton that makes them unique among invertebrates. At the surface the skeleton may be elaborated into spines, bumps, and ridges, whose functions are incompletely known. Species of *Keratella* possess ridges that form regular geometric patterns, called facet patterns (FPs), with the animals resembling tiny geodesic domes. We tested the ability of FPs to pass design standards for buildings using architectural software and concluded that *Keratella* FPs provide a level of resistance to the physical stresses that may be incurred through interactions with microcrustaceans. However, not all FPs are equal in their ability to do so.

Session 1: Biodiversity and Ecology (Oral presentation)

How well do rotifers invade populations? The interplay of sex propensity, migration rates and local genetic diversity

Arenas-Sánchez, Cristina¹; Ortells, Raquel¹; Carmona, María José¹; García-Roger, Eduardo M.¹; Montero-Pau, Javier¹.

1. Cavanilles Institute of Biodiversity and Evolutionary Biology, University of València, València - Spain.

Dispersal is a fundamental process in ecology and evolution affecting all living organisms, with the settlement phase being particularly critical. This phase depends on the interaction between the environmental conditions of the new habitat and the biological traits of both resident and immigrant populations. While previous studies have examined some of these elements in isolation, their interactions remain largely unexplored. To address this gap, we conducted an invasibility experiment using the facultatively sexual rotifer *Brachionus plicatilis* as a model organism. We used clones from two geographically distinct populations, designating one as the resident and the other as the immigrant. Our study examined how the combination of migration rates, genetic diversity in the resident population, and the timing of sexual reproduction in immigrants influence settlement success. Whole-genome sequencing was used to track immigrant private alleles and assess settlement outcomes. Our findings reveal that all the studied factors—both independently and in combination—exert a significant impact on settlement success. Specifically, increased migration rates, lower resident genetic diversity, and the early initiation of sexual reproduction in immigrants were associated with higher establishment success. Moreover, a notable synergy emerged between high migration rates and early sexual reproduction in immigrants, while lower genetic diversity in the resident population facilitated the settlement of immigrants with delayed sexual reproduction. Overall, these findings highlight the importance of adopting a multifactorial perspective to fully understand dispersal dynamics, offering valuable insights into the ecological and evolutionary processes that rule the colonization of established populations.

Keywords: Invasibility experiment, Settlement success, Dispersal

Application of functional diversity in rotifers in eutrophicated aquatic systems in Mexico.

Barrios, Cesar Alejandro Zamora¹.

1. National Autonomous University of Mexico, Fesi., Mexico - Mexico.

Rotifers are essential for transferring trophic energy from primary producers and the microbial loop to secondary and tertiary consumers in aquatic food webs. In systems with CyanoHABs (Cyanobacterial Harmful Algal Blooms), small rotifer species frequently dominate the community. Our goal is to analyze the taxonomic and functional diversity of rotifers in two shallow eutrophic systems in Mexico where CyanoHABs are present. Alongside the taxonomic analysis, we constructed a matrix of functional traits based on morphological, trophic, and locomotion features derived from specialized literature. From this matrix, functional diversity indices such as functional richness (FRic), functional equity (FEve), functional divergence (FDiv), functional dispersion (FDis), and RaoQ were calculated. The results show a high functional richness during months of higher taxonomic diversity, with a significant reduction during months of lower abundance. A decrease in functional evenness was observed during certain months, which could indicate the dominance of species with similar strategies during periods of higher trophic pressure. This suggests that when there is increased competition for resources, species with similar functional traits tend to become more abundant. In contrast, those with different or less efficient strategies become less common. These results suggest that functional diversity could be a valuable tool for understanding the structure and functioning of rotifer communities in aquatic environments under high anthropogenic pressure. This analysis will allow us further to explore the relationship between biological

functionality and trophic conditions, thereby strengthening the ecological knowledge base regarding rotifers in Mexican lentic systems.

Keywords: Functional diversity, Rotifers, Trait-based analysis

Comparing rotifer reproductive behavioral patterns among populations with differing hydroperiods

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2. Universidad Autónoma de Aguascalientes, Aguascalientes - Mexico. Reproduction is critical for organisms inhabiting ephemeral aquatic habitats, where desiccation risk selects for rapid and successful mating. Monogonont rotifers rely on sexual reproduction to produce diapausing embryos that withstand these harsh conditions. We investigated how mating behaviors vary among three rotifer species (*Epiphanes brachionus*, *Epiphanes chihuahuaensis*, *Platyonus patulus*) from short (SH) or long hydroperiod (LH) habitats. We hypothesized that SH populations would demonstrate faster and more opportunistic reproductive behaviors. To test this, we recorded 10 males and 1 female from the same population for 10 min and analyzed their reproductive behaviors. We observed the five common reproductive behaviors found in rotifers: encounter, circling, localization, copulation, and dissociation. We also assessed swimming speed and cross-mating success between populations. *Epiphanes brachionus* displayed interesting behaviors associated with localization and copulation not observed in other species. Males from SH populations of *E. brachionus* were more likely to perform coronal localization and engage in copulation than LH populations. In *E. chihuahuaensis*, males from a LH had the highest encounter frequencies. Interestingly, *E. chihuahuaensis* males

frequently re-approached and re-mated with the same female; a pattern not observed in *E. brachionus*. Swimming speed also varied; SH *E. brachionus* males swam more slowly than females. Preliminary cross mating experiments reveal that populations from LH had higher rates of diapausing embryos production than SH X LH crosses. Our results demonstrate that rotifer mating strategies are species-specific and shaped by habitat predictability. These behavioral differences suggest adaptive flexibility in reproductive tactics that may optimize survival in fluctuating environments.

Keywords: Behavior, Reproduction, Temporary waters

Life history and reproductive traits of Antarctic bdelloid rotifers: egg-laying, live-bearing and mixed strategies.

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Antarctic bdelloid rotifers are an abundant and diverse group and are most likely all endemic to the continent. Their life history strategies are, however, poorly understood. Under constant lab conditions, five species (six strains) of bdelloid rotifers were studied to provide detailed descriptions of their life history and reproduction. Two live-bearing species, iteoparous *Philodina gregaria*, and semelparous *Adineta grandis*, and three egg-laying species, *Adineta* sp., *Habrotrocha* sp. (Bd14), and *Macrotrachela donneri* (two strains) were included in the study. Daily observations were made to determine hatch time, time to first oviposition (maturity), reproductive output, and lifespan. Egg-laying species generally produced more offspring (up to 27 per individual), matured faster, and lived longer than the live-bearing species.

Maximum recorded lifespan was 235 days (*M. donneri*). Live-bearing species are thought to invest more energy into fewer offspring due to the increased metabolic demands required to develop offspring internally, while egg-layers exhibited potential for faster population growth. A long period of senescence of up to 145 days was observed for *Habrotricha* sp. (Bd14) while other species died soon after offspring production ceased. *Macrotrachela donneri* appeared to exhibit a mixed reproductive strategy, largely laying eggs but with occasional viviparity. The lifespan and reproductive period of Antarctic bdelloid rotifers was determined to be unusually long compared to common non-Antarctic species. These results are discussed in light of the apparent dominance of live-bearing life history strategies in Antarctica, as *A. grandis* and *P. gregaria* are thought to be the most widely-distributed and successful of the species considered.

Keywords: Life history, Viviparity, Antarctica

Presence and abundance of *Lecane decipiens* (Murray, 1913) in Bromeliaceae Phytotelmata

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Still underexplored, the study of zooplankton communities in phytotelmata is essential for understanding these unique aquatic microsystems, which are ideal for examining ecological interactions on a small scale. Due to the limited space, organisms inhabiting these environments often exhibit specific adaptations, such as short life cycles, passive dispersal abilities, and desiccation resistance. This study aimed to assess the presence and density of the rotifer *Lecane decipiens* in two species of Bromeliaceae found in the courtyard of the Federal University of the State of Rio de Janeiro. *Lecane decipiens*

is a good species to study due to its frequent occurrence and high adaptability in small, isolated freshwater environments such as bromeliad phytotelmata. Its tolerance to extreme variations in temperature, pH, and water volume makes it an ideal model organism for evaluating zooplankton responses in microhabitats with fluctuating conditions. In addition, its short life cycle and ease of identification under optical microscopy allow for efficient and consistent monitoring. The consistent presence of the species in both bromeliads studied further highlights its ecological relevance in this type of aquatic system. Over a 10-month period (January to October 2023), monthly water samples were collected from the central tanks of two bromeliads. Sample volume and limnological variables—water temperature (°C), electrical conductivity (µS/cm), and pH—were measured using a multiparameter probe and recorded for analysis and correlation with the *L. decipiens* population. In the laboratory, specimens were counted using a 1 mL Sedgwick-Rafter chamber under optical microscopy. Preliminary results indicate potential species homogeneity between the two bromeliads, with similar average densities (individuals/mL) across the months. The lowest average density was 4.8 ind./mL in July, while the highest was 65.2 ind./mL in March, with an overall mean of 21.4 ind./mL. Initial statistical analyses show a positive correlation between *L. decipiens* density and water temperature, and a negative correlation with electrical conductivity, pH, and sample volume. The results highlight the sensitivity of *Lecane decipiens* to environmental variables in phytotelmata. The positive correlation with temperature suggests seasonal influence on population dynamics, while negative correlations with conductivity, pH, and volume indicate preference for warmer and less diluted in this specific conditions of study. Similar densities across both bromeliads point to ecological generalism, reinforcing the species' adaptability and

the value of phytotelmata as micro-scale ecological models.

Keywords: Rotifer, Aquatic microhabitats, Biodiversity

Rotifer Fauna (Monogononta) In 83 Shallow Lakes along a latitudinal gradient in South America

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The richness and density of Rotifer and limnological features were studied in 83 lakes located from 5° to 55° S in South America. The lakes were grouped in five regions, tropical-I (19 lakes), tropical-II (19 lakes), subtropical (18 lakes), temperate (16 lakes), and tundra (11 lakes). The lakes were sampled between 2004 and 2006. A total of 261 rotifer taxa belonging to 37 genera were found, with a predominance of the families Brachionidae, Trichocercidae and Lecanidae. Species of the genus *Macrochaetus* were only observed in tropical regions (I and II), while species of the genus *Notholca* in the tundra. Eleven species were found in all regions (*Brachionus angularis*, *B. calyciflorus*, *B. caudatus*, *B. quadridentatus*, *Keratella americana*, *K. cochlearis*, *K. tropica*, *Lecane bulla*, *L. leontina*, *Plationus patulus* and *Testudinella patina*) whereas 177 taxa were registered in just one of the regions. Between 6 and 29 rotifer species were found per lake, with significant differences in richness and density among

regions. Subtropical and temperate lakes had significantly higher values, respectively, of richness (122 taxa) and density (average 1,455 ind.m⁻³) ($p < 0.05$, KW). While species richness was positively correlated with floating plant density, a stepwise linear regression showed chlorophyll-a, pH and organic matter as the best predictors for rotifer density. As other plankton components (bacterioplankton, phytoplankton) studied in this large-scale latitudinal gradient, the rotifer fauna seemed to be predominantly structured locally by environmental factors. However, some rotifer species appear to have latitudinal limits of occurrence, as seen in the northern hemisphere.

Keywords: Neotropical region, Shallow lakes, Tropical

Effect of laying order on offspring reproductive mode in relation to the nongenetic transgenerational inhibition of sex in *Brachionus plicatilis*.

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A nongenetic transgenerational inhibition of sexual reproduction in *Brachionus plicatilis* was confirmed in previous studies. Nevertheless, the underlying mechanism of this transgenerational effect remains unclear. One possibility that has been proposed is that this effect could be mediated by cytoplasmatic cellular components (e.g., nutrients, metabolites, or hormones), which may be passed from mothers to daughters, gradually decreasing in concentration and thereby diminishing their inhibitory effect transgenerationally. This would imply an increasing sexual response across generations. Worth mentioning, such a mechanism would also work among the whole offspring within a given generation, leading to a reduction of the concentration

of the metabolite responsible for the inhibitory effect on sexual reproduction with each subsequent egg-laying (i.e., with laying order). If so, this would imply an increasing sexual response with laying order, thereby increasing sexual response in later-laid offspring within the same generation. In this study this prediction was tested by quantifying the proportion of sexual reproduction in the offspring of rotifer females from the first and tenth generations after hatching from the diapausing egg in several clones of *B. plicatilis*. Results showed that sexual reproduction was indeed higher in the tenth generation compared to the first, reconfirming the nongenetic transgenerational inhibitory effect. However, no differences in the sexual response were observed across the laying order within either generation. These findings do not support the hypothesis of a control mechanism for this transgenerational inhibitory effect mediated by cytoplasmatic components being transferred from mother to offspring. Keywords: Transgenerational effect, Sexual reproduction, Cytoplasmatic cellular components

Rotifers in Albufera lagoon (Valencia, Spain) main changes during last decades.

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1. University of Valencia, Paterna - Spain. Located by the Mediterranean coast (eastern Spain), near the city of Valencia, L'Albufera de Valencia is the largest shallow oligohaline lagoon of Spain. It has an area of about 22 Km² and an average depth lesser than 1 m. surrounded mostly by rice fields, which remain as wetlands during winter; but also by densely populated cities causing urban and industrial impacts. Before the 1960s, the lake was mesotrophic, dominated by rooted submerged macrophytes and the water was clear, zooplankton was diverse with abundant crustaceans. Later, as a consequence of uncontrolled discharge of urban, agricultural and industrial

wastewater, the lake became hypertrophic, reaching high chlorophyll concentrations during the 1980-90s. The lake became dominated by phytoplankton entering in a turbid phase; that resulted in the macrophytes loss; rotifers dominated the zooplankton and cladocerans were very scarce. In 1986 the area was protected and declared a Natural Park. The diversion of effluents, from populations and industries, to sewage treatment plants were slowly improving the water quality and decreased the turbidity of the water. However, a large amount of nutrients and other pollutants are still stored in the lake sediments. During the 2010s, macrophytes began to recolonize the lake, cladocerans increased in diversity and density, but the lake was still dominated by rotifers and cyclopoids. Throughout this period, rotifers dominated the zooplankton but there were important changes in their specific composition, although generally with *Keratella* and *Brachionus* as the most important genera and with the appearance of exotic species in recent years.

Keywords: Hypertrophic, Diversity, Exotic

Host preference of epizoic bdelloid rotifers

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Several species of rotifers live as epibionts on other aquatic invertebrates. However, this type of association has never been thoroughly studied. This work aimed to observe these associations and understand the reasons behind host selection by rotifers. By analyzing various potential hosts in different freshwater ecosystems, the study explores whether bdelloid rotifers exhibit specific preferences for certain hosts or if these associations are more opportunistic. Phylogenetic relationships among various potential host organisms were reconstructed, using a genetic approach, to understand how much phylogenetic signal influences these relationships.

Differences between sampled habitats (lentic and lotic environments) were also considered to evaluate the impact of the environment on host selection. A combination of ecological and phylogenetic analyses was employed to test for host specificity, revealing a significant influence of evolutionary relationships and habitat type on rotifer-host interactions. The findings suggest that while some invertebrate species are frequently selected by bdelloid rotifers (e.g., Trichoptera and Asellidae), others appear to be avoided (e.g., Platyhelminthes and Annelida), indicating selective attachment behaviour. This study helps to fill a gap in knowledge regarding symbiotic relationships between bdelloid rotifers and their hosts and provides insights into the ecological and evolutionary dynamics underlying these interactions.

Keywords: Bdelloidea, Epibiosis, Preference

Ecological and genetic patterns in selected rotifers (Rotifera) from a high-altitude lake in Mexico

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Rotifers are a polymorphic taxonomic group with a global distribution. This group also has some endemic species and taxa with restricted distribution. Their high sensitivity to environmental stress makes them model organisms for ecological, ecotoxicological and evolutionary studies. Abiotic factors such as temperature, pH, salinity, and nutrient concentrations exert a considerable influence on their taxonomic diversity and population abundances. The DNA analysis of rotifers yields information for evolutionary relationships both within and between species, which reveals the presence of cryptic species. Furthermore, the utilization of molecular markers facilitates our understanding of phylogeography and molecular ecology. These in turn are

helpful for estimating distribution, diversity, and responses of these organisms to alterations in environmental conditions. More than 400 rotifer species have been recorded from Mexican waters. In addition, the occurrence of cryptic species in different taxa suggests that the total number of species may exceed 600. The present study investigated populations of *Keratella cochlearis* Gosse, 1850, *Lecane closterocerca* (Schmarda, 1859), *Trichocerca porcellus* (Gosse, 1851), and *Trichotria tetractis* (Ehrenberg, 1830) from a high-altitude waterbody (Del Llano Reservoir, Villa del Carbon, Mexico) through seasons. Our data showed a significant influence of temperature, dissolved oxygen and nutrient levels on the species distribution. Further, mitochondrial cytochrome c oxidase subunit I (COI) marker revealed temporal variations in genotypes of the studied taxa, particularly for *T. tetractis*.

Keywords: Taxonomy, rotifers, cryptic species, species diversity, DNA analysis, COI.

Do Rates of Genetic Divergence Differ Between Gnesiotrocha and Pseudotrocha?

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Variation in genetic divergence across rotifer clades offers insights into their evolutionary trajectories. This study compares divergence patterns between Gnesiotrocha and Pseudotrocha, two superorders that differ in ecological and life history traits. Gnesiotrocha often includes sessile or colonial species with limited dispersal potential, whereas Pseudotrocha comprises more planktonic forms with broader dispersal capabilities—traits likely influencing gene flow and speciation. We analyzed rotifer cytochrome oxidase subunit I (COI)

sequence data from GenBank and newly obtained collections, calculated haplotype diversity and estimated the time to the most recent common ancestor (MRCA), and applied species delimitation methods (GMYC, bPTP, ABGD, and K θ) to identify putative cryptic species. Preliminary results showed minimal differences in the mean metric values between the two clades. For instance, the number of haplotypes ranged from 17 to 54 for *Gnesiotrocha* and 13 to 42 for *Pseudotrocha*, and the mean number of putative cryptic species was 8 and 6, respectively. The MRCA was 59 for *Gnesiotrocha* versus 51 for *Pseudotrocha*. However, since geographic ranges varied among species, as did the number of populations sampled and total number of sequences, the genetic diversity within and among species may be underrepresented, potentially obscuring true evolutionary patterns and limiting comparability. Future studies incorporating broader geographic sampling and additional genomic markers may provide more robust insights into divergence rates, genetic structuring, and speciation processes in monogonont rotifers.

Keywords: cryptic species, diversification, haplotype diversity, MRCA, species delimitation

Rotifer communities in subtropical ponds under different land-use intensities

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Small water bodies such as ponds have a disproportionate role in biodiversity. They can often mitigate the effects of floods/droughts, and play a crucial role in the global carbon cycle. In Uruguay (30°-35°S, 53°-58°W), thousands of rural ponds have been constructed over the past two decades to water livestock and support small-scale crop irrigation. However, their functioning and contribution to local biodiversity are largely unknown. Due to land use intensification, many of these systems experience eutrophication, with loss of taxonomic and functional richness. To investigate this, we studied rotifer communities in 30 artificial ponds with contrasting land-use intensities, aiming to understand how landscape and local environmental factors—including trophic interactions—shape rotifer community structure. We selected five pondscapes with six ponds each, three in micro watersheds with intensive land use (e.g. intensive livestock activities on pastures), and three in low-medium land-use areas (e.g. extensive livestock and grasslands). We sampled the Rotifer community by pooling depth-integrated water samples along transects covering both pelagic and macrophyte-dominated areas (5 litres, 30- μ m mesh size). Additionally, we measured multiple physico-chemical parameters (temperature, pH, turbidity, dissolved oxygen, conductivity, organic matter and nutrient concentrations), and biological variables (fish, macroinvertebrates, phytoplankton and macrophytes communities). Rotifer richness was similar between high and low-intensity land use, and biomass was higher in the intensive land-use ponds. By evaluating the impact of land-use intensity, the findings are expected to provide valuable insights for effective management and conservation

of aquatic ecosystems in the face of ongoing environmental changes.

Keywords: Subtropical, Land-use, Ponds

Indirect effects of the predator *Eucyclops serrulatus* on two species of *Brachionus* (*B. calyciflorus* and *B. havanaensis*) (Rotifera)

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Direct or indirect effects of predation are important in structuring zooplankton communities. The presence of predators such as copepods can also alter the morphology and/or demography of their prey, cladocerans and rotifers. There are around 17 species of *Eucyclops* found in Mexico. *Eucyclops* effectively feeds on algae and smaller zooplankton such as rotifers. Here we present data on the indirect effects (ID) of *Eucyclops serrulatus* on the morphology and demography of *B. calyciflorus* and *B. havanaensis*. We performed a population growth experiment where we placed rotifers at a density of 1 ind. ml⁻¹ in transparent jars with 130 ml EPA medium with 1x10⁶ cells ml⁻¹ of *Chlorella vulgaris*. The copepods were separated by a small cage containing a 50 µm mesh to allow the medium to interchange with the rotifer. We placed two copepods in each cage with four replicates each. For controls we placed an empty cage in the test jar. Weekly, five rotifers were taken out from each replicate to perform morphometric and geomorphometric analyses. We found that the presence of female *E. serrulatus* reduced the growth rate of *B. havanaensis* by 32% and a 5% of *B. calyciflorus*. We did not observe morphometric responses in *B. calyciflorus* and *B. havanaensis*. The results of the study have been discussed with emphasis on the differences in the response of prey to predators with respect to their susceptibility to predation.

Keywords: Predation, Demography, Morphometry

Seasonal snow patches in temperate climate: ephemeral cryohabitats where bdelloid rotifers thrive

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Seasonal snow patches (SSP) in the lowlands of temperate Europe are cryosphere components characterized by a short period of existence (late winter–early spring), frequent freeze–thaw cycles, and fragility due to rising temperatures worldwide. Although cold ecosystems are known habitats for rotifers, snow in temperate lowlands has not yet been investigated. To fill this knowledge gap, we sampled snow at 40 sites in coniferous and mixed forests across Baltic region (Lithuania, Latvia, Estonia) and analysed diversity of snow-dwelling bdelloid rotifers (Bdelloidea, Rotifera) using both microscopy and DNA-based approaches. We examined the abundance and biomass of snow algae and bacteria, likely food source for rotifers, along with characteristics of the surrounding environment that might shape the occurrence, diversity, and spatial distribution of snow metazoans. Bdelloids predominate over other invertebrates, accounting for more than 50 % of the community in most samples and reaching densities of over 4,000 ind·m⁻². The certain specificity of bdelloid assemblages in SSP was revealed, implying presence of little-known and rare taxa absent from surrounding habitats, alongside regular limno-terrestrial species. Although rotifers are presumed to originate from tree canopies above SSP, only a weak correlation was found

between rotifer abundance and canopy shading, supporting the role of long-distance dispersal. We assume that bdelloid rotifers benefit from conditions on the snow surface, i.e. formation of a water film during positive early spring temperatures, presence of primary producers, and nutrients deposited from the surrounding environment.

Keywords: Bdelloidea, Cryosphere, Diversity

A phylum in the making: How many rotifer species are there?

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Despite their importance in ecological research and applied sciences, the number of rotifer species remains unknown, with current estimates relying on outdated expert judgements. To assess the completeness of rotifer taxonomy and estimate total species richness, we compiled a comprehensive dataset of validly described species from 1758 to 2023. This dataset includes 2,912 species, based on the List of Available Names in Zoology (for taxa up to 1999) and the Catalogue of Life (for recent descriptions). We applied various extrapolation approaches to project species richness by 2100, including robust linear and quadratic regressions and generalized additive models (GAMs). In addition, we used a multimodel averaging framework combining three nonlinear models—negative exponential, rational, and Chapman—with AICc-weighted averages to estimate final richness values. Linear models projected between 4,254 and 4,476 species, quadratic

models between 3,194 and 3,460, and GAMs between 2,702 and 3,546, all based on lower and upper confidence limits. The model average indicated that approximately 2,520 species remain to be described by 2100. These findings reveal substantial gaps in our knowledge of rotifer diversity and reflect the historical dynamics of taxonomic discovery within the group. Given the likely presence of cryptic diversity, our results underscore the importance of continued support for integrative taxonomy in Rotifera biodiversity research.

Keywords: Taxonomic effort, Species discoveries, Extrapolation models

Migration of zooplankton species by endozoochory of migratory birds

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Endozoochory is the internal transport of dispersal stages via animals. In Aguascalientes, Mexico, reservoirs often host migratory birds from North America, raising the possibility that these birds contribute to zooplankton dispersal across aquatic systems. To evaluate this, diapausing eggs extracted from collected fecal samples of migratory birds in five representative sites were incubated to assess hatching success and potential colonization. A total of 13 rotifer and 3 cladoceran species were identified in sediments and fecal samples. The species that most hatched from fecal samples were the rotifers *Brachionus calyciflorus*, *Filinia terminalis*, *Bdelloidea* sp., and the cladocera *Moina micrura*. Furthermore, a morphotype of the *Brachionus* genus with unique ornamentation was observed only in fecal samples. These results emphasize the evolutionary value of diapausing eggs by enabling passive dispersal and long-term

survival of zooplankton species and suggest that some species may exhibit greater resilience to environmental changes. The successful hatching of multiple species indicates that endozoochory, though limited, can facilitate zooplankton exchange. However, the low overall success rate aligns with the idea that aquatic communities tend to resist excessive species turnover, likely as a safeguard against ecological imbalance.

Keywords: Dispersion, Rotifers, Hatching rate

Tiny animals, big message: rotifers from the Cuiabá River basin highlight the ecological importance of the Pantanal

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The Cuiabá River is a key freshwater system in Mato Grosso, Brazil, supplying drinking water to several cities and supporting regional water security. It also plays a crucial role in sustaining the Pantanal, one of the world's largest and most biodiverse wetlands. This study aimed to conduct a preliminary assessment of rotifer communities along the Cuiabá River Basin. Three seasonal samplings were conducted in February, May, and August 2025 at eight sites. Sampling sites followed a longitudinal gradient along the Cuiabá River Basin, ranging from areas near the headwaters to the lowlands where the river merges with the Pantanal floodplain. A total of 84 rotifer species were identified, across 33 genera, plus bdelloids classified only at the class level. ANOVA (Analysis of Variance) results showed significant differences among sites, but not among sampling periods. Sites 7 and 8 (only sites were entirely located within the Pantanal) stood out markedly. Site 8 showed the highest mean density (11,305.17 ind.m⁻³), species richness (33.3), and Shannon

diversity index (2.31), followed by site 7 (7,297.56 ind.m⁻³; richness 26; Shannon 2.17). In contrast, the other sites showed much lower densities (<2,200 ind.m⁻³), richness (<17 species), and Shannon diversity (<2). Evenness ranged from 0.52 to 0.76 across the basin. These findings highlight the Pantanal's role as an environmental buffer, pollution attenuator, and crucial freshwater reserve. Our results reinforce the urgent need to recognize, preserve, and integrate this unique wetland into broader water management and conservation strategies, especially in the face of growing anthropogenic pressures.

Keywords: Zooplankton, Climate crisis, Conservation

eDNA metabarcoding versus classical survey methods for biodiversity monitoring

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Biodiversity knowledge is a crucial component in the understanding of ecosystems stability and resilience. Traditionally biodiversity research depends on classical taxonomy based on morphological traits, which lately we tend to neglect as a non-rewarding task gaining the title 'Cinderella science'. This tendency is supported by advancements in molecular methods promising an easy and quicker way for recording and monitoring biodiversity through the use of eDNA. The present study aimed to compare the use of eDNA versus classical taxonomy in effectively identifying the rotifera biodiversity in a freshwater ecosystem. For this, seasonal samples were collected from Lake Volvi (40°40'37.57" - 23°28'50.61"), Northern Greece. Results revealed both overlapping and unique species detections between the two approaches. Classical microscopic identification based

on morphological features identified 32 rotifer species, while the analysis of the eDNA samples targeting the COI gene identified 16 species; including three bdelloids which through microscopy were only identified as Bdelloidea. Seven species were identified with both approaches, while 22 taxa were identified only through microscopical analysis and nine taxa were only identified through eDNA analysis. Although eDNA and other molecular techniques might enhance biodiversity studies, they depend on the groundwork laid by classical taxonomy to ensure accuracy and reliability. It is thus clear that classical taxonomy remains a fundamental pillar of biodiversity providing the framework for identifying, naming and classifying organisms. However, so far, the findings of the present study indicate the potential of integrating molecular tools into biodiversity monitoring, as has already been done successfully in species (re)descriptions.

Keywords: Morphological identification, eDNA, Freshwater

Effects of irradiation with different light wavelengths on the hatching of zooplankton diapausing eggs

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One major consequence of increased anthropogenic activity in the last century is ozone layer depletion, leading to greater sunlight exposure. Sunlight includes a range of wavelengths that can differently affect organisms, including the diapausing eggs of zooplankton. These eggs are a dormancy strategy produced by rotifers and cladocerans, two major zooplankton groups, triggered by unfavorable environmental conditions such as drought, predation, or pollution. Acting as a genetic reservoir, they are energy-rich, long-lasting, and hatch only when specific

cues indicate suitable environmental conditions. Their role is vital for zooplankton population recovery and ecosystem resilience, as zooplankton link primary producers to higher trophic levels and contribute to nutrient cycling. This study examined the effects of different light wavelengths on the hatching of diapausing eggs from the rotifer *Brachionus calyciflorus* and the cladocerans *Moina macrocopa* and *Simocephalus mixtus*. To achieve this, eggs placed randomly and individually in 96-well polyethylene plates were exposed to white (5287 lux), black (66.3 lux), and blue light (15.1 lux) under a 16:8 photoperiod at 20°C for 15 days. Results showed that the highest hatching rate occurred under blue light, reaching 15.6% around eight days, whereas white light produced the lowest hatching rate—only 8.8% over ten days. Although these results lead to better understanding of the dynamics behind ecosystems and sunlight irradiation, where the naturally occurring conditions appear to negatively impact the species studied, more experiments with different light wavelengths and other species are needed to comprehend the variability within hatching patterns as evolutionary mechanisms of zooplankton species.

Keywords: *Brachionus calyciflorus*, Hatching rate, Day of hatching

Competition and niche differentiation of two cryptic rotifer species.

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Understanding species coexistence is a central goal in community ecology. In three experiments, we investigated how two rotifer species from the same cryptic species complex that differ in their temperature tolerance are able to coexist: *Brachionus calyciflorus* (heat tolerant) and *B. fernandoi* (heat-sensitive). In the first

experiment we tested competitiveness at 12, 15, 18, and 20°C using two clones of *B. calyciflorus* (exclusively asexual, potentially sexual) and one clone of *B. fernandoi* (potentially sexual) to test whether the heat-tolerant species was inferior to the heat-sensitive species. We found that *B. fernandoi* was inferior to *B. calyciflorus* at almost all temperatures and developed lower population densities. It was also partially excluded by the exclusively asexual clone. The second experiment tested for the propensity for sex of the two potentially sexual clones at the same temperatures and found an overall inferiority of *B. fernandoi*, which invested less in sexual reproduction than *B. calyciflorus*. In the third experiment, we studied the hatching pattern of the resting eggs of both species (two clones each) by using a dynamic temperature change. We found that the resting eggs of *B. fernandoi* hatched between 5 – 15°C, while the resting eggs of *B. calyciflorus* hatched between 15 – 25°C, allowing *B. fernandoi* to develop population growth in the absence of the superior species. Combining all growth and life history data, we conclude that sympatric niche differentiation is driven by temperature-dependent responses in population growth, mixis induction and hatching, and that this mechanism enables the two species to coexist.

Keywords: *Brachionus*, Coexistence, Resting eggs

Towards a consensual framework of guidelines for taxonomic descriptions in Rotifera

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Rotifers are abundant and ecologically significant freshwater, marine and terrestrial organisms, many of which have peculiar features that warrant their use in ecological studies and as biological test

organisms. Basic knowledge on taxonomy, and in particular species descriptions that enable recognition of basic taxa, are a prerequisite for their application in applied studies, biodiversity research and for building molecular sequence libraries for the application of methods such as environmental DNA. However, the “taxonomic impediment” is particularly relevant for rotifers. To contribute to overcome this issue and to facilitate taxonomic and descriptive work on the group, we invite colleagues to collaborate in developing a framework for rotifer taxonomic descriptions. This framework would contain an overview of mandatory elements as well as a list of morphological and other characters deemed essential or desirable for effective species diagnosis and recognition.

Keywords: Taxonomy, Nomenclature, Biodiversity

Zooplankton functional traits and species diversity in the assessment of the functioning of shallow water bodies

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Rotifers, cladocerans and copepods are the main freshwater zooplankton groups and play an important role in the foodwebs of shallow and deep standing waters, influencing biotic interactions and ecosystem functioning. At the species level, zooplankton are adapted to survive under demanding conditions through various morphological, physiological, behavioral or life-cycle traits, while functional traits summarize their responses within biotic interactions and

surrounding environment. In this study we will present ecosystem functioning of shallow water bodies along trophic and latitudinal gradients based on the assessment of the functional traits (e.g. feeding, survival strategy) and species diversity approach, simultaneously determining environmental drivers. Zooplankton sampling was conducted during the unvegetated seasons (early spring, late autumn) in the latitudinally distant two groups of shallow water bodies in Europe (northern vs. southern), within slightly different climate conditions. Despite pronounced differences in some abiotic water characteristics between the two regions, zooplankton trait-based indices exhibited a consistent pattern. This uniformity was likely driven by low habitat heterogeneity, resulting from the absence of macrophytes and limited food availability during the colder seasons. At the species level, the percentage of common rotifer taxa remained similar across both seasons, however, there were marked differences in the composition of distinct species communities. Comparing species-level and functional trait assemblages is a valuable approach for predicting the impacts of climate change and biodiversity loss, particularly in highly threatened freshwater ecosystems.

Keywords: Gradient of environmental factors, Feeding and Habitat type, Ecosystem functioning

Bet hedging and phenotypic plasticity in the exit from rotifer diapause: the joint expression of evolutionary strategies in time-varying environments

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Time-varying environments pose substantial challenges to organisms, which may evolve adaptive strategies, such as phenotypic plasticity or bet

hedging. While plasticity is expected to evolve in predictable environments, bet hedging is favoured under unpredictable conditions. However, environmental variability typically includes both predictable and unpredictable components, potentially selecting for mixed strategies. Here, we empirically address the co expression of phenotypic plasticity and bet hedging in traits related to diapause exit in *Brachionus plicatilis* clones from populations across a natural predictability gradient. We monitored hatching dynamics of diapausing eggs from these clones under six experimental salinity treatments, considering salinity a potential environmental cue. For each clone, we estimated four diapause-exit-related traits: the hatching time (and its variation), the hatching fraction, and the Environmentally Standardized Plasticity Index (ESPI) of the hatching fraction. Across populations, lower salinities led to higher hatching fractions and shorter hatching times, while higher salinities delayed hatching. Hatching fraction and variation in hatching time were positively correlated, suggesting alternative bet-hedging strategies shaped by distinct sources of unpredictability. ESPI was positively related to hatching fraction and negatively to variation in hatching time, supporting the idea that phenotypic plasticity and bet hedging represent alternative adaptive strategies, whose relative importance may vary according to environmental predictability. ESPI was also significantly associated with an environmental predictability index. Overall, our findings indicate that mixed strategies involving both phenotypic plasticity and bet hedging may evolve in response to the reliability of diapause-exit cues, underscoring the importance of considering the multicomponent nature of environmental variability in evolutionary ecology.

Keywords: Bet hedging, Phenotypic plasticity, Diapause

Where are Bdelloid rotifers in the Snowy mountains during the summer? — Life Strategies of cold-adapted Bdelloid rotifers in Alpine Environments.

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Bdelloid rotifers are microscopic invertebrates with a cosmopolitan distribution. Their ability to enter cryptobiosis—a reversible state of suspended metabolism—enables them to survive in extreme environments, including polar regions and snow-covered alpine habitats. Despite their resilience, studies on bdelloid rotifers inhabiting alpine snowfields remain limited, and many species in these environments have yet to be taxonomically described. Furthermore, their ecological traits and survival strategies under such conditions are poorly understood. In Antarctic species, where low temperatures persist year-round, ecological adaptations to cold environments have been well documented. In contrast, little is known about species inhabiting regions with seasonal snow cover that are subject to high summer temperatures. In this study, we investigated the ecological adaptations of bdelloid rotifers collected from the seasonal snowpack of a Japanese alpine region, which experiences extensive snow cover during winter and summer temperatures exceeding 30°C. Culture experiments indicated that the isolated species is psychrophilic, exhibiting growth only under low-temperature conditions. To determine how these rotifers persist during the summer months, we tracked their distribution following snowmelt. Although individuals initially migrated into the soil, their abundance declined with increasing temperature. In contrast, relatively stable populations were observed in mosses and lichens on tree bark until the return of winter snowfall. These results suggest that bdelloid rotifers inhabiting alpine snow environments likely

survive the summer by entering dormancy within epiphytic mosses, which may serve as refugia during periods unsuitable for active life.

Keywords: Bdelloid rotifers, Life strategies, Alpine environments

Combined approaches to the phylogeny of the Gnesiotrocha

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Within phylum Rotifera (*sensu stricto*), Superorder Gnesiotrocha comprises a large taxon whose members have diverse morphologies (suspension v. raptorial feeders) and lifestyles (sessile v. swimming; solitary v. colonial). However, relationships within this group are not fully resolved. We used whole genome sequencing and multiple single gene markers to investigate relationships among representatives of the major taxa. Genomes were sequenced on an Oxford Nanopore MinION, assembled using FLYE, and polished using RACON. We extracted conserved, predicted protein coding regions using BRAKER2, which were analyzed by OrthoVenn3 to find conserved, single-copy protein clusters. Proteins within each cluster were aligned using MAFFT, trimmed, and concatenated using an in-house python script. Single gene markers (18S, COI, ITS) of >1600 GenBank sequences from >50 species plus our sequencing efforts were also aligned and concatenated. We then used Bayesian inference for phylogenetic reconstructions. Whole genome sequences of 2,116 conserved genes from six taxa, showed *Sinantherina socialis* and *Lacinularia flosculosa* as sister taxa with *Conochilus unicornis* forming one clade; another clade

comprised *Filinia longiseta* and an unnamed *Hexarthra* sp. Preliminary results of single markers showed high resolution and strong support using ML and Bayes within the *Collotheca*, *Conochilus*, *Filinia*, *Hexarthra*, *Limnias*, *Sinantherina*, and *Testudinella* genera for both 18S and COI genes, while relationships within other taxa remained unresolved. Efforts are underway to increase taxon sampling and to develop new sets of genome markers (UCEs). This study improves knowledge of gnesiotrochan genetic diversity, which will ultimately aid in our understanding of their evolutionary position within Metazoa.

Keywords: Bayesian phylogenetics, Phylogenomics, Whole genome sequencing

Bdelloid Rotifer Diversity in China: Spatial Patterns and Driving Factors

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China is one of the most biodiverse countries worldwide, with various landforms and climatic conditions. However, the diversity and biogeographic patterns of bdelloid rotifers remain poorly studied across the country. To reveal the spatial patterns of bdelloid rotifer diversity in China and identify their driving factors, samples were collected from 1306 sites spanning 25 provinces between September 2017 and December 2024. A total of 203 bdelloid rotifer species were identified, including two new species, 13 suspected new species and 143 new records. We obtained more than 500 COI sequences from 16 species collected at 17 sites in China for genetic diversity and phylogeographic analyses. Also, we investigated habitat preferences of bdelloid rotifer morphological species and cryptic species, revealing their patterns of species diversity, genetic diversity, and community assembly mechanisms across

different regions and habitats, along with associated driving factors. At macroscales, Chinese bdelloids diversity was influenced by geographic locations, wind speed, and annual rainfall, while island populations showed correlations with island area, isolation degree, wind speed, and temperature. At microscales, moisture content, total organic carbon, total nitrogen, and total phosphorus emerged as key factors structuring rotifer communities in mosses, leaf litter, soil, and aquatic habitats. Furthermore, we characterized the diversity of rotifer-associated bacterial communities, developed an effective synthetic medium for culturing *Adineta vaga*, and successfully isolated 20 bdelloids-associated bacterial strains. The findings confirm high species diversity of bdelloid rotifers and provide important insights into biogeographic distribution patterns and its formation mechanism of bdelloid rotifers in China.

Keywords: Bdelloidea, Diversity, Biogeographic pattern

Food Algae drive the Propensity for Sex in *Brachionus fernandoi*

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Parthenogenetic rotifers can switch from asexual (amictic) to sexual (mictic) reproduction which is often induced by high population densities. Laboratory observations showed that *B. fernandoi* exhibited a different mixis behaviour when fed with the green alga *Monoraphidium minutum* or with *Cryptomonas* sp. This phenomenon was studied in a series of experiments to enlighten the effect of the food algae. 1) *B. fernandoi* was reared at very low densities (no mixis) either with *M. minutum* or with *Cryptomonas* sp. and then animals from the F2-generation were either kept at their food alga or transferred to the other food alga. The propensity for sex, i.e. the number of animals at which the first sign of mixis occurred, was recorded. All animals that remained at

Cryptomonas food became mictic at comparably low densities whereas animals continuously grown with *M. minutum* remained mostly amictic. Switching from *M. minutum* to *Cryptomonas* led to a delay in mixis induction and animals experienced a switch from *Cryptomonas* to *M. minutum* either became mictic at low densities or remained amictic. 2) We added either 20% *Cryptomonas*, shredded *Cryptomonas* or filtrate from shredded *Cryptomonas* to *M. minutum* food and in all treatments the propensity for sex was similar to a pure *Cryptomonas* treatment indicating that small amounts of *Cryptomonas* are sufficient for mixis induction. 3) Testing further food algae we found highest propensity for sex for *Cryptomonas* food compared to diatoms or further green algae. These results reveal that food quality also affects mixis induction in *B. fernandoi*.

Keywords: Mixis induction, Food quality, Reproduction

Determination of rotifer diversity and trophic status with various indices in a deep dam lake: Hirfanlı dam example-Ankara/Türkiye

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Rotifera group has an important role in biological monitoring of aquatic habitats and evaluating trophic status. Rotifers are very sensitive to environmental change. Therefore, they are used as an indicator of eutrophication in freshwaters. Hirfanlı Dam, a deep lake, is a dam for electricity production and flood control. The dam lake area is 263.00 km² and its average

depth is 50 m. This study was carried out in Hirfanlı Lake between July 2017 and May 2018 (Winter, spring and summer seasons). Samples were collected horizontally and vertically from 5 different sites of the Lake. Rotifers were collected using Hydro-Bios plankton net with 55 µm mesh and fixed with 4% formaldehyde. In all 28 rotifer species were identified in the study. The dominant species of the lake are *Keratella cochlearis*, *Keratella quadrata* and *Polyarthra dolichoptera*. Eleven species identified in this study are new records for the region. Temperature ranged from 5.1-25.6 °C, oxygen 7.8-14.0 mg/L, pH 8.14-9.36, oxygen saturation was 94-138%, salinity was ‰ 0.6-0.8, conductivity was 1612-1683 (µS, 20 °C), Secchi disk was 0.9-8.0 m, and depth was 5.0-9.0 m. The Shannon–Wiener diversity of Rotifera was 1.88 in March 2018 and minimum 0.34 in July 2017. The sabrobic index varied between 1.5 and 1.8, and the lake showed oligosaprobic property in May 2018 but β-mesosaprobic in other months. Sládeček's *Brachionus*: *Trichocerca* quotient (QB/T), indicated the mesotrophic trophic status. According to the TSIROT index, March 2018 and July 2017 showed mesotrophic/meso-eutrophic, May 2018 showed mesotrophic, and March 2018 showed meso-eutrophic/eutrophic.

Keywords: Dam Lake, Rotifera, Trophic State

Session 1: Biodiversity and Ecology (Poster presentation)

Assessment of the response of rotifers to an extreme drought event in artificial ponds

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In Uruguay, there are numerous shallow artificial ponds whose construction has increased notably in recent decades. In

these systems, rotifers play a key role in trophic networks and maintain a resting egg bank in the sediment, capable of hatching when environmental conditions become favorable. In the context of climate change and intensive land use, it is essential to understand how this community responds to disturbances such as drought or eutrophication. Additionally, during drought events, these ponds are often anthropogenically modified by sediment removal to increase depth, which may negatively affect the dormant egg bank. This study aimed to determine the structure of rotifer communities in artificial ponds under high and low land use intensity, and to analyze the factors shaping their composition before and after an extreme drought event. Physicochemical variables were measured, and the active rotifer community was collected by water filtration, while the dormant community was extracted using sucrose flotation. Following the drought, a general reduction in richness was observed, with greater losses in low-use ponds, which had initially higher diversity, while high-use systems were already impoverished. Regarding the resting stages, egg counts were lower in ponds subjected to sediment removal. These results indicate that low-use systems, although starting with higher diversity, experienced losses that brought them to a similar state as intensively managed ones. The latter, already impoverished, showed little loss but no sign of recovery. The outcome reflects a downward homogenization, signaling widespread diversity loss under extreme events.

Keywords: Climate change, Extreme drought, Rotifer resilience

Dissecting dispersal traits in rotifers diapausing eggs

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Diapausing eggs are critical life-history stages in rotifers, acting as dispersal units and enabling population persistence under adverse conditions. Despite their ecological importance, the genetic basis underlying phenotypic variation in diapausing eggs remains largely unexplored. This study integrates phenotypic characterization and genome-wide association studies (GWAS) to investigate dispersal-related traits in diapausing eggs of the monogonont rotifer *Brachionus plicatilis*. Phenotypic traits related to dispersal potential, including egg size, shape, and buoyancy were quantified on lab-produced diapausing eggs belonging to 40 clones. High inter-clonal variability suggested a heritable basis for these traits. Additionally, clones were genotyped via high-throughput sequencing, yielding a dataset of over 150,000 high-quality SNP markers. GWAS analyses identified significant associations between specific loci and dispersal-related traits, particularly egg size and lipid content. This work represents one of the first GWAS applications targeting diapausing egg traits in aquatic microinvertebrates and provides insights into the genetic architecture governing dispersal strategies in rotifers.

Keywords: GWAS, Morphology, Buoyancy.

Salinity determines the diversity of rotifers on the coasts of Río de La Plata (Uruguay)

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Estuaries are subject to high environmental variability in space and time, which determines the structure of planktonic communities. The objective of this study was to characterize rotifer dynamics along almost 6 years and their

relationships with environmental conditions in a coastal, mixohaline zone of the Río de la Plata, Uruguay. Two sites 500 m from the coast were selected in Punta del Tigre, San José. Sampling was carried out bimonthly (spring and summer) and quarterly (autumn and winter) from November 2014 to July 2019 (n=32). The study area was shallow (<4 m), oligohaline, and meso-eutrophic. It presented marked variations in conductivity and temperature over time. Long periods of very low conductivity alternating with high conductivities for short periods were observed. A total of 46 taxa of the Rotifera phylum were recorded. The occurrence of species recorded with biomass $\geq 5\%$ of the total responded to variations in conductivity, with greater dominance and richness of rotifers under low conductivity conditions. The rotifer community showed differences in its biomass across all samples. Conductivity and temperature were key variables explaining the differences in biomass and diversity of the rotifer group. Keywords: Estuary, Conductivity, Coast

Can inter-basin water transposition influence similarity of rotifer communities in reservoirs in Southeast Brazil?

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Brazil has many river basins harboring several reservoirs that host a rich zooplankton diversity. Despite this, they may undergo homogenization and non-native species spread due to water transpositions. Here, we assessed

whether hydrological connectivity through water transposition affects rotifer richness and community similarity among six reservoirs (two originally in the Paraíba do Sul River basin (PSR); and four in Guandu River basin (GR)) using samples collected between 2011 and 2014. We hypothesized that rotifer communities of reservoirs connected by the transposition would show greater similarity than those located upstream waters transposition. Also, we expect to find differences in species composition between reservoirs and basins. 71 rotifer species were identified, most of them from the Brachionidae family. The major richness was found in GR, influenced by the upstream reservoir. Moreover, using PERMANOVA analysis, we found significant differences for community composition between reservoirs and basins. Furthermore, the Jaccard similarity indices showed that reservoirs that receiving direct input from the water transposition were more similar to each other than upstream reservoir in GR. However, interestingly, both reservoirs in the PSR showed greater similarity with the last reservoir linked by water transposition (GR), suggesting that hydrological connectivity can influence the biotic homogenization process. Our findings highlight that inter-basin transfers can reduce ecological and taxonomic distinctiveness across freshwater systems, with implications for biodiversity conservation and management in highly regulated tropical basins. These results should be related to local environmental and to reservoirs morphometric characteristics to understand which factors may select rotifer composition.

Keywords: Zooplankton, β -diversity, Species homogenization

The rotifers of “Lagunas de Ruidera Natural Park” lakes (central Spain) in relation to their position in the landscape

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In the context of DAMOLAKE project, during winter and summer 2022 we have studied the zooplankton of three lakes in the karstic barrage systems of “Lagunas de Ruidera Natural Park” (Central Spain), 15 connected tufa-lakes. Conceja is located upstream, Colgada in the middle and Cueva morenilla is downstream. Location of the lakes it is important because affect water inputs sources and anthropic pressures. Our aim is to evaluate the influence of the position in the landscape on zooplankton. On drier periods the surface water flux can be interrupted, remaining some lakes disconnected of surface runoff. At the sampling time the lakes were connected, their depth ranged (6-15m); they were mixed with low water retention time and low plankton production. They presented a fringe of helophytes and denses charophytes meadows. Rotifera were dominant in density and specific richness, at the water column; with 15 species (8, 10 and 11, respectively); Dominant rotifers were *Keratella cochlearis* and *K. quadrata* (winter) and *Polyarthra dolichoptera* and *Ploesoma truncatum* (summer). In a previous study, with water column and shoreline surveys, the three studied lakes had respectively 25, 28 and 37 rotifer species; showing a similar pattern for richness (an increase in species number downstream) in these three lakes. In a PCA with zooplankton densities, the ordination of the samples shows the position in the landscape; where rotifers were the most relevant group to separate the winter samples from the summer ones; in addition, the richness increased downstream.

Keywords: Tufa-lakes, Richness, Downstream, PCA

How will increasing temperature impact rotifer hatching dynamics?

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As the climate changes shifting hydroperiods will expose sediments to higher temperatures and organisms that rely on diapausing egg banks will need to adapt to longer periods of environmental uncertainty. Triggers of hatching are not fully understood, but it is known that temperature can influence rates and hatching patterns. To investigate impacts of increased temperatures on diapause egg hatching, we conducted sediment rehydration experiments (1) at 20°C and compared recovered species to lists from active populations using generalized linear models, and (2) with sediments that were pre-treated at 38.5°C (light, 14 hrs)/24°C (dark, 10 hrs) for 1 week, then heated at 39°C, 49°C, and 57°C (dark) for 5 hrs, before rehydration. Playas had much greater species richness (S: active: 24 – 61, mean (SD): 40 (15.6); rehydrated: 15 – 27; mean: 21.3 (6.7) than rock pools (S: active: 1-23, mean: 5.1 (6.0); rehydrated: 1- 7, mean: 2.4 (2.1)). We found a strong relationship between species richness and number of rehydration attempts/site as well the number of species recovered from rehydrations. Playa sediments exposed to higher temperature treatments had higher species richness. Some species were routinely recovered from one habitat state (active/dry) and not the other. For example, *Lecane hornemanni* was only found in rehydrations and *Filinia* and *Asplanchna* species were found only immediately after rehydration so their presence may be underestimated in active sampling. Thus, both approaches are needed to fully recover community diversity. In addition, future community composition may change as sediment egg

banks are impacted by increasing temperatures.

Keywords: Climate change, Cyclical parthenogenesis, Diapause, Resurrection ecology, Temporary waters

Variations in taxonomic and functional β diversity of rotifers during the flood phase in the Upper Paraná River floodplain

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Rotifers represent essential elements of zooplankton, contributing to the functioning of aquatic ecosystems. Although they share similar functional traits, taxonomic variation among communities may reflect some important ecological differences, especially in environments subject to flood regimes. We analyzed the taxonomic and functional β diversity of rotifers across river, lake, and backwater environments in the Rio Ivinhema floodplain during the flood phase (November 2017 to February 2018). Taxonomic and functional β diversity were estimated and partitioned into species replacement and nestedness components. We also calculated the local contribution to beta diversity (LCBD). Patterns of β diversity were analyzed based on community structure using PERMANOVA, considering the effects of environment type, month, and their interaction. Taxonomic structure varied significantly among the analyzed groups ($F = 1.297$; $R^2 = 0.471$; $p = 0.022$), as functional structure did ($F = 2.140$; $R^2 = 0.595$; $p = 0.007$). Species replacement was the main component of taxonomic β diversity, while functional β diversity was mostly associated with nestedness. Sites with lower taxonomic and functional richness exhibited higher LCBD values, highlighting their regional uniqueness. These findings suggest species replacement and functional simplification were the main drivers of community differentiation during the flood phase,

possibly related to hydrological connectivity and environmental variation among habitats. Our results reinforce the relevance of multifaceted approaches to uncover mechanisms structuring zooplankton communities in floodplain systems that support high biodiversity.

Keywords: Zooplankton communities, Inland wetlands, Multifaceted biodiversity assessment

A review of rotifer studies in the Brazilian Pantanal

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This review analyzes studies on the phylum Rotifera in freshwater environments of the Brazilian Pantanal, one of the largest floodplains in the world, encompassing sub-regions such as the Paraguay, Cuiabá, Miranda, and Taquari rivers, as well as the Nhecolândia complex. The search included publications up to 2025 in the databases Google Scholar, Scopus, and Web of Science, resulting in 1,482 records. After title and abstract screening, 38 studies were read in full; of these, 24 met the inclusion criteria and comprised the final analysis. The objectives were: (i) to systematize the knowledge about rotifers in the region; (ii) to identify predominant methodological approaches and scientific advances; and (iii) to highlight research gaps and future directions. The results reveal the predominance of classical ecological approaches, focusing on the composition and abundance of zooplankton communities, which are generally analyzed collectively among Rotifera, Cladocera, and Copepoda. Although rotifers are frequently reported, they are rarely investigated independently. Most research is concentrated in natural and lentic environments, with an emphasis on temporal scales; spatial or spatiotemporal approaches remain underexplored.

Taxonomic diversity is the most used metric, generally associated with limnological variables. In contrast, analyses based on functional diversity, although increasing, are still limited, and phylogenetic metrics remain absent. This review underscores the need to strengthen approaches focused on functional and phylogenetic diversity and to explore underrepresented environments, contributing to a broader understanding of zooplankton diversity patterns in Neotropical floodplain systems.

Keywords: Zooplankton, Neotropical wetlands, Biodiversity patterns

Understudied and undervalued: a literature gap on rotifers in the Pantanal, one of the largest wetlands in the world

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The Pantanal, one of the world's largest wetland areas, is located mostly in Brazil, with portions in Bolivia and Paraguay. Despite being a globally recognized biodiversity hotspot, the region faces growing threats from deforestation, fires, hydrological changes, climate crisis, and agribusiness pressure. Its biological diversity, especially microscopic fauna such as rotifers, remains poorly studied. This study presents a systematic literature review to assess research efforts on rotifers in the Pantanal. A search in the Web of Science database using (rotifer* OR zooplan*) AND Pantanal returned 31 articles published between 1992 and 2024. Of these, only 17 focused on zooplankton, and just 11 addressed rotifers. The highest output occurred in 2017 (four articles). By contrast, searches using only Pantanal or fish* AND Pantanal yielded 3,289 and 438 articles, respectively. While fish studies make up 13% of total Pantanal research, zooplankton and rotifers are represented by only 0.5% and 0.3%. Most authors are based in Brazil, though some

contributions came from Finland, Germany, and other countries. The most productive authors are affiliated with three groups from the Brazilian states of Mato Grosso, Mato Grosso do Sul, both encompassing the Pantanal, and Paraná, home to one of Brazil's leading zooplankton research centers. The low number of zooplankton studies reflects a shortage of qualified local professionals, limited funding, and low research prioritization. These gaps hinder the development of long-term studies, the advancement of ecological knowledge, and the formulation of effective conservation strategies.

Keywords: Zooplankton, Climate crisis, Biodiversity hotspot

On *Keratella americana* f. *hispida*, a little-known morphological variant of the species *K. americana* Carlin, 1943 (Rotifera, Monogononta, Brachionidae)

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It has been reported that some *Keratella* species exhibit a wide morphological variation associated with factors such as temperature, trophic state, and the presence of predators. *Keratella americana* is distributed throughout the American continent and is characterized by a row of four facets on the dorsal plate and a caudal spine. It exhibits morphological variation in body size, spine length, and dorsal plate ornamentation. Because of this variation, the *K. americana* f. *hispida* morphological variant was described. Our aim was to examine the variation of the COI mitochondrial gene of individuals of *K. americana* f. *hispida* to determine if this form can represent a different species from the *K. americana* s.s. Samples were collected in the San Pedrito lagoon in Centla, Tabasco. Phylogenetic analyses and species delimitation methods were performed to discriminate against analyzed species. Photographs of

Scanning Electron Microscope of the spinules in the *hispida* form were taken to describe their morphology. Sequences of the COI gene of *Keratella* species already published and the ones from this study were analyzed. Here, we report by the first time in Mexico to *K. americana* f. *hispida*, characterized by spinules on the dorsal plate. The comparison of the sequences generated in this study showed that *K. americana* f. *hispida* and *K. americana* form a single putative species. The genetic distance between both morphotypes was 1.3%. These results indicate that the *hispida* form does not represent a distinct species of *K. americana*, and it is confirmed that it is only a morphological variant.

Keywords: Floodplain, Morphological plasticity, Environment

Patterns of Rotifer Diversity Along a Vertical Gradient in Two Tropical Reservoirs Dominated by Cyanobacteria

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Zooplankton plays a key role in energy transfer between trophic levels in aquatic ecosystems. In the tropics, rotifers stand out for their ability to incorporate matter from the microbial loop, making it accessible to larger organisms such as microcrustaceans. This study evaluated rotifer species composition in two tropical reservoirs: Juturnaíba (shallow) and Funil (deep), investigating vertical diversity patterns (richness, Simpson's index, evenness) of rotifers across different depths. Sampling was conducted at three depths in Juturnaíba (surface, euphotic zone, and bottom) and four in Funil (surface, euphotic zone, intermediate, and bottom). Given its greater depth, Funil may offer a higher availability of ecological niches; therefore, our hypothesis predicts differences in species composition as a

function of depth only in this reservoir. Qualitative and quantitative analyses were carried out to estimate local (alpha) diversity based on species composition and abundance, as well as the Bray-Curtis dissimilarity matrix across depths. In both reservoirs, there were no significant differences in rotifer density along the sampling depths ($p > 0.05$). In Funil, we observed positive correlations between rotifer density and phytoplankton biovolume, group VII (large colonies), and conductivity. In Juturnaíba, correlations were found with temperature, conductivity, group V (unicellular flagellates), and copepod density. In Juturnaíba, there were differences in rotifer species composition across depths. The results highlight not only the importance of limnological conditions but also the relevance of ecological interactions in shaping the distribution of the rotifer community.

Keywords: Shallow reservoir, Deep reservoir, Aquatic ecosystems

Demonstration of trophic status and rotifer diversity in a lake used as drinking water: Lake Eğirdir, the second largest freshwater source of Anatolia, Isparta/Türkiye

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In freshwater ecosystems rotifers are generally dominant and numerically abundant, as well as they are sensitive indicators of water quality, pollution and eutrophication process. Lake Eğirdir, the second largest freshwater lake in Türkiye (surface area 457 km²), is used for drinking water, agriculture and tourism activities. This study aimed to determine

the rotifer species diversity with different indices in Eğirdir Lake and to reveal the trophic status. Rotifer samples were taken from 5 stations, seasonally (spring, summer, autumn, winter) from the lake between 2016-2018. A total of 42 rotifer species were identified, and six of these species (*Colurella adriatica*, *Euclanis deflexa*, *Lecane furcata*, *Lophocharis salpina*, *Rotaria neptunia*, *Bdelloidea*) were recorded for the first time in the region. *Polyarthra dolichoptera*, *Synchaeta pectinata*, *Asplanchna priodonta*, *Lecane bulla*, *Euchlanis dilatata* and *Trichocerca similis* were the dominant species. The Shannon–Wiener diversity of the rotifer group was maximum in summer of 2016 (1.31) and minimum in spring of 2017 (0.09). In addition, the saprobic index varied between 1.2 and 1.7. In terms of saprobic index, the lake varied between oligosaprobic and β -mesosaprobic between 2016 and 2018. According to the TSI_{ROT} index, the lake showed mesotrophic/meso-eutrophic properties during the study period. As a result, when the lake was evaluated with different indices in terms of rotifer diversity, the trophic status varied between oligosaprobic-mesosaprobic and eutrophic states.

Keywords: Freshwater lake, Rotifer diversity, Türkiye.

A preliminary study on the Rotifera fauna of Gölbaşı Lake (Kestel /Bursa-Türkiye)

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Rotifera organisms are important in the nutrition of larval fish. Also, Rotifera species richness and abundance are related to water quality and are thus used as bioindicators in determining the trophic levels of lakes and reservoirs. In this

study, a preliminary work of Gölbaşı Lake Rotifera fauna was carried out during 2022. Gölbaşı Lake (40°13'77" N, 029°19'243"E) was built between 1933 and 1938 on the Aksu Stream, a side branch of the Nilüfer Stream in Bursa. It is for irrigation purposes. The lake volume at normal water level is 12.75 hm³, and the area is 1.74 km². The physicochemical properties of water in Gölbaşı Lake, such as water temperature, pH, dissolved O₂ and oxygen saturation (%) were measured in the field using the YSI equipment. Rotifera samples were collected with plankton net of 55 μ m mesh size and samples were fixed in 4% formalin. Then the species from the samples were identified using a Nikon TMS-F model invert and Olympus CX-31 model microscope. A total of eight Rotifera species were recorded from the lake. The water temperature in the lake was 12.8°C, pH 8.2, dissolved oxygen 11.3, oxygen saturation 108.9 % and conductivity 350.7 μ S/cm. All species identified are new records for the Türkiye Rotifera fauna for the lake. *Polyarthra dolichoptera*, *Synchaeta pectinata* and *Keratella cochlearis* are the most dominant species.

Key words: Rotifera, Fauna, Türkiye

Session 2: Ecotoxicology (Oral presentation)

Rotifer populations and aquatic community structure inform about recent metal enrichment in an Atacama Desert Lake, Chile.

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The extremely arid conditions of the Atacama Desert in Northern Chile and the great mining industry of copper contribute with high concentrations of metals and metalloids in aquatic environments. The input of metals, transported by wind, surface water, or ground water, could significantly affect aquatic community structure and zooplankton population

dynamics. Inka-Coya Lake (22°20'S-68°35'W, 2534 m a.s.l.) is located at Chiu-Chiu village, Antofagasta Region, Chile, near the main worldwide center of copper mining. Using a combination of different methodologies, including field, paleolimnological, and experimental approaches, we tried to reconstruct the patterns of metal(loid) exposure in lakes of the Atacama Desert. Also, we assessed the value of sexual reproduction and diapause production by rotifer *Brachionus* species isolated from Inka-Coya Lake. Our results showed (1) geochemical analysis of Inka Coya Lake core reveals increased metals and metalloids in recent sediments, (2) correlation between local production Cu and Cu enrichment factor suggests anthropogenic contribution in the sediment, (3) *Brachionus* individuals living in sublethal metalloids concentrations produced diapausing eggs in a metal-enriched medium of lower quality and with lower hatching success (4) molecular damage in recently deposited diapausing eggs is observed in the surface sediment of the lake. Results suggest diapause production in rotifer species as an adaptive strategy in a polluted environment with common metals from this extremely arid region.

Keywords: Atacama Desert, Metals, Paleoenvironment

Environmental concentrations of MPs available for rotifer ingestion in the Rio Grande/Bravo

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Studies to determine food clearance or microplastic (MPs) toxicity have shown the ingestion of MPs by zooplankton, including rotifers. For example, individuals of *Brachionus* ingest MPs around 5 – 20 µm size. However, experimental exposure concentrations (3x10⁴ - 3x10⁵ beads/ml, or 5x10⁶ µm³/ml beads) may not represent environmental concentrations. We determined MPs concentration in water

and sediment of the Rio Grande/Bravo collected at the Juárez (Chihuahua, México)/ El Paso (Texas, U.S.A) border to determine that could be ingested by rotifers. We use fluorescence and confocal microscopy to quantify and measure MPs: up to 17 MPs/L and 10235 MPs/kg (particles, fragments, and fibers) were found in water and sediment samples, respectively. Sizes of MPs varied from 12.62 – 4282.25 µm in water and 16.58 – 3609.97 µm in sediments. Particle sizes were grouped into interval classes following Sturges' Rule to estimate the frequency of MPs sizes "available" (<40 µm) for rotifer ingestion. Fragments of MPs found in the river (3x10⁻⁵ - 2x10⁻⁴ Part/ml; 0.033 - 0.2 Part/gr) could be ingested by rotifers: 1.8x10⁻⁷ to 4.4x10⁻⁵ part/ind*hr is the estimated number of MPs available for ingestion considering clearance rates of 0.009-0.17 ml/ind*hr for 0.28-3.1 µm beads sizes from food studies. Since *B. plicatilis* reported clearance rates for MPs are similar or smaller than that for algae (e.g. *Isochrysis galbana*: 4.88 ml/ind*hr), and zooplankton discriminates against inert particles from natural food, the possibilities of MPs uptake by rotifers may be reduced when exposed to environmental concentrations of MPs in the Rio Grande/Bravo along the Juárez-El Paso metroplex.

Keywords: Rio Grande/Bravo, Microplastics, Rotifers

Transgenerational Toxic Effects of Ibuprofen on the Rotifers *Euchlanis dilatata* and *Lecane papuana*.

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1. Universidad Autónoma de Aguascalientes, Aguascalientes - Mexico. Ibuprofen is a nonsteroidal anti-inflammatory drug widely used to treat fever and minor headaches. Ibuprofen can inhibit the cyclooxygenase pathway. However, its ample use has transformed ibuprofen in a contaminant of emerging

concern in aquatic ecosystems. We have performed 24-h and 48-h acute, and 5-d chronic toxicity tests with ibufopren using the rotifers *Euchlanis dilatata* and *Lecane papuana* for two generations. In general, both rotifers are resilience to high concentrations of ibufopren with LC50 and EC50 values similar to those of other aquatic invertebrates. However, we found a transgenerational size reduction effect on *Lecane papuana* F2 females after a 15 ng/L ibufopren exposure. We discuss these results with emphasis in the ecological effects for rotifer populations and in general for aquatic ecosystems.

Keywords: Aquatic Toxicology, Contaminants of emerging concern, Environmental Toxicology, Rotifer Ecology, Zooplankton Ecology

Comparative population dynamics of *Platyonus patulus* (Rotifera) and *Alona rectangula* (Cladocera) exposed to microplastics and the pesticide, imiprothrin, separately and combined

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Emerging pollutants such as the synthetic pyrethroid pesticide imiprothrin, is used indiscriminately in both urban and rural areas. Due to its long half-life (59 days in neutral and acidic pH) and diverse application areas such as agricultural areas, industries, households, among

others, imiprothrin has the potential to reach aquatic ecosystems and be adsorbed by microplastics. Due to their small size (<5 mm), microplastics induce different responses in zooplankton individually, and in combination with other contaminants, can have a synergistic effect. *Platyonus patulus*, a globally distributed freshwater rotifer species, in nature can be exposed to these contaminants and can be adversely affected from competition with other zooplankton such as the cladocerans. *Alona rectangula*, a common littoral cladoceran often coexists with *P. patulus*. Therefore, in this study we evaluated the acute toxicity of the pesticide imiprothrin and microplastics, separately and in combination, on the population growth and competitive interactions between *P. patulus* and *A. rectangula*. The median lethal concentrations (LC50) of *P. patulus* and *A. rectangula* with only pesticide were 3.43 and 336 µg/L, respectively. The LC50 of both the zooplankton species were much lower, about 15%, when exposed to microplastics and imiprothrin together. In chronic toxicity tests, the population growth rate of *P. patulus* was adversely affected by imiprothrin adsorbed to microplastics and in competition with *A. rectangula*, as compared to controls.

Keywords: Insecticide, Competition, Polystyrene

**Session 2: Ecotoxicology
(Poster presentation)**

Is metal acute toxicity modified when combined with other metal? LC50 of two metal mixtures of As, Cr, Cu, Ni, and Pb in *Platyonus patulus*.

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It has been known that metal mixtures significantly affect population dynamic parameters in rotifers, such as the

mortality ratio in *Platonus patulus*, which increased from 0.07 up to 0.8 (11 times) when exposed to metal mixtures of As+3-Cr+3-Cu+2-Ni+2-Pb+2-Zn+2 at lower concentrations (10 to 150 µg/L) than those reported for the single metal 24 hr exposure LC50 (105-9200 µg/L). For this reason, we were interested in estimating LC50 for metals in a mixture following the American Society for Testing and Materials (ASTM) protocol for 24 hr exposure. Acute toxicity for As+3, Cr+3, Cu+2, Ni+2, and Pb+2 (five concentrations: 49-120000 µg/L) and five metal mixtures (As+3-Cu+2, As+3-Cr+3, Cr+3-Ni+2, Cr+3-Pb+2, and Ni+2-Pb+2) was estimated in *P. patulus* at 19-23°C and 12L:12D. Data were analyzed by the graphic method, and Quest Graph TM LC50 Calculator AAT Bioquest; Probit analysis is ongoing. Values of 24 hr LC50 exposure were Cu+2 (70 µg/L)<Ni+2 (4560 µg/L)<As+3 (16420 µg/L)<Cr+3 (16490 µg/L)<Pb+2 (59510 µg/L). Concentration of metals in bimetal mixtures that produce 50% of population death were in between the minimum and maximum ranges determined by the LC50 Calculator for single exposure, except for Cr in the Cr+3-Ni+2 mixture (4800 µg/L <12400-22620 µg/L), and Ni in the Ni+2-Pb+2 mixture (2110 µg/L <2260-9120 µg/L). A couple of As+3-Cr+3 (6200-16000 µg/L, 8000-14600 µg/L) and Cr+3-Ni+2 (4880-5000 µg/L, 15000-3500 µg/L) combined concentrations caused 50% of dead organisms. Results indicated that the concentration of metals in a mixture causing acute toxicity in *P. patulus* could be smaller than their LC50.

Keywords: LC50, Metal Mixtures, Rotifers

Effects of salinity on the combined toxicity of copper and polyethylene micro/nanoplastics to the marine rotifer *Brachionus plicatilis*

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4. Instituto de Ciencias del Mar Y Limnología, Estación el Carmen, Universidad Nacional Autónoma de México. Programa de Estancias de Investigación Dgapa, UNAM, Mexico., Ciudad Del Carmen, Campeche - Mexico. While potentially toxic, copper (Cu) is an essential micronutrient required by all living organisms for myriad physiological and biochemical processes. Cu is naturally present as a trace element in all aquatic environments; however, multiple anthropogenic sources from industries, agriculture, and harbors discharge Cu into marine systems, where it becomes potentially toxic to aquatic organisms, making it essential to understand its interactions with other contaminants. We aimed to evaluate the effect of salinity on the toxicity of copper in a mixture with polyethylene nano/microplastics (PE-NMPs) on the euryhaline rotifer *Brachionus plicatilis*. We measured population-level responses, ingestion rates, and Cu accumulation in rotifers exposed to the combination of Cu and PE-NMPs at salinities ranging from 5 to 35 g/L. Regardless of salinity, population growth rates decline in the presence of Cu and PE-NMP mixtures. *Brachionus plicatilis* seems to be more sensitive to these mixtures under suboptimal salinity conditions. Ingestion rates suggest that

increasing salinity reduces the toxicity of Cu and PE-NMP combinations, supporting previous findings that indicate increased copper tolerance with rising salinity in euryhaline species.

Keywords: Mixtures, Synergisms, Microplastics

Toxicity of copper to two endemic Antarctic bdelloid rotifers

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Bdelloid rotifers are a key component of Antarctic terrestrial ecosystems, displaying a high degree of biodiversity and endemism. Rotifers inhabit the ice-free areas of the continent overlapping with human presence. Legacy waste tip sites and ongoing human activities at research stations in Antarctica have resulted in contamination of terrestrial environments. While waste management and environmental practices have improved, the impacts of exposure to native biota to legacy contaminants, including metals, to native biota is largely unknown. The sensitivity to aqueous copper of two endemic bdelloid rotifer species, *Adineta* sp. and *Habrotrocha* sp. (Bd14) was estimated in chronic toxicity tests of 28 days duration. Exposure to copper resulted in an initial period in the first 1-3 days of the test in which activity was greatly reduced, followed by normal activity and continuation of their life cycle. Mortality increased with increasing exposure duration for the first 18 days of the test. Estimated lethal concentrations causing 50% mortality (LC50) were 227 and 170 µg Cu L⁻¹ at 4 d and 104 and 68 µg Cu L⁻¹ at 18 d for *Adineta* sp. and *Habrotrocha* sp. (Bd14), respectively. Reproduction was also impacted in both species by exposure to copper with 50% reduction in reproductive output at 53 and 38 µg Cu L⁻¹ at 28 d for *Adineta* sp. and

Habrotrocha sp. (Bd14), respectively. Results from this research will be used to inform risk assessments at contaminated sites in Antarctica and can contribute to the development of Antarctic-specific environmental quality guidelines.

Keywords: Copper, Metal toxicity, Reproduction

Combined effects of microplastics and oligohaline salt (NaCl) levels on the population dynamics of *Brachionus calyciflorus* Pallas (Rotifera: Brachionidae)

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Microplastics affect functioning of aquatic ecosystems in different ways. They not only interfere with the feeding of zooplankton, but also adsorb certain toxicants and thus enhance the toxicity to zooplankton. Salinity is a natural stress to freshwater zooplankton, mainly rotifers. Except only a few species, majority of Rotifera are intolerant to salinity. In seasonally drying ponds, planktonic rotifers of the genus *Brachionus* often are subjected to stress from salinity due to gradual evaporation. In such conditions, species of *Brachionus* experience stress from extremely low levels (oligohaline) to high salinity levels. In this work, we conducted population growth experiments of *B. calyciflorus* at a very wide range of salt (NaCl) levels from 100 µg/L to 5 g/L and at fixed microplastics density. Our results showed that at very low salt levels with or without microplastics, there was a hormetic effect on the population growth rates of rotifers. With inclusion of microplastics, the effect was however, amplified. At high concentrations (>2 g/L) the rotifers experienced salinity stress and began to decline with increasing salt concentrations. Thus the concentration-dependent opposite effects of salt on rotifers have been discussed in relation to

anthropogenic salinization of inland waters.

Keywords: Salinity, Microplastics, Population growth

Comparative population dynamics of *Platyonus patulus* (Rotifera) and *Alona rectangula* (Cladocera) exposed to microplastics and the pesticide, imiprothrin, separately and combined

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Emerging pollutants like the synthetic pyrethroid pesticide imiprothrin are widely used in urban and rural areas. Due to its long half-life (59 days in neutral and acidic pH) and widespread applications (agriculture, industry, households), imiprothrin can reach aquatic ecosystems and be adsorbed by microplastics. Considering the small size of microplastics (<5 mm), pristine spheres can alter zooplankton physiology and demography, with effects potentially amplified when combined with other pollutants (synergistic effect). *Platyonus patulus*, a globally distributed freshwater rotifer species, often coexists and competes with the littoral cladoceran *Alona rectangula* in contaminated aquatic systems. Therefore, in this study we evaluated the acute and chronic effects of imiprothrin and microplastics, alone and combined, on their life history, demography and competitive interactions.

Median lethal concentrations (LC50) were determined by exposing neonates (<12 h) of each species to the contaminants. Chronic tests included rotifers (1 ind. mL⁻¹), cladocerans (0.6 ind. mL⁻¹), and mixed populations competing (0.5 *P. patulus*, 0.3 *A. rectangula* ind. mL⁻¹), exposed to 10% of the LC50 of imiprothrin for rotifers, microplastics (8.5 mg L⁻¹), and both combined. LC50 values for imiprothrin alone were 3.43 µg L⁻¹ for *P. patulus* and 336 µg L⁻¹ for *A. rectangula*. When combined with microplastics, LC50 values were approximately 15% lower for both. Chronic exposure showed that *P. patulus* reduced its population growth, survivorship, and fecundity when exposed to imiprothrin adsorbed to microplastics and in competition with *A. rectangula*, compared to controls.

Keywords: Insecticide, Competition, Polystyrene

Effect of Microplastics on the competition of two rotifers (Rotifera: Monogononta): a population growth study

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Microplastics are an emerging contaminant that, given their ubiquity, size, and potential toxicity, could have a negative impact on freshwater food webs. Therefore, this study analyzed the effect of 10 µm microplastics on the competition of two rotifer species (*Brachionus calyciflorus* and *Platyonus patulus*) through their population growth. To this end, the rotifers were exposed to four concentrations of polystyrene microspheres (0.0, 0.15, 0.3, and 0.6 µg mL⁻¹) in 20 ml of EPA medium and fed with the alga *Tetradismus obliquus* (1 x 10⁶ cel. mL⁻¹). Population growth was analyzed for both species alone, with 20 individuals placed per experimental unit,

and in competition by placing 10 individuals as the initial inoculum of each species. Populations were quantified daily and transferred to fresh medium with the selected microplastic concentrations until most treatments decreased their population density. These microplastic concentrations did not have a negative effect on the population growth of the rotifers. In the case of *B. calyciflorus*, the highest population densities were recorded at the low and medium microplastic concentrations (0.15 and 0.30 $\mu\text{g ml}^{-1}$). In the competition treatments, the population density of *B. calyciflorus* was strongly suppressed by *P. patulus* regardless of the microplastic concentration. Our results showed that at these microplastic concentrations, the outcome of the competition between both rotifers is not affected by the presence of these contaminants.

Keywords: Anthropogenic stressors, Emerging pollutants, Contamination

Toxicity evaluation of three emergent pollutants on the freshwater rotifer

***Lecane quadridentata*, Ehrenberg 1832**
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1. Universidad Autónoma de Aguascalientes, Aguascalientes - Mexico. The aim of this work was to determine the acute and chronic toxicity as well as the esterase activity induced by two anti-inflammatory drugs (naproxen sodium and acetaminophen) and one antibiotic (ampicillin) on the freshwater rotifer *Lecane quadridentata*. Results recorded for the acute toxicity tests showed the following sequence regarding LC50 values: naproxen < acetaminophen < ampicillin. Chronic tests to assess the effects on the intrinsic growth rate (r) exhibited the antibiotic and naproxen as the less and most toxic compounds, respectively. In vivo enzyme activity tests showed a decrease on the esterase activity with acetaminophen and naproxen while ampicillin increased the enzyme

activity when compared to control. To date, few studies have been addressed to evaluate the effects of these drugs on ecologically relevant organisms such as rotifers. Therefore, this research provides new evidence on the toxic effects of emerging pollutants on a species of zooplankton organism. Acute to Chronic Ratios were calculated for the three chemicals. Although the lethal concentrations of ampicillin and acetaminophen were in the range of g/L, naproxen yielded an acute toxicity value in mg/L. This work showed that concentrations of these chemicals in the range of 12 to 300 mg/L caused a decrease in the reproduction of *Lecane quadridentata*.

Keywords: Antibiotics, Aquatic Toxicology, Esterases, Fluorescence Non-steroidal anti-inflammatory drug.

Effects of pesticides and vinasse used in sugarcane cultivation on the hatching of dormant rotifer eggs

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Agricultural residues, such as sugarcane vinasse and the insecticide fipronil, can directly or indirectly impact the hatching of dormant rotifer eggs. The aim of the present study was to evaluate the effects of the pesticide Regent® 800 WG (a.i. fipronil) and the fertilizer vinasse on the structure of the dormant rotifer community. Sediment samples containing rotifers' dormant eggs were collected from natural lakes in São Paulo, Brazil.

Hatching experiments were conducted using sediments exposed to vinasse (10 and 50 (%v/v)), and environmentally realistic pesticide concentrations (70 $\mu\text{g L}^{-1}$, 700 $\mu\text{g L}^{-1}$, and 7,0 mg L^{-1}). Vinasse treatments led to a decline in hatchlings. The control had a species richness of 1.33 and 22.67 individuals, while 10% vinasse resulted in 1.00 and 3, and 50% vinasse in 1.00 and 1. In contrast, Fipronil treatments did not reduce the species richness or abundance of hatchlings. While the control group had a richness of 12.2 and an abundance of 241, the fipronil treatments showed similar or slightly higher values, with species richness ranging from 12.8 to 13.4 and abundance from 170.6 to 255.8. These findings suggest that sugarcane vinasse severely impairs the hatching and diversity of rotifer dormant eggs, while fipronil at the tested concentrations did not cause effects on the hatching. This study highlights the ecological risks of releasing agricultural residues, mainly sugarcane vinasse, into aquatic environments, emphasizing the importance of managing such waste to safeguard the recruitment and resilience of aquatic microfauna from dormant egg banks.

Keywords: Dormancy, Chemical contamination, Zooplankton, Freshwater

You take my breath away: The influence of heavy metal exposure on metabolism in rotifers

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Anthropogenic activities introduce heavy metals into aquatic habitats. Metals are persistent and can harm organisms through alterations to metabolic rate and, by extension, changes to respiration rate. Here, we determine if exposure to heavy metals influences respiration rates and if prior long-term exposure to toxicants impacts the degree of change. To investigate this, we isolated *Epiphanes brachionus* and *E. chihuahuaensis* from a polluted habitat and from a non-polluted

habitat, respectively, and determined the concentrations of copper that result in 50% mortality (LC50) of exposed animals. Probit analysis indicated an LC50 of 0.042 $\text{mg CuSO}_4/\text{L}$ for *E. brachionus* and 0.067 $\text{mg CuSO}_4/\text{L}$ for *E. chihuahuaensis*, slightly lower than the average seen across monogonont species (~0.096 $\text{mg CuSO}_4/\text{L}$). Next, we exposed rotifers to 70% of the LC50 for 24 hrs and then monitored the resulting changes in respiration rate that occurred over a subsequent 2 hr recovery period. Trials are ongoing, but the average control respiration rates are 2.26 pmol/min/ind (SD=1.01) and 2.87 pmol/min/ind (SD=1.16) for *E. brachionus* and *E. chihuahuaensis*, respectively. Following copper exposure, *E. brachionus* showed a reduction in respiration rate by approximately 66%. Trials are ongoing for *E. chihuahuaensis*. While no studies have examined rotifer respiration responses to toxicant exposure, research on *Daphnia longispina* showed that less resistant lineages had increased respiration when exposed to sublethal levels of copper. These results will help inform researchers of how prior exposure to toxicants may mediate rotifer physiological responses to future exposures.

Keywords: Adaptation, Ecotoxicology, Heavy Metals, Respiration

Toxic effects of caffeine on a rotifer population: Comparisons between culture water and natural wetland water

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Emerging contaminants (ECs) such as pharmaceuticals, pesticides and industrial chemicals are increasingly affecting aquatic communities in wetlands. In Spain, the discharge of treated wastewater to the Fuente de Piedra wetland (37°6'N, 4°44'W) is one of the

main problems in this ecosystem. Among the ECs detected in Fuente de Piedra (FP), caffeine (stimulant drug) is particularly relevant. The objective of this study is to analyze the acute toxicity of caffeine on the survival of the rotifer *Keratella tropica*, one of the main zooplankton species in FP. Nevertheless, in natural environments, rotifers are never exposed to single contaminants in standard waters. Other contaminants in FP include many pharmaceuticals (e.g. naproxen and gabapentin), pesticides (e.g. imidacloprid), stimulant drugs (e.g. benzoylecgonine and theophylline), and personal care products (BP4). For that reason, we compare the ecotoxicological effects of caffeine on *K. tropica* between artificial culture water (COMBO medium) and natural FP water. Our preliminary results show toxic effects of caffeine at very high concentrations, although natural FP water significantly modified those toxic effects. In consequence, toxic effects of ECs like caffeine should be studied using natural wetland water in order to properly evaluate the consequences of those toxics on natural rotifer populations.

Keywords: Caffeine, *Keratella tropica*, Toxicity

Effects of glyphosate and arsenic on the hatching of resting eggs from two morphotypes of *Brachionus*

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Glyphosate, a widely used herbicide, raises environmental concerns in wetlands, particularly under the EU Water Framework Directive (WFD). Though not a WFD priority substance, some countries restrict its use due to its persistence and impact on aquatic ecosystems. Similarly, arsenic (As) is a naturally occurring

metalloid but is also amplified in aquatic environments by agricultural activities (e.g. fertilizer application). This study evaluated their individual and combined effects on the hatching rate of resting eggs from two *Brachionus* morphotypes (identified as *B. angularis* and *B. quadridentatus/rubens*). Eggs were isolated from sediment samples of Laguna Honda in the Albufera de Adra (Andalusia, southern Spain), a Mediterranean coastal wetland impacted by plastic-covered agriculture. A factorial experiment exposed the eggs to four glyphosate concentrations (0.1, 1, 10, and 400 µg/L) under two conditions: with or without a fixed As concentration (50 µg/L). Our results indicate that glyphosate contamination significantly decreased the hatching rate of both *Brachionus* morphotypes in a concentration-dependent manner, suggesting a direct toxic effect on embryonic development or egg viability. In contrast, the effect of As was morphotype dependent, with *B. quadridentatus/rubens* showing signs of a potential resistance or compensatory response to As. These findings highlight the importance of considering intraspecific variability in ecotoxicological studies, as overlooking such differences may underestimate pollutant risks. Moreover, they underscore the potential threats to aquatic population resilience in ecosystems affected by agricultural contaminants.

Keywords: Glyphosate, Arsenic, Resting egg

Rotifers as test organisms to assess toxicity of cement blocks composed of treated wastewater

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The construction industry encourages the responsible use of water in all processes related to cement and concrete. The use of treated wastewater is an alternative that have gained interest recently. As part of a project that investigate the feasibility of replacing well water by treated wastewater without altering the mechanical performance of the concrete blocks used in the construction industry; we have built cubic Portland Cement blocks of 7×7×7 cm (343 cm³; 0.061 in³) that include: a) 100% tap water, b) 50% tap water and 50% treated wastewater, and c) 100% treated wastewater with three replicates each. To investigate their potential toxicological effects each block was immersed into 3.5 L of reconstituted medium hard water. After periods of 1 h, 1 d, 2 d, 4 d, 8 d, 16 d, 32 d, and 64 d, samples were taken to: i) perform chemical analysis; and ii) carry out acute and chronic toxicity tests with the freshwater rotifer *Lecane quadridentata*. The results highlighted the need for integral toxicological evaluation of the blocks and the potential to replace water with wastewater as long as the mechanical performance of the cement block is not altered.

Keywords: Aquatic Toxicology, Construction Industry, Environmental Toxicology, Lixiviation, Sustainable Construction

Acute and chronic toxicity of silver nanoparticles on the freshwater rotifers *Brachionus calyciflorus* and *Lecane quadridentata*

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Due to their unique properties at the nanoscale, silver nanoparticles (Ag-NPs) can impact planktonic communities and, consequently, the food chain. Toxicological studies on planktonic organisms, such as rotifers, are crucial for assessing the effects of emerging pollutants. In this study, we compared the acute and chronic toxicity of Ag-NPs on the freshwater rotifers *Brachionus calyciflorus* and *Lecane quadridentata*. We determined the 24-h LC₅₀ and used the intrinsic population growth rate as an endpoint for chronic bioassays. Additionally, potential morphological changes were evaluated. Ag-NP concentrations of 6.25 – 75.0 µg/L for *B. calyciflorus* and 100 – 300 µg/L for *L. quadridentata* caused significant disruption to their reproductive rates. The rotifer *B. calyciflorus* was more sensitive to Ag- NPs (LC₅₀ = 18.87 µg/L) than *L. quadridentata* (LC₅₀ = 151.24 µg/L). Reproduction in *B. calyciflorus* was significantly decreased at 2.35 µg/L Ag-NPs, whereas in *L. quadridentata*, it occurred at 37.81 µg/L. Microscopic observations revealed morphological alterations in the lorica, body constrictions, and foot deformations, primarily in *B. calyciflorus*. These differences in susceptibility suggest that *B. calyciflorus* may be a more reliable indicator of Ag-NPs pollution in freshwater environments. Our results also show that Ag-NP toxicity varies across freshwater rotifer species, stressing the need to evaluate a broader range of taxa to gain a more comprehensive understanding of ecological risks in aquatic populations.

Keywords: Emerging pollutants, Sensitivity, Growth rates

Effects of cyanotoxins on the demography on the rotifer *Brachionus calyciflorus*: A case study from the Lake Chalco (State of Mexico, Mexico)
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Rise in aquatic pollution due to an increase in anthropogenic activities has led to eutrophication and proliferation of cyanobacteria. These cyanobacteria have adverse effects on zooplankton, often due to the production of toxic secondary metabolites such as cyanotoxins. Many zooplankton species have developed physiological and behavioral strategies that allow them to coexist with cyanobacteria. We evaluated the acute and chronic effects of different concentrations of the cyanobacterial crude extracts from Lake Chalco on the rotifer *Brachionus calyciflorus* isolated from the same lake. The field sample was dominated by *Planktothrix agardhii*. We filtered 80 L of the lake water and estimated the diversity and density of cyanobacteria. The crude extract, after five cycles of freezing, thawing and sonication at 20 kHz, was filtered and the microcystin concentration was quantified using ELISA. Acute toxicity tests were conducted based on 24h mortality. Chronic toxicity tests (population growth) of *B. calyciflorus* were conducted at two sublethal concentrations of microcystin (0.785 and 3.14 µg/L) based on LC50 data (7.85 µg/L). Population growth rates of *B. calyciflorus* exposed to sublethal concentrations of cyanotoxins ranged from 0.37 to 0.46 per day. Our results showed that even the rotifer species that coexists with the cyanobacteria in field over several decades, was adversely affected by the microcystins.

Keywords: Ecotoxicology, Cyanobacteria, Crude extracts, Acute toxicity, Chronic toxicity

Session 3: Ecology of Rotifers in the Tropics (Oral Presentation)

Hatching patterns of rotifers in sediments from Mediterranean and tropical temporary ponds.

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Aquatic invertebrates inhabiting temporary ponds ensure their survival during the dry season by producing resting stages, which can overpass this period buried in the sediment. They can hatch during the wet season, colonizing the water column. They make up the egg bank, a reservoir of its potential biodiversity. Within a metacommunities project on tropical/Mediterranean temporary ponds, we designed several experiments to study the hatching patterns. We took sediment samples from 21 temporary ponds in Costa Rica (tropical climate) and 32 in eastern Spain (Mediterranean climate). We used a culture chamber, with adjustable light and temperature. For the Mediterranean sites, we run an experiment with the sediment from 32 temporary ponds, during 28 days, we periodically collected the animals that hatched from the sediment. For the tropical samples, we run two experiments: a first one with the sediment from 21 ponds and the same procedure than the one explained above; Rotifers appeared in 18 ponds out of a total of 21 and since the first sampling. For the second experiment we used sediment from four sites in a tropical wetland (Palo Verde Nat. Park, Costa Rica). In this experiment, carried out under variable natural tropical temperature and light, we identified 22 rotifers and 17 crustacean species, with high variability among sites. Most species hatched during the first 10-15 days. To conclude; rotifers were the most diverse zooplanktonic group that hatched in the sediments with more than 40 species identified.

Keywords: Resting eggs, Diversity, Zooplankton

Session 3: Ecology of Rotifers in the Tropics (Poster Presentation)

Synchronous change in multiple rotifer species enable reliable thresholds for assessing water quality in South American shallow lakes

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5. Radboud University, Nijmegen - Netherlands;

6. Aarhus University, Aarhus - Denmark. Shallow lakes are highly vulnerable aquatic systems that support essential ecological, economic, and recreational functions. To assess the ecological impacts of eutrophication, we surveyed 83 shallow lakes across five climate zones in South America, focusing on rotifers at population and community-level. Using Threshold Indicator Taxa Analysis (TITAN), we identified ecological thresholds for ten rotifer taxa along four trophic indexes (Carlson, Toledo, Lamparelli, and Cunha). Our taxa-level analysis revealed consistent indicator species across all indexes, with sensitive taxa—such as *Brachionus dolabratus*, *Keratella procurva*, and *Epiphanes macrourus*—exhibiting synchronous declines at lower thresholds, often within oligotrophic to mesotrophic conditions. In contrast, tolerant species—including

Plationus patulus, *Pompholyx sulcata*, and *Keratella tropica*—increased in abundance and frequency, but at variable and generally higher thresholds. Notably, the thresholds at which rotifer communities exhibited significant changes occurred at eutrophication levels than the cut-off values typically used to classify eutrophic conditions in standard trophic indexes. This suggests that biological responses can signal ecosystem disturbance earlier than traditional chemical metrics alone. Our results reinforce the ecological value of rotifers as reliable indicators of water quality change and support their inclusion in monitoring frameworks. We recommend integrating TITAN with complementary analytical tools to enhance freshwater biodiversity assessments and guide evidence-based conservation in South American lakes and beyond.

Keywords: Brachionidae, Eutrophication, Non-linear models

Beyond what meets the eye: insights from rotifers into the ecology of a forgotten urban pond

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Traditional utilitarian perspectives on freshwater ecosystems often lead to the neglect of small urban water bodies like ponds, particularly those lacking economic or recreational value, resulting in their ecological undervaluation. This study investigates the rotifer community of a small, previously unstudied urban pond in Poconé, Mato Grosso, Brazil, within the Pantanal region. Although considered degraded by local residents, the pond supports top predators like caimans and aquatic birds, suggesting a high-energy

trophic network. The pond, sustained by a nearby spring, is isolated from other ecosystems. Rotifers and environmental variables were sampled bimonthly from August 2023 to July 2024. A total of 48 species were identified across 19 genera, plus bdelloids classified only at the class level. Temporal variation among sampling events revealed fluctuations in key rotifer community metrics. Richness ranged from 18 to 28 species, Shannon diversity varied between 1.74 and 2.17, and evenness ranged from 0.60 to 0.68. Mean density also varied substantially across samples, from 2,367.27 to 14,364.63 ind/m⁻³. Bdelloids, *Brachionus caudatus*, *B. falcatus*, *Epiphanes macroura*, and *Hexarthra intermedia* were present in all samples, while 16 species (33.3%) appeared only once. These results indicate a consistently rich and dense rotifer community, confirming the hypothesis that the pond sustains a productive trophic base capable of supporting higher trophic levels. This study highlights the importance of small urban ponds as valuable contributors to regional biodiversity, underscoring their role in supporting complex food webs and offering new insights into the ecological dynamics of neglected freshwater systems.

Keywords: Zooplankton, Pantanal, Food web

Effects of Water Stress on the Reproduction of Rotifers in the Northern Pantanal

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Water stress, intensified by climate change and human activities, significantly impacts aquatic biodiversity, altering species composition and environmental filters. This study examines the effects of temperature on the reproduction and morphology of rotifers in the northern Pantanal. Active and passive sampling methods were employed during the dry

season (September), targeting water bodies under three hydration conditions: permanently hydrated, intermediate hydration (moist soil), and temporarily dehydrated (dry soil). Active sampling filtered 600 liters of water using a 68 µm mesh net, while passive sampling collected sediment. Hatching experiments were conducted at 28°C and 30°C (±1°C), with a 12-hour photoperiod over eight weeks. During the first month, three rotifer taxa were identified (*Bdelloidea*, *Brachionus quadridentatus*, and *Filinia* sp.), increasing to twelve taxa in the second month. *Bdelloidea* dominated both sampling methods, followed by *Lecane* sp. and *Lecane bulla bulla*. Results indicate that water stress reduces and simplifies rotifer communities, with higher richness in the second month reflecting an acclimation period. The resilience of *Bdelloidea*, known for desiccation resistance, highlights its survival in extreme environments. *Lecane* sp. and *Lecane bulla bulla* were associated with intermediate hydration. Sediment served as a biodiversity reservoir, with distinct species compositions between active and passive communities. Although temperature treatments showed no significant morphological effects, higher hatching rates at elevated temperatures were observed. This study emphasizes the need to understand aquatic community dynamics under climate change, suggesting future research on photoperiod intensity and adaptive responses to extreme conditions.

Keywords: Desiccation resistance, Pantanal wetlands, Climate induced water stress.

Alpha, beta, and gamma diversity of rotifer limnetic assemblages in tropical reservoirs with different trophic states

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Rotifers are key components of zooplankton in continental freshwater. More than 200 species have been recorded in Venezuelan water bodies. A simple method to assess biological diversity is by examining taxa richness. While many studies have explored rotifer taxonomy and ecology in Venezuela, few have focused on their distribution patterns relative to trophic state. Rotifer assemblages can reveal insights into the trophic status of water bodies. Therefore, this study aims to determine the alpha, beta, and gamma rotifer diversity in the limnetic zone of 16 reservoirs and attempt to relate them to trophic states. To achieve this, a list of dominant morphospecies was compiled, showing higher richness in mesotrophic to eutrophic reservoirs and lower in oligotrophic ones. Species such as *Brachionus falcatus*, *Keratella americana*, *K. cochlearis*, *K. tropica*, *Platyonus patulus*, *Hexarthra* spp., and *Polyarthra* spp. were widely distributed regardless of trophic state. Conversely, *Ascomorpha ecaudis* was found only in oligotrophic conditions, while *Brachionus angularis*, *Epiphanes* spp., *Filinia* spp., and *Lecane* spp. appeared in mesotrophic to eutrophic environments. The preliminary analysis estimated an alpha diversity of 11.2 ± 5.3 , a gamma diversity of 35 morphospecies, and a beta diversity of 3.1. This suggests three reservoir groups corresponding to different trophic states: oligotrophic, mesotrophic, and eutrophic. Although the distribution of reservoirs across hydrographic basins influences taxa presence, trophic conditions may overlap. Thus, further research on rotifer species richness can enhance understanding of the trophic status of Venezuelan reservoirs.

Keywords: Monogononta, Species richness, Neotropical water bodies

Effects of salinity on the hatching of resting eggs of the rotifer *Brachionus plicatilis* Müller, 1786

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Salinity is a major factor structuring rotifer communities in coastal environments, generally leading to a decline in species richness. However, certain species, such as the rotifer *Brachionus plicatilis* Müller, 1786, can thrive under elevated salinity conditions. In this study, we investigated how salinity affects the hatching success of *B. plicatilis* resting eggs collected from a Brazilian coastal lagoon. Resting eggs were isolated from 100 grams of wet sediment per replicate and incubated during 8 days at salinities of 0.0, 8.0, 16.0, 24.0, and 32.0. Hatchling numbers across salinity treatments were compared using a generalized linear model (GLM). At the end of the incubation period, 571 resting eggs hatched. The mean number of hatchlings ranged from $0.25 (\pm 0.25 \text{ SE})$ at 0.0 salinity to $55.75 (\pm 2.46 \text{ SE})$ at 8.0 salinity. Hatching success was low and statistically similar at salinities of 0.0 and 32.0, while the highest hatching rates occurred at 8.0 and 16.0, with no significant difference between them. The 24.0 salinity treatment resulted in intermediate hatchling numbers, differing from all other treatments. These results indicate that *B. plicatilis* resting eggs preferentially hatch under intermediate salinity conditions (8.0 to 16.0), corroborating our field observations where this species dominates in brackish waters. Resting egg banks may enable *B. plicatilis* populations to survive unfavorable conditions in the water column (e.g., low salinity) and respond rapidly to salinity increases.

Keywords: Dormancy, Diapause, Salinization, Brachionidae

Pantanal-Cerrado border: a study of the spatial variation of rotifers in fish farming systems

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The Pantanal biome is a floodplain in the upper Paraguay River, and the Cerrado biome is a Neotropical savannah with a wide latitudinal gradient in the Brazilian Central Plateau. Fish farming activities in both biomes have expanded intensively in the last decade, and the zooplankton communities of these systems are poorly studied. Rotifers are key to these communities and their species distribution often changes in response to geographical factors. Here we hypothesized that difference in rotifer density among fishponds will increase with distance due to dispersal limitation, and fishponds located in different biomes present dissimilar rotifer composition. Sampling took place in 2021 across 34 fishponds located in both biomes in the state of Mato Grosso, filtering 40 L through a 68 µm plankton net, followed by its fixation in 4% formaldehyde. Statistical analysis included Mantel tests and PERMANOVA, both based on Bray-Curtis distances. Among the 149-zooplankton taxa identified, 61 were rotifers, 28 species exclusive to the Pantanal biome, including 7 species of *Lecane*, 3 of *Filinia*, 5 of *Trichocerca* and a new record of *Brachionus fernandoi* for Brazil. No rotifers were observed in five Cerrado ponds, while Bdelloidea were exclusively observed in this biome. Rotifer density varied significantly with increasing distance between fishponds (Mantel $r = 0.1582$, $p = 0.014$); and between different biomes (pseudo- $F = 2.6823$, $p = 0.001$). Thus, the hypotheses were supported, corroborating studies that demonstrate the influence of spatial factors on rotifer distribution and highlighting the spatial

heterogeneity of this group in association with distinct biomes.

Keywords: Biome, Water, Biodiversity

Effect of temperature and food availability on the demography of predatory rotifer *Asplanchnopus* sp.

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Asplanchnopus is one of the three genera in the family Asplanchnidae. The genus is widely distributed in all biogeographical regions except Antarctica. There are four known species of *Asplanchnopus*: *A. dahlgreni*, *A. multiceps*, *A. bhimaverensis* and *A. hyalinus*. Although these species are often reported in studies on zooplankton diversity, there are only a few studies on the biology of these taxa. Here we compare data on the demography of a species, the trophi of which is similar to that of *A. multiceps* except for a small tooth on the inner margin of the ramus. The species was isolated from a high altitude (>2800 msl), fast-flowing stream, close to the Iturbidae Reservoir in the State of Mexico (Mexico). We conducted population growth and cohort life table demography experiments at three prey levels (1, 2 and 4 ind ml⁻¹ of *Plationus patulus*) at 20 and 25°C. Four replicates were set up per treatment and experiments were conducted in 25 ml synthetic medium in scintillation vials. Experiments were ended when the population density declined, or the original cohort died. We also conducted studies on the feeding behaviour of this predator. This species of *Asplanchnopus* had longer survivorship (7 - 11 d), higher net reproductive rate (8 - 13 ind. female⁻¹ day⁻¹) and population growth rate (0.42 - 0.75 d⁻¹) as compared to previous studies on *A. multiceps*. Survivorship and reproduction were higher at 20°C than at 25°C. The functional response

experiments indicated higher prey consumption at 20°C. Data have been discussed with reference to the possible description of a new species of *Asplanchnopus multiceps* species complex.

Key words: Predator-prey relation, Population growth rate, Temperature, Demography

Rotifer prey type and turbidity levels affect the functional response, prey selectivity and population growth of the heliozoan *Actinosphaerium eichhornii*.

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Heliozoans are littoral-benthic predatory species where turbidity is high but most experiments rarely consider the effect of turbidity. Here we evaluated the effect of five levels of inorganic turbidity (0 to 40 NTU) and three prey species of rotifers (*Brachionus calyciflorus*, *Brachionus havanaensis* and *Plationus patulus*) on the population growth, functional response and prey selectivity of *Actinosphaerium eichhornii*. The heliozoan population growth was quantified using three prey species, separately, offered daily, at a density of 1 ind./ml. The initial heliozoan density was 0.1 ind./ml. The experiments lasted for 2 weeks. In functional response studies, pre-starved predators were allowed to feed for 1 h on each prey at 7 densities (1 to 64 ind./ml), alone and with different turbidity levels. For prey selection, we offered all the three rotifer species at one density (3 ind./ml) and pre-starved heliozoans were allowed to feed for 2 h, after which we counted the number of uneaten prey items. Manly's alpha was used to derive the prey selectivity index. The heliozoan population growth rate decreased with increasing levels of turbidity. Functional response curves showed increased rotifer consumption with increasing prey availability until 32

ind./ml, after which an asymptote was observed. With turbidities of 20 and 40 NTU, the asymptote was reached at lower prey levels. Manly's alpha showed higher preference for *B. havanaensis* as compared to other prey. Turbidity levels decreased the preference for *B. havanaensis* by heliozoans. The results have been discussed with emphasis on the role of turbidity on predation by *A. eichhornii*.

Key words: Rate of population increase, Prey selectivity, Turbidity

**Session 4: Genomics
(Oral Presentation)**

Homologous recombination and neotelomere addition enable delayed repair of fragmented chromosomes in the bdelloid rotifer *Adineta vaga*

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In most animals, the accumulation of genomic DNA damage triggers programmed cell death. Bdelloid rotifers, however, exhibit an extraordinary ability to survive extensive DNA damage without apoptosis. Remarkably, *Adineta vaga*, one bdelloid rotifer species, was recently shown to be able to reproduce despite chromosome fragmentation, relying on a faithful, transgenerational repair

mechanism based on meiotic homologous recombination. Yet, how these chromosome fragments are protected during subsequent mitotic divisions remains unclear. In this study, we generated a diploid, phased, telomere-to-telomere genome assembly of *Adineta vaga*. By combining this with high-quality long-read sequencing after X-ray irradiation, we confirmed previously observed chromosome fragmentation patterns. More importantly, we found that fragmented DNA is stabilized through the addition of neo-telomeres. Using single Pacbio HiFi reads to detect phase-switching, we also identified the homologous recombination pathways involved in double-strand break (DSB) repair. Furthermore, we leveraged phasing information alongside publicly available transcriptomic datasets to investigate whether haplotypes evolve independently. We identified differentially expressed alleles (DEAs), suggesting both loss-of-function and neo-functionalization. However, DEA distribution mirrored overall gene density without regional clustering, indicating that dosage compensation, if present, does not drive localized recombination arrest.

Keywords: Genome evolution, DNA repair, Extremotolerance

Repetitive Element Analysis of Monogonont Rotifer Genomes

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2. University of Massachusetts Lowell, Lowell - Estados Unidos;

3. Ripon College, Ripon - Estados Unidos. Rotifers are a diverse group of micro-invertebrates that have assorted lifestyles. Their genomes vary greatly in size, from less than 30 to over 200 Mb. As more genomes are sequenced, deeper genomic comparisons can enhance our understanding of genome evolution

including the potential role of repetitive elements in genome expansion. Here we report on the genomes of two planktonic species - *Anuraeopsis fissa* and *Polyarthra vulgaris* - that were sequenced using Oxford Nanopore Technology, assembled with Flye, and polished with Racon. The assembled genomes were 74 and 119 Mb, respectively, in length and contained 14,209 and 24,392 predicted proteins. Using these new assemblies, and those previously published, we compared the number of repetitive elements across 11 genomes using RepeatMasker. *Polyarthra vulgaris* had the lowest percentage of repetitive elements (8.6%), whereas the highest was in *Notommata copeus* (17%). Repetitive elements were categorized into retroelements (e.g., SINEs, LINES), DNA transposons (e.g., hobo-Activator), and "other" (e.g., rolling circles, simple repeats, satellites, sncRNAs), and select assemblies varied in the amount of each category. Interestingly, genome size does not correlate with the percentage of repetitive elements found, i.e., higher percentage within larger genomes, and variation in the types of elements. Thus, genomic analysis is providing evidence that common bioinformatic tools fail to identify all of the genetic elements in rotifers, including unique repetitive element types. Our work highlights the need for collaborative work to modify tools and pipelines to work more robustly with rotifers and other non-model species.

Keywords: Genome sequencing, Monogononts, Non-model organism analysis

A case study from the Chihuahuan desert: Are rotifer genomes ecoresponsive?

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Heavy metal pollution is a global problem to which organisms have had to adapt to survive. This study aimed to determine

whether rotifers from polluted habitats contain different numbers of detoxification-related genes than those from non-polluted habitats. We hypothesized that rotifers from polluted habitats would have larger detoxification gene repertoires. To test this, we sequenced genomes of *Epiphanes chihuahuaensis* and *E. brachionus*, from each habitat type. All four genomes were sequenced using an Oxford Nanopore MinION, assembled by Flye, polished with Racon, and putative genes were identified using Braker2 which were then annotated with Omicsbox. We identified genes related to heavy metal detoxification: Class A GProtein Coupled Receptors (GPCRs), Cytochrome P450s (CYP450s), Glutathione S-Transferases (GSTs), and Heat Shock Proteins (HSPs). Both populations of *E. brachionus* had larger genomes (~105 Mb) than either *E. chihuahuaensis* genome (~76 Mb), but all had summary statistics indicative of good quality assemblies (high N50, low L50, high coverage). After rarefaction to account for differences in genome size, there was no pattern of increase in the repertoire across detoxification genes for both species, but there were a few cases of a population from a polluted site having more copies of specific genes (e.g., Class A GPCRs, GSTs and HSPs in *E. chihuahuaensis* and CYP450s in *E. brachionus*). Exploration of the various protein groups identified here, along with future in vivo protein expression analysis, will give researchers a better idea of how long-term toxicant exposure affects genomic architecture and physiological responses in rotifers.

Keywords: Adaptation, Anthropogenic Pollution, Detoxification, Heavy Metals

Synteny conservation despite variations in horizontal gene transfer patterns among bdelloid rotifer genomes

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Bdelloid rotifers represent an ancient clade (> 60 Mya) of microscopic, obligately parthenogenetic animals. Their unique traits include desiccation and radiation resistance, and an exceptionally high amount of horizontally transferred genes (HTGs) from non-metazoan origin. To understand the evolution of this asexual clade and the genomic mechanisms contributing to their unique adaptations, we assembled and compared seven new chromosome-level genomes of bdelloid and non-bdelloid rotifers, and obtained partial genome assemblies of six new bdelloid species. Our comparative genomic study found that chromosome-scale synteny and colinearity are highly conserved among bdelloids, but not between bdelloids and other rotifer clades. Analyses based on chromosome-scale conservation of ancestral linkage groups (ALGs), a collection of genes whose synteny persisted for hundreds of millions of years, show that the common ancestor of all rotifers had retained most of these ALGs. The genomes of bdelloid rotifers (and, to a lesser extent the acanthocephalans) have however been massively rearranged. We also confirm the presence of a significantly higher number of HTGs in all bdelloids compared to monogononts, acanthocephalans or seisonids. HGT integration hotspots are concentrated in subtelomeric regions in *Adineta* spp., *Philodina roseola* and *Habrotrocha* sp. while they are distributed along the chromosomes for *Rotaria rotatoria*. We also started to compare the functions of HTGs in bdelloid species to better

understand the evolutionary dynamics of these foreign acquired genes.

Keywords: Bdelloid, HTG, Synteny

Unraveling the mysterious asexual evolution and the extreme tolerance of bdelloid rotifers

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Bdelloid rotifers are microscopic animals notorious for their long-term persistence without canonical sexual reproduction. This paradox is often counterbalanced by their remarkable ability to repair genome breakage caused by desiccation and other stresses. Our research group, through our ERC project, has been investigating how bdelloid rotifers survive both asexuality's challenges and extreme conditions. To tackle these questions, we use comparative genomics and study DNA repair at the molecular and cellular level. I will present at Rotifera 2025 our main findings, while my researchers will delve deeper into specific aspects. Chromosome-scale genome assemblies of distinct bdelloid species revealed six homologous chromosome pairs with conserved synteny (see Olivier De Thier), and detected signatures of homologous recombination, compatible with meiosis. Cytological studies on bdelloid species *Adineta vaga* support a meiotic-derived oogenesis, where meiosis I is abortive, and germline DNA repair is delayed to this stage when homologous chromosomes pair. Experimental evolution and induced DNA damage studies in *A. vaga* confirmed large-scale loss of heterozygosity, confirming meiotic homologous recombination. Surprisingly, we also detected large-scale duplications, deletions and chromosome fragments that persisted and were repaired across generations, through a novel transgenerational DNA repair mechanism (see Antoine Houtain). More recently, we began exploring the molecular mechanisms behind *A. vaga*'s extreme resistance to desiccation and radiation,

identifying key actors. The first Crispr-Cas9 mutants have now been obtained and will be presented by postdoc Marc Guérineau.

Keywords: Evolution, Resistance, DNA repair

Session 4: Genomics (Poster Presentation)

Identification of potential GalNAc-transferases in rotifers using a novel predictive Hidden Markov Model

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Sugars can be added to proteins to form complex glycoproteins that are used for a variety of cellular functions including cell recognition, development, and protection. One type of protein glycosylation is O-linked N-acetylgalactosamine (GalNAc) and it is performed by a family of proteins called GalNAc-transferases (GALNTs). Much of our existing knowledge about GALNT is derived from mammalian studies, and there are significant gaps in describing how these enzymes function across rotifers and other diverse taxa. This study aimed to create a predictive model for the identification of GALNTs across 13 monogonont rotifer taxa for which genomes are available. Starting with the mammalian gene homologs, we created a model to identify potential GALNTs in rotifers. First, to expand the number of GALNTs available to build the model, mammalian GALNTs were used to search various microinvertebrates protein sequences using BLAST. The sequences with highly supported matches were collected and categorized into GALNT sub-families. A subset of the collected GALNTs were then used to create a Hidden Markov Model (HMM) and tested with the remaining GALNTs and a variety of non-GALNT proteins. Results show that the HMM model identified all of the compiled GALNTs tested and excluded the non-GALNTs. Between 13 and 29

GALNTs were identified within each of the rotifer genomes but were often classified as hypothetical proteins in functional analysis pipelines. Future work includes developing individual GALNT sub-family models and verification of the predicted function through molecular biology experiments.

Key Words: Functional annotation, GALNTs, Hidden Markov Model

Integrative machine learning framework for detecting cytoskeletal-related proteins in rotifers: A case study of actin and myosin

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Actin and myosin are cytoskeletal proteins involved in essential cellular processes such as motility, contraction, and shape maintenance. In rotifers, identifying and characterizing these proteins is vital for understanding their biology, development, and evolutionary adaptations. We developed a machine learning based pipeline capable of accurately predicting actin and myosin sequences within predicted rotifer proteins databases by integrating Logistic Regression (LR), Multi-Layer Perceptron (MLP), and Extreme Gradient Boosting (XGBoost), with dimensionality reduction using Principal Component Analysis (PCA). We evaluated our classifiers using 5-fold cross-validation. LR achieved the highest F1-score, followed by MLP and XGBoost. The most influential components identified using PCA were hydrophobicity, polarizability, solvent accessibility, charge and structural features. To assess utility, we applied our models to unannotated predicted proteins from rotifer species. The model predicted 346 actin-like and 503 myosin-like candidates across 17 rotifer species. These predictions were consistent across the three models, demonstrating the pipeline robustness. We validated the results using

phylogenetic analyses of our putative proteins and representatives of known myosin classes using a ML classifier. We found large protein clusters assigned to myosin-6 (involved in endocytosis, cell division, differentiation and cell migration) and myosin-7 (involved in functions of sensory structures and fertility). This approach will streamline protein annotation in non-model organisms and enable deeper insights into the functional genomics of rotifers. While the models provide accurate predictions, these must be validated experimentally through methods such as gene expression profiling, structural analysis, or functional analysis to confirm their roles in rotifer biology.

Keywords: Bioinformatics pipeline, Genome annotation, Protein annotation

Session 5: New Advances in Rotifer Studies (Oral Presentation)

Proteomic Insights into Sessility and Lifestyle Evolution in Rotifers: Unveiling Sessile Adaptations

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2. Ripon College, Ripon - Estados Unidos. Sessility is a lifestyle that has originated independently many times throughout metazoan evolution. Changes from motile to sessile lifestyles, and perhaps back again, may have sweeping consequences for a species' genetic makeup. Within Rotifera, motile and facultatively sessile species occur across Superorders Pseudotrocha and Gnesiotrocha, whereas obligately sessile lifestyles are present only in the latter. Proteomics can provide a wealth of information that can be used to elucidate lifestyle differences. Study of rotifer proteomes has been largely isolated to the model genus *Brachionus* and some bdelloids. These

studies have focused primarily on dormancy, DNA repair, ecotoxicology, and diet. We recently sequenced novel genomes from 13 rotifer species, including five gnesiotrochans, and constructed a predicted protein database. Using high-resolution shotgun LC-MS/MS proteomics and Proteome Discoverer and Scaffold, we identified 1675 proteins, including 32 highly abundant in sessile taxa. Preliminary analysis revealed an enrichment of cytoskeleton-related proteins—such as actin, actin-related, myosin heavy chain—in these sessile species. These results suggest an expanded contractile architecture, potentially enabling both enhanced predator avoidance via rapid body contractions and stable attachment to surfaces through strong biochemical anchoring. While additional analyses are needed, this study provides the first total proteomes that better capture the diversity within monogonont rotifers. Our findings underscore the utility of novel genomic and proteomic resources to develop comparative datasets, enabling deeper insights into lifestyle adaptations among rotifers.

Keyword: Cytoskeleton, Genomes, Proteins

Unrepaired DNA double-strand breaks induced by CRISPR-Cas9 enable transgenerational gene knockout in the bdelloid species *Adineta vaga*

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Bdelloid rotifers are extremely resilient to ionizing radiation, capable of surviving doses that are lethal to most animals. While their DNA is fragmented upon irradiation, the return to favorable conditions triggers genome reassembly in

somatic cells through mechanisms that remain unknown. In contrast, DNA repair in the germline is delayed until oocyte maturation, where large deletions are progressively repaired across several generations via meiotic homologous recombination. To investigate this process, we used direct-parental DIPA-CRISPR method, delivering the Cas9 ribonucleotide complexes into hundreds of *Adineta vaga* individuals to induce targeted double-strand breaks (DSBs) at two different cut sites within DNA Ligase E (AvLigE), a radiation-induced gene of non-metazoan origin. Some of the transformed mothers presented the expected deletion in a fraction of their somatic genome, repaired through non-homologous end-joining, with a significant number of their offspring inheriting the unrepaired targeted gene. Over subsequent generations, however, most DSBs were ultimately repaired, occasionally leading to loss of heterozygosity. Unexpectedly, a subset of descendants retained the unrepaired AvLigE, showing significant sequence degradation at both sides of the DSBs, yet remained viable. This persistent unrepaired gene may reflect a lack of intact homologous templates, establishing permanent AvLigE knockout lineages that are now under further investigation. Altogether, our findings provide new evidence for a transgenerational repair mechanism in bdelloids and open novel avenues to explore the genetic basis of radiotolerance.

Keywords: Bdelloids, CRISPR-Cas9, Radiotolerance

Ultrastructural analysis of the nucleolus of two rotifer species with substantial evolutionary divergence

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Eukaryotes, such as rotifers, possess a nucleolus, a subcompartment of the cell nucleus where ribosome biogenesis occurs. The nucleolus is associated with early gene expression as well as the synthesis and processing of transcripts that assemble into ribonucleoproteins (RNPs). As such, it is the largest RNP structure within the nucleoplasm. This study analyzes the ultrastructure of the nucleolus in two rotifer species with substantial evolutionary divergence: the exclusively asexual bdelloid rotifer *Habrotrocha* sp. and the monogonont rotifer *Euchlanis dilatata*, which undergoes cyclical parthenogenesis. Samples were processed using conventional transmission electron microscopy techniques, using fixation with Karnovsky's solution (6% GTA, 4% PFA). General contrast was achieved using uranyl-lead (Ur-Pb) staining, and preferential regressive staining for ribonucleoproteins was performed using Ur-EDTA-Pb. In both species, results revealed a fibrogranular organization, consistent with the definition of bipartite nucleoli, where both the dense fibrillar and the granular regions can be distinguished. Fibrillar centers were not consistently observed. In *Habrotrocha* sp., the nucleolus is compact, central, with nucleolar bodies, suggesting low cellular activity. In contrast, *E. dilatata* exhibits a peripheral nucleolus with interstices, ribonucleoproteins in the nucleolus and chromatin, indicating an elevated activity. Keywords: Monogonont rotifer, Bdelloid rotifer, Transmission electron microscopy

Two decades of global contributions to rotifer research: proxy and qualitative analyses

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Macroanalysis of rotifer literature of last 20 years (2005-2024), retrieved from Web of

Science (WoS), has been analysed using proxy / scientometric indicators and qualitative assessment. Articles (about 5800) on rotifers published during this period constitute more than 60% of the entire literature available on this theme over 100 years from WoS. Proxy and scientometric analysis included citations, journal-related aspects and authorship factors. These indicators showed that more than 87000 citations have been received for all articles during this period. Citations for individual articles ranged from 0 to >1100. Number of authors per article also varied greatly, from single authors to multiple co-authors (1252). Total number of articles per author varied from 1 to >140. For qualitative analysis, the published works were divided into 13 fields: 1. History of Rotifer Research; 2. New Methods in Rotifer Research, 3. Taxonomy and Systematics, 4. Biodiversity and Exotic Taxa, 5. Microscopy, Morphology and Anatomy, 6. Limnology, Field Ecology and Bioindicators, 7. Ecotoxicology and Bioassays, 8. Evolutionary / Behavioural biology and Geriatrics, 9. Genetics and Genomics, 10. Experimental Ecology; 11. Fisheries and Aquaculture, 12. Biomedical, Biotechnological, Pharmacological and Engineering aspects, 13. Physiology, Biochemistry and Molecular biology. Qualitative indicators include novelty, originality, rigour, data quality, application of standard methods, valid interpretation, important additions of information to the area, ramification and implications, and/or optimal / judicious use of citations. Comments have been made on the qualitative indicators of selected rotifer publications during the chosen period.

Key words: Scientometric analysis, Proxy indicators, Qualitative indicators

Session 5: New Advances in Rotifer Studies (Poster Presentation)

Profiling the meeting: A bibliometric reappraisal of the XVI International Rotifer Symposium

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Conference abstracts are not peer-reviewed documents but often precede full papers, providing concise summaries of emerging topics curated by experts in the field. In this study, we screened and analyzed the abstracts from the most recent Rotifera Conference held in Croatia to gain a quantitative overview of taxonomic coverage, authorship patterns, and geographic representation. A total of 142 abstracts were reviewed, in which 96 unique species spanning 36 genera were mentioned—representing only about 3.5% of all known species currently listed in the LAN (List of Available Names). The genus *Brachionus* dominated the literature, appearing in 47 abstracts, followed by *Lecane* (20), *Keratella* (15), *Lepadella* (10), *Euchlanis* (6), and *Polyarthra* (5). In terms of country contributions, the largest numbers of abstracts originated from Mexico (24), the United States (23), and Poland (15). Only 13 abstracts (9.15%) resulted from international collaborations, while the remaining 129 (90.85%) were authored within a single country. A word frequency analysis revealed that terms such as "size," "diversity," "environmental," "conditions," "bdelloid," and "populations" were among the most recurrent across the abstracts. We call for the digitization of abstract books from earlier conference editions to enable historical evaluations of the field, facilitate assessments of shifting research priorities, support meta-research and guide improvements in abstract writing and knowledge dissemination among early-career researchers.

Keywords: Synthesis, Rotiferology, Bibliometrics

Inventory of rotifers in bromeliads growing on a rocky outcrop in the floodplain of the Upper Paraná River (PR – Brazil)

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The Bromeliaceae family is widely distributed throughout Brazilian tropical forests and is well known for its characteristic rosette-shaped leaf arrangement. The space formed by the rosette facilitates the accumulation of rainwater, creating natural microcosms known as phytotelma. These aquatic microhabitats host a diverse associated fauna, including rotifers. In the floodplain of the Upper Paraná River, along the right bank, numerous individuals of *Aechmea distichantha* Lem. were found colonizing a rocky outcrop. Species occurrence data were obtained from a hatching experiment and direct sampling of bromeliads in the area in 2024. We identified a total of four families (Asplanchnidae, Brachionidae, Lecanidae, and Notommatidae), along with representatives of Bdelloidea. Additionally, 14 rotifer taxa belonging to six genera were recorded in the bromeliads. The most conspicuous species belonged to the genus *Lecane* (*Lecane bulla*, *L. furcata*, *L. hamata*, *L. leontina*, *L. lunares*, and *L. lunaris crenata*), followed by *Keratella* (*Keratella cochlearis*, and *Keratella* sp.), *Brachionus* (*Brachionus calyciflorus*, *B. falcatus*), *Asplanchna* (*Asplanchna* sp.), *Kellicottia* (*Kellicottia bostoniensis*), and *Monommata* (*Monommata* sp.). The findings from this study contribute to the establishment of a species database to support future ecological research.

Keywords: Checklist, Monogononta, Phytotelma

Standardizing Taxonomic Nomenclature for Rotifers

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The International Code of Zoological Nomenclature (The Code), 4th edition¹, has been an important guide for animal taxonomists and systematists ever since its conception and creation in the late 19th and early 20th century. The Code gives us rules by which we can create valid names using binominal nomenclature (genus and species) for the animal kingdom. It was Haring's Synopsis of the Rotatoria² that gave us the first authoritative nomenclatural rule set exclusively for correctly naming rotifers. The Synopsis brought the 'inextricable (rotifer) nomenclature'² available at the time in line with The Code despite early parochial resistance.^{3,4} More recent authoritative references aligning rotifer names with The Code include Dumont et. al. 1993, Segers 1995, Nogrady, Pourriot & Segers 1995, De Smet 1996, De Smet & Pourriot 1997, Nogrady & Segers 2002. Since The Code-derived rule sets are retroactive back to 1758 the large administrative and scientific burden of many volunteer rotifer experts has produced a Rotifer World Catalogue (RWC) as part of the 'Catalogue of Life'. The RWC contains information on rotifer nomenclature, taxonomy and classification for all currently accepted species, genus and family group names in the Phylum. The list currently contains 4267 validated species and 4016 total names of Rotifers.

Keywords: The Code, ICZN, Synopsis

Reflection of different rotifer species for interior furniture designs: An innovative approach for the first time in the world

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In interior design, the starting point for any living emotion or form. In this study, it is aimed for living things in nature play an active role in our daily lives. In interior design, especially in the field of furniture (coffee table, console, chair, photo frame, full-length mirror, desk, etc.), it is envisaged to present the reflection of form and/or movement of rotifers in design development by taking their natural beauty. In the study, photomicrographs of rotifers from samples collected from different waterbodies of Türkiye were used. Hand drawing and computer-aided design applications were used to show the different species. The final design was transferred with a sketch to display it beautifully. In addition, it has been shown that the Rotifera, the microscopic organisms, invisible to the eye, can also be reflected in our interior design for homes. In this design, depict not only physical characteristics but also other features including colour, texture, and shape. Rotifera, apart from a scientific perspective, can be successfully used for different disciplines of both aesthetic and scientific areas. Inspired by the life forms of Rotifera, we integrated them into furniture design for the first time in the world.

Keywords: Interior design, Rotifera, Innovative approach

Session 6: Experimental Studies and Aquaculture (Oral Presentation)

Effects of adaptation on evolutionary potential of the rotifer *Brachionus calyciflorus* in multi-stressor environments: insights from sequential laboratory evolution experiments.

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Populations are increasingly exposed to diverse stressors, often in novel combinations, which threaten their persistence and adaptive potential. Using sequential evolution experiments with populations of the cyclic parthenogenetic rotifer *Brachionus calyciflorus*, we investigated how prior adaptation to heat stress influences the evolutionary response to copper stress, and vice versa. Our results reveal asymmetric cross-tolerance: while heat adaptation conferred increased tolerance to copper, copper adaptation offered no protection against heat stress. Moreover, adaptation to heat was significantly impaired when preceded or followed by a multigenerational exposure to copper. In contrast, copper adaptation remained robust regardless of prior or subsequent multigenerational exposure to heat. These findings underscore the complex interplay between stressors in shaping the micro-evolutionary trajectories of populations. Understanding these dynamics may prove critical for predicting population persistence in dynamic, multi-stressor environments and has important implications for biodiversity management in the face of climate change and anthropogenic pollution.

Keywords: Rapid adaptation, Micro-evolutionary potential, Global change

Effect of food and competition on the population growth of *Cyrtosia tuba* (Ehrenberg, 1834) (Epiphanidae: Rotifera)

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- Cyrtosia tuba*, though widely distributed, is a rarely encountered rotifer. We studied the effect of algal food (*Chlorella vulgaris*)

availability and the direct and indirect competition with other rotifers of the family Euchlanidae with which it often coexists. Population growth experiments were conducted at seven concentrations of alga (0.0078, 0.0156, 0.0313, 0.0625, 0.125, 0.25, and 0.5 X 10⁶ cells ml⁻¹) while life table studies were conducted at four food levels (0.0625, 0.1, 0.25 and 0.4 X10⁶ cells ml⁻¹). We also studied the effect of direct competition and the effect of allelochemicals produced by *Dipluechlanis propatula* and *Euchlanis dilatata* on *C. tuba*. All experiments were conducted at 25°C in 25 ml scintillation vials with 20 ml of appropriate medium and food concentration. Four replicates were set up for each treatment. Living individuals of *C. tuba* were counted daily and the medium was replaced until the end of each experiment. The rates of population increase based on the population growth experiments ranged between 0.12 to 0.31 d⁻¹ while those based on the life table demography experiments ranged between 0.39-0.56 d⁻¹. Survivorship increased with increasing food availability. The adverse effect of allelochemicals or the direct presence, of the euchlanids, was significant on *C. tuba*. Our findings have been discussed in relation to the findings from other members of Epiphanidae.

Key words: Food level, Competitive interaction, *Cyrtosia*, *Dipluechlanis*, *Euchlanis*

Session 6: Experimental Studies and Aquaculture (Poster Presentation)

Distribution of Antarctic bdelloid rotifers predicts sensitivity to temperature and salinity

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The Vestfold Hills region of Antarctica hosts a network of lakes that range in salinity from ultra-fresh (<0.01) to ultra-saline (270). These lakes have been formed through a range of current and historical processes including glacial advance and retreat, marine input phases via sea level rise and fall, isostatic rebound, among others. Salinity and temperature, and how these parameters interact with the availability of liquid water, are the most important abiotic drivers of Antarctic limno-terrestrial meiofauna. Recently, the distribution three bdelloid rotifers species was investigated in the Vestfold Hills using genetic methods. *Philodina* sp. (Bd46), *Habrotrocha* sp. (Bd14), and *Habrotrocha devetteri* are limited in distribution to ultra-fresh lakes, moss, and semi-saline lakes, respectively. The sensitivity of these species was subsequently tested at a range of salinities (0 – 50 ppt) and temperatures (5, 15, 25 °C) using rotifer activity, survival, and reproductive output. The rotifer distribution in the saline lakes clearly predicted how each species responded to salinity. *Habrotrocha devetteri* was highly tolerant to saline conditions, and nearly all rotifers that were contracted were contracted at the end of experiments recovered when transferred to their preferred salinity. However, this species was the least tolerant of high temperatures. *Philodina* sp. (Bd46) was the least tolerant of high salinity but the most tolerant to higher temperature treatments. *Habrotrocha* sp. (Bd14) exhibited a mixed response to both salinity and temperature, consistent with their 'generalist' distribution as a moss and melt-stream dwelling species.

Keywords: Salinity sensitivity, Physiological tolerance, Temperature

Effect of enrichment of *Brachionus plicatilis* (Rotifera) with the probiotic *Bacillus subtilis* on the population growth at different salinities

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Live feed plays a fundamental role in aquaculture. In recent decades, the growing interest in producing high-quality live feed in large quantities has promoted the use of probiotics as a complementary strategy to improve both its production and nutritional value. Zooplankton, especially rotifers, represent an excellent option due to their high nutritional value, as they provide essential fatty acids, lipids, vitamins, and proteins that meet the dietary requirements of fish and invertebrate larvae. The aim of this study was to evaluate the effect of *Bacillus subtilis*, a commercial probiotic (SERENADE® ASO), on the population dynamics of the rotifer *Brachionus plicatilis*. Three probiotic concentrations (0.5 , 1.0 , and 2.0×10^6 cells/ml), three salinity levels (10, 20, and 30 mg/L), and *Chlorella vulgaris* as feed (1.0×10^6 cells/ml) were used. Each experimental unit contained 20 individuals in 20 ml of EPA medium, with four replicates per treatment, along with control groups containing only the microalga. Every day, the rotifers from each test jar were counted and transferred to fresh medium, for approximately 20 days. The results showed that the probiotic had a significant positive effect on maximum population density (200 ind/ml) and rate of population growth rate (0.4 per day) as compared to the controls (150 ind/ml and 0.3 per day, respectively). Based on the results obtained, the use of probiotics as an enrichment strategy in live feed cultures for fish and invertebrate larvae represents a highly cost-effective alternative.

Keywords: Aquaculture, Probiotics, Zooplankton

Session 7: Morphology of Rotifers (Oral Presentation)

Morphological diversity and surface properties of diapausing embryos of sessile rotifers

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Sexual reproduction in monogonont rotifers results in the formation of diapause embryos (DEs), a trait documented in only ~10% of species despite being considered plesiomorphic. DEs exhibit significant diversity in size, shape, color, and surface ornamentation, with both common congeneric patterns and notable intraspecific variation. The functional and evolutionary significance of DE morphology remains debated. Most DE morphology was described using light-microscopy, which has limited accuracy, while scanning electron microscopy (SEM) and atomic force microscopy (AFM) provide the best documentation. SEM images of DEs from sessile species reveal three shells: 1) an outer, thin, transparent shell that may be absent, short-lived, or permanent, 2) a thick intermediate shell with diverse ornamentation, but always a suture (groove) along the crest, and 3) a thin internal film enveloping the embryo, present in all species. AFM shows the topography and mechanical properties of the DEs surface. The intermediate shell's ornamentation is smooth with an oblique ridge in *Collotheca monastica*, concentric ridges in *Ptygura crystallina*, a meridional ridge in *P. thalenoensis*, or bumps and an oblique ridge in *P. ctenoida*. The outer shell of sessile rotifer DEs is thinner than that of well-known planktonic species such as *Asplanchna* or *Brachionus*. We

support the results of others that propose that the tubes in which sessile species deposit their eggs act as an exogenous shell, allowing them to save energy in forming more elaborate protective shells. Notable differences among the DEs of *Ptygura* species suggest that the genus is polyphyletic.

Keywords: Collotheca, Ptygura, SEM, AFM, Resting egg

Does facet pattern morphospace affect structural stability in *Keratella* (Rotifera, Monogononta, Brachionidae)?

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Genus *Keratella* comprises 56 species of rotifers, 54 of which possess a dome-shaped, dorsal plate divided by slightly raised ridges into a network of polyhedral units (facets). Thus, most species resemble elongate, truncated, geodesic domes (geodomes), with the polyhedrons defining a species' facet pattern (FP). FPs are categorized into groups based on their archetypical model: cFP, *K. cochlearis* (n=17); qFP, *K. quadrata* (n=28); sFP, *K. serrulata* (n=9); two species have no FP (nFP). A previous study that used finite elemental analysis (i.e., using the architectural program SkyCiv©) provided 'proof-of-concept' that *Keratella* FPs may have the functional significance of resisting pressure on the dorsum. We extended that study to test FPs' ability to meet architectural code (a proxy for structural stability) by evaluating a SkyCiv geodome modified to resemble a *Keratella* and 19 *Keratella* FPs regardless of their taxonomic status. These included seven cFP, five qFP, five sFP, and two invented FPs. Stability was tested by applying stresses of 1, 2, 3, and 4x the structural mass of each hypothetical geodome to its

dorsum. The modified dome, all qFPs, and both invented FP passed at all levels. Four cFP passed at all levels; two failed at higher levels; one failed at all levels. Two sFP passed at all levels; three failed at higher levels. We posit three peaks within the adaptive-fitness landscape of *Keratella* FP morphospace, with their known morphological variants and the nFP representing locally adapted optima. Testing stability in other rotifer taxa possessing FPs (e.g., *Trichotria tetractis*) is warranted.

Keywords: Adaptive/Fitness landscape, Geodesic dome, Physical stress

Session 7: Morphology of Rotifers (Poster Presentation)

Ultrastructure of the epidermis suggests a phylogenetic closeness between some species of the genus *Ptygura* and the genus *Limnias*

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The syncytial integument with a dense intracytoplasmic lamina (ICL) is a distinctive feature of phylum Rotifera, but its extent varies among taxa. We used transmission electron microscopy (TEM) to study the epidermal ultrastructure of *Ptygura innominata* Franch, 2021, a small sessile rotifer characterized by a dorsal plate bearing antler-like hooks. *Ptygura* is traditionally characterized by a circular to elliptically shaped corona. However, emerging data suggests that this genus might be polyphyletic. Some *Ptygura* species share features with the genera *Beauchampia* and *Limnias*, such as a hardened dorsal plate, symmetric trophi, absence of birefringent body in the larval gut, and a wide dorsal gap in the corona. These features are absent in other

species of *Ptygura* that frequently possess asymmetrical trophi. Our studies on ultrastructure of the epidermis of *Limnias* are now extended to *Ptygura innominata* to explore relationships at the ultrastructural level. Critical similarities include: 1) alternating rows of cilia and microvilli, 2) absence of vertical rootlets, 3) continuity between junctional complexes and the upper ICL layers, 4) organization of ICL sublayers, 5) mounded surface in trunk and foot, 6) ultrastructure of epidermal mounds, and 7) absence of mounds on the dorsal plate. These characteristics have not been described in other sessile genera. Otherwise, major differences include: 1) glycocalyx morphology, 2) presence of electrodense concretions at pore edges, and 3) muscular insertions in the dorsal plate. The ultrastructural similarities provide additional evidence that *Ptygura* is polyphyletic with some species closer to genus *Limnias*.

Keywords: Integument, Rotifera, Sessile, TEM.

Ultrastructure of epithelial adaptations for ambush predation in the macrophagous sessile rotifer *Collotheca monastica*

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Sessile rotifers, limited to the superorder Gnesiotrocha, are categorized into two orders with distinct feeding strategies whose phylogenetic relationships remain unclear. Flosculariaceae are microphagous filter feeders, employing malleoramate trophi and an active corona-mouth ciliary system. Collotheceae are macrophagous ambush feeders using uncinat trophi and a wide infundibulum. The latter possesses low-motility cilia

(setae) either on the infundibular edge or on prominent lobes (Collothecidae) or lacks cilia (Atrochidae). The newly identified species *Collothea monastica* feeds on large prey, exhibits immobile infundibular cilia and epidermal tubercles, which were associated with *Cupelopagis vorax* (Atrochidae), a species whose ultrastructure has been described. We studied *C. monastica* with Transmission Electron Microscopy finding differences in the proventricular epithelium and epidermal tubercles that does not support this link. However, we identified ultrastructural features associated to the macrophagous diet in *C. monastica*: (1) immobile setae likely due to altered microtubules and lack of mitochondria; (2) syncytial infundibular lining epithelium with thin ICL, fibrous-granular glycocalyx, and unusual conical pores suggesting exocrine function; (3) ciliate buccal tube with folded walls which allow to evert it in feeding process; (4) resemblance of its non-cellular proventricular epithelium to buccal velum; (5) stomach with ciliate and glandular cells with expanded endoplasmic reticulum; (6) cecum delimited by a no-cellular fibrous layer and containing partially digested particles embedded in a fibrous matrix; and (7) excretophores resembling fat bodies with electron-lucent content and reduced cytoplasm. Homology with Flosculariaceae structures is discussed. We conclude that striking morphological adaptations to macrophagous diet have correlation at ultrastructural level. Keywords: Excretophores, Infundibulum, Integument, Proventriculus, TEM.

Session 8: Rotifers as Bioindicators (Poster Presentation)

Influence of environmental variables on the structure of the rotifer community in Rodrigo de Freitas Lagoon (Rio de Janeiro, Brazil)

Moreira, Manoela Dos Santos¹; Castelo Branco, Christina¹.

1. Federal University of The State of Rio de Janeiro, Rio de Janeiro - RJ- Brasil. Rodrigo de Freitas Lagoon (RFL) is located in an urban area of Rio de Janeiro, with several anthropogenic influences. It is considered eutrophic and brackish due to nutrient inputs and constant water exchange with the sea, through an artificial channel. This study aimed to characterize the rotifer community of RFL and relate it to limnological variables. We tested the hypothesis that low diversity of rotifers would be found, but with high dominance of some species, due to the stressful characteristics of the environment such as high salinity and low dissolved oxygen. Samples were collected at 11 different points during the rainy (December 2021) and dry (July 2022) seasons. Rotifers were collected with a 68 µm mesh plankton net, fixed with 4% formaldehyde, counted in Sedgewick-Rafter chambers and identified to the lowest taxonomic level possible. Limnological variables were measured with a multiparameter probe and a Secchi disk. Six taxa of rotifers were identified: Bdelloidea, *Brachionus calyciflorus*, *Brachionus havanaensis*, *Brachionus cf plicatilis*, *Keratella americana* and *Keratella cf valga*. *Brachionus cf plicatilis* was the dominant species, with average densities of 150 and 6.971 ind/m³, respectively. The higher densities were at sites with more influence of rivers inputs and higher salinity (2021) and also at sites with higher dissolved oxygen and pH, and lower salinity and electrical conductivity (2022). Data reveal spatial heterogeneity in rotifer distribution, influenced by environmental variations between sampling points and seasons, highlighting the relevance of limnological features in the structure of the rotifer community in RFL.

Key-words: Urban Lagoon, Bioindication, *Brachionus*

Rotifers as indicators of trophic status in small water bodies across field and forest catchments

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Effective methods for assessing trophic status in lakes using zooplankton are well-established, yet small and shallow water bodies, despite their ecological significance and vulnerability to anthropogenic pressures, lack standardized assessment tools. This study addresses that gap by evaluating the utility of rotifer communities as indicators of trophic state in 100 ponds located in agricultural (field) and forested catchments. We hypothesized that the Rotifer Trophic State Index (TSIROT) would provide reliable trophic assessments comparable to the traditional Carlson TSI index and that physical and chemical parameters would significantly influence rotifer composition. Field ponds, subject to nutrient-rich runoff, exhibited higher trophic levels and were dominated by detritivorous rotifers. In contrast, forest ponds maintained lower trophic states, supported by extensive macrophyte cover and diverse communities of algivorous, mesotrophic, and littoral rotifer assemblages. Environmental factors such as total phosphorus, pH, and macrophyte coverage effectively differentiated pond types and shaped rotifer communities. Rotifer traits, including species diversity, abundance, habitat preferences (pelagic vs. littoral), and the relative proportions of eutrophic and mesotrophic taxa, proved

sensitive to environmental gradients and useful for trophic classification. Our findings indicate that TSIROT can be applied to small water bodies to assess trophic state and produces results that are consistent with those obtained using Carlson's index. This study contributes to the development of rotifer-based bioindication methods for small aquatic ecosystems and underscores the importance of catchment characteristics in shaping pond water quality.

Keywords: Water quality monitoring, Eutrophication assessment, Catchment impact

Session 9: Exotic species or invaders? (Oral Presentation)

Kellicottia bostoniensis (Rousselet, 1908): a non-native species persisting in a vertical gradient in a tropical reservoir

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The rotifer *Kellicottia bostoniensis*, a transcontinental invasive species, has exhibited notable dispersal and adaptability to tropical freshwater environments. In Brazil, at the Ribeirão das Lajes Reservoir, the non-native species is found mainly at the surface during winter. The present study analyzed 342 samples collected from 2004 to 2006 at 5-meter intervals from the surface to the bottom (40 meters of depth), measuring limnological variables "in situ", and water samples for nutrient analyses. Additionally, 162 phytoplankton samples were collected for analysis. *K. bostoniensis* was detected at most

depths, including anoxic zones, being most abundant between 5 and 25 meters. At 5 meters, it constituted approximately 33% of the rotifer community and 10% of the total zooplankton density. A negative correlation was observed between its density and electrical conductivity, as well as with micro cyanobacteria. Conversely, positive associations were found with chlorophyll-a, nano chlorophytes, and nano cryptophytes. These findings align with previous studies in temperate regions, where increases in *K. bostoniensis* populations are linked to nanoplankton biomass, consistent with its microfiltration feeding strategy targeting nanophytoplankton (<20 µm), bacteria, and detritus. Winter mixing in the reservoir likely enhances nutrient availability in the water column, promoting nanophytoplankton abundance increase and favoring *K. bostoniensis*. This study underscores the limitations of surface-only sampling, which may significantly underestimate the abundance and distribution of this invasive rotifer. Comprehensive vertical sampling is essential for accurately assessing its presence and ecological impact.

Keywords: Bioinvasion, Vertical distribution, Freshwater ecosystem

Influence of local abiotic environmental parameters and native zooplankton structure on the colonization of alien rotifer *Kellicottia bostoniensis* in two reservoirs of northern South America (Colombia)

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In 2019, the exotic rotifer *Kellicottia bostoniensis* was recorded for the first time in northern South America in different Colombian waterbodies. In this work, we analyzed the distribution of this taxon

along the longitudinal gradient in the photic zone, in the Punchiná and San Lorenzo reservoirs from 2019 to 2023. To answer the following questions: How does *K. bostoniensis* respond to environmental factors? and how does the structure of native zooplankton and the population density of predators, competitors, and potential prey determine this distribution? Differences in *K. bostoniensis* population densities were analyzed using the Kruskal-Wallis test. A redundancy analysis (RDA) was performed to examine the response of *K. bostoniensis* to multivariate environmental factors and compare these responses with those of the zooplankton community structure and potential predator, competitor, and prey. Our results show that morphometric factors and other local abiotic environmental parameters in each reservoir were key factors for *K. bostoniensis*. In a reservoir with longitudinal compartmentalization (Punchiná), dissolved oxygen, turbidity, and suspended solids were positively associated with *K. bostoniensis* abundance, whereas transparency, total depth, pH, temperature, and native zooplankton were negatively related. In the irregularly dendritic reservoir (San Lorenzo), *K. bostoniensis* showed the opposite response. Population densities were low in both reservoirs (<14 ind/L). Our findings highlight the important role of local abiotic parameters, particularly the reservoir morphology, native zooplankton, and suspended matter, in driving *K. bostoniensis* abundance and occurrence. They also reveal relevant trends in its successful establishment capacity, suggesting continued dispersal to other basins in Colombia and other South American countries.

Keywords: Ecological interactions, *Kellicottia bostoniensis*, New locations

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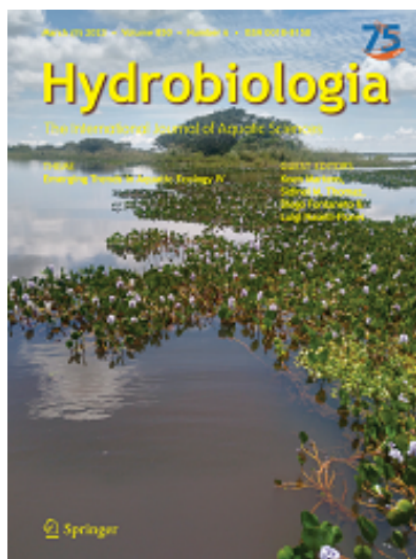
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Notes and News

Predation-prey vulnerable interactions among rotifers and fish in Guanting Reservoir, China

During my early studies of zooplankton research I observed cases of population density enhancement of *Asplanchna priodonta* that accompanied winter-spring algal blooms of *Peridinium gatunense* in Lake Kinneret. The identification (and counts) of *Asplanchna* were accomplished quickly and easily due to their stomach contents, which commonly included 3–5 cells (40–60 µm diameter) of dark colored *Peridinium* cells (Photo 1). *Asplanchna* is translucent organism, but a dark lump of *Peridinium* cells allowed me to see rather easily the entire rotifer and, no doubt, that of any fish that visually tracked zooplankton. The darker lump created a vulnerability to the otherwise translucent *Asplanchna*.



Photo 1: *Asplanchna priodonta*. Dark lump: Ingested *Peridinium* cells, Lake Kinneret (size: 1.4 mm).

Some 36 years later (2006) I re-evaluated my earlier observations, but

this time I did so through the view point of predatory fish in Guanting reservoir in China. Guanting was the first reservoir that was constructed (1951–1954) as part of the Yongding River System in the Huallal district within the Province of Hbei. The objective of constructing the Guanting system was to improve the drinking water supply and aid in flood control, as well as to improve the fishery. Unfortunately, over the years agricultural and industrial developments accompanied by population increase in the catchment caused water quality and fishery deterioration. Collaborative surveys of the limnological features of Guanting was carried out by an Israeli company and the Guanting Reservoir Administration-Beijing Hydraulic Research Institute. Twenty-nine fish species were found in Guanting of which 10 are commonly exploited, these included: 5 Carps: (Silver Carp, Grass Carp, Bighead Carp, Crucian Carp, and Common Carp) and 5 native species. Beside limnological, climatological, and morphometrical features of Guanting, the fish gut contents were analyzed of which a distinct common stomach component was *Asplanchna* sp. present as a dark lump. Surprisingly, increased magnification clearly defined these darkly colored lumps as an aggregation of 2–3 specimen of *Keratella* sp. This was a reminder of the *Peridinium* cells forming dark lump in the stomach of *A. priodonta* in Lake Kinneret. Thus, the process was clear; the dark *Keratella*-laden lump within the stomach of *Asplanchna* allowed the predatory fish to capture *Asplanchna*, which otherwise would be difficult for the zooplanktivorous fish to see.

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Obituary



Prof. Radovan Erben (September 24th, 1943 - August 20th, 2025) at the opening ceremony of Rotifera XVI in Zagreb (Croatia), September 4th, 2022

Radovan Erben (1943–2025) devoted more than four decades of his life to the Division of Zoology, Department of Biology, Faculty of Science, University of Zagreb, where he worked until his retirement in 2013. He was a pioneer of synecological studies on rotifers in Croatia, later expanding his research to the ecology of invasive species, ecotoxicological studies, and the impact of environmental stressors, with a primary focus on molluscs. His early research on rotifers was closely linked to biocoenotic surveys of zooplankton, particularly on the Plitvice Lakes (Croatia), as well as their occurrence in mosses, which are widespread habitats covering the tufa barriers of these lakes. For his outstanding contribution to science and education, he received the national award in 1999. Above all, he will be remembered as a respected colleague, a dedicated teacher, and a kind mentor who left a lasting mark on generations of students and fellow researchers.

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Obituary

In memory of Patrick Brown

Dear Colleagues,
It is with great sadness that we announce that Dr. Patrick D. Brown passed away on Sunday September 21 after a long battle against cancer. He was surrounded by family and friends. Patrick received his PhD in Ecology and Evolutionary Biology in 2023 in the Walsh Lab where he

subsequently completed a one-year post-doc. Most recently he was a faculty member at Eastern New Mexico State University-Ruidoso. During his time at UTEP, Patrick touched many people with his passion for science.



Patrick Brown sampling Lake Lucero at White Sands National Park, New Mexico, USA.

Patrick was a true scholar who thoroughly enjoyed and excelled in scientific inquiry. Despite health issues, Patrick was an exemplary graduate student and scientist, publishing many articles. He was a joy to collaborate with, contributing ideas, his statistical skills, and insights in data interpretation. Patrick was an inspiration to undergraduates he mentored and is credited by many for their continuing in graduate studies including graduate students currently at UTEP. Patrick was a social butterfly with many friends at UTEP, in El Paso, and beyond. He was also an

accomplished artist, loved running, playing games with friends, and exploring nature and the outdoors. His enthusiasm was infectious and his uniqueness inspiring. Most of all he was a great friend. He will be greatly missed – he made science much more fun.

Publications of Patrick Brown

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Sincerely,
Liz Walsh and Bob Wallace

Sponsors of Rotifera XVII (August 4-8, 2025 Rio de Janeiro, Brazil)



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