



BOOK OF ABSTRACTS & PROGRAMME

1st Central European Symposium for Aquatic Macroinvertebrate Research (CESAMIR) - 10-13 April 2014, Szarvas, Hungary

SYMPOSIUM TIMETABLE

Time	Wed	Thursday (10 April)	Friday (11 April)	Saturday (12 April)	Sun
8:00		Breakfast	Breakfast	Breakfast	
9:00			Plenary 2: BOUKAL	Plenary 3: CSÁNYI	
10:00		Opening Ceremony	Coffee break	Coffee break	
10:30		Plenary 1: BÁNFI	Talks – O2 10:30 Bódis 10:50 Dénes 11:10 Csercsa 11:30 Széles	Talks – O4 10:30 Berchi 10:50 Boda 11:10 Mižičová 11:30 Krasznai	
12:00		Lunch	Lunch	Lunch	
13:00		Talks – O1 13:00 Fleituch 13:20 Horváth 13:40 Várbíró 14:00 Rádková	Talks – O3 13:00 Copilas-Ciocianu 13:20 Pařil 13:40 Csabai 14:00 Āerný	Talks – O5 13:00 Deák 13:20 Turić 13:40 Ambrus 14:00 Méhes	
14:20		Coffee break	Coffee break	Coffee break	
14:40	REGISTRATION	Posters – P1, P2 14:40 Faunistics 15:40 Physiology, Toxicity, Urbanisation	Posters – P3, P4 14:40 Ecology, Evolution 15:40 Water quality, Rehabilitation, Methodology	Talks – O6 14:50 Mauchart 15:10 Polářek 15:30 Móra 15:50 Ortmann-Ajkai	
16:30		Coffee break	Coffee break	16:10 Closing Ceremony	
17:00		Workshop (W1):Drought	Workshop (W2): WFD		
20:00		Welcome Reception	Conference Dinner		

REGISTRATION ALL DAY LONG 8:00-20:00

POST CONFERENCE FIELD TRIP 8:00-16:00



BOOK OF ABSTRACTS & PROGRAMME

JOINT SYMPOSIA

**1st Central European Symposium
for Aquatic Macroinvertebrate Research**

and

**11th Hungarian Symposium
for Aquatic Macroinvertebrate Research
10-13 April 2014, Szarvas, Hungary**

Compiled by Péter Mauchart and Zoltán Csabai

Pécs-Szarvas, 2014

Printed in University of Pécs Medical School Press

Cover design: Zoltán Csabai

CESAMIR Symposium logo: Tibor Danyik

MAVIGE Symposium logo: Ferenc Kiss

Title pictures:

up left: *Palingenia longicauda* (by courtesy of Arnold Móra)

up right: Maros River (by courtesy of Arnold Móra)

middle left: stream in the Mecsek Mts. (by courtesy of Zoltán Kálmán)

middle right: *Cordulegaster heros* (by courtesy of Réka Boda)

down left: *Notonecta lutea* (by courtesy of Arnold Móra)

down right: Égervölgyi pond in Mecsek Mts. (by courtesy of Réka Boda)

WELCOME MESSAGE

On behalf of the organizing committee, it is a great pleasure to welcome you to the 1st Central European Symposium for Aquatic Macroinvertebrate Research (CESAMIR). The organizers would like to thank you for your contribution to this event, held in Szarvas, Hungary between 10th and 13th of April, 2014. We have made every effort to make your visit a pleasant and hopefully memorable one. We sincerely hope you enjoy your stay here. Hungarian researchers settled on their meetings in the field of aquatic macroinvertebrate research (Hungarian Symposium for Aquatic Macroinvertebrate Research, MaViGe) since 2004, which takes place annually in different cities all over Hungary. This conference series is one of the most highly acclaimed meetings in the field of limnology in Hungary with over 60-80 participants in each year. On the 10th meeting in 2013, the committee has decided to open to international relations. Accordingly, the 2014 meeting has been organized as a Joint Symposia: 1st CESAMIR and 11th MaViGe. According to the tradition of MaViGe, CESAMIR aims to integrate recent achievements of all branches of aquatic macroinvertebrate science, from basic to applied research, including taxonomy, biodiversity and faunistics, ecology, population biology, water quality monitoring, etc. We trust to that CESAMIR will develop to a biannual symposium in the future, bringing together scientist from around Europe that work in different areas of research on these fascinating groups of aquatic organisms. We hope that the 1st CESAMIR provides a good opportunity to present, discuss and share ideas, not only during the symposium but also during the „after hours”. We would like to thank the plenary lecturers for accepting our invitation to open the day to day scientific program, as well as those colleagues who organized the valuable and interesting workshops. Finally, our thanks are due to all those colleagues who made their best to invite researchers, and all those organizers who helped to frame the program and background of the symposium. The organizers hope you will enjoy the symposium and have time to explore the city of Szarvas and its amazing natural environment.

Zoltán Csabai

Co-chair of the scientific committee
Head of department,
associate professor
Department of Hydrobiology,
University of Pécs

Arnold Móra

Co-chair of the scientific committee
Research fellow
Balaton Limnological Institute,
Centre for Ecological Research of the
Hungarian Academy of Sciences

László Tirják

Chair of the local organizing
committee
Director
Körös-Maros National Park Directorate

GENERAL INFORMATION

VENUE

All scientific and social programmes of the Symposium (oral and poster sessions, reception, meals and evening events) will take place at the **Körös Valley Visitor Centre** of the Körös–Maros National Park Directorate. The Visitor Centre has been built in Szarvas, near the headquarters of the Directorate. Around the buildings the 26 hectares of Anna Garden has unique nature and special value, since besides the natural conditions the castle and its park is also important cultural heritage.

The address of the Visitor Centre is: Anna-liget 1., H-5540 Szarvas, Hungary

GPS coordinates are: 46°51'29.39" N, 20°31'31.57" E

See maps on the back cover.

More information about the Visitor Centre can be read at the following website:

http://www.kmnp.hu/index.php?pg=menu_1376

Information about Szarvas, the host city of the Symposium can be found at:

<http://en.wikipedia.org/wiki/Szarvas>

INTERNET ACCESS

There is free wifi internet access at the venue and free wifi and/or cable connection internet access in the hostel buildings.

ON SITE

All participants, including speakers, must register at the information desk and will receive an official conference package and a name badge, and where you may upload your presentation file and get additional information.

Opening hours of the information/registration desk

Wednesday 15:00 – 19:00

Thursday 8:00 – 20:00

Friday and Saturday: during coffee breaks

Every attendee must wear her/his official name badge to enter the sessions, meals and social programmes. This name badge contains codes for the ordered services. All participants will receive a "Certificate of attendance" and the printed invoice (if requested) at the information desk during the registration.

PARKING

Safe parking is available at the conference venue, Körös Valley Visitor Centre. At the hostel buildings there are public parking places in a limited number. The organizers recommend leaving your car at the conference venue. It can be reached by a ten minutes walk (2 km) from the hostel, and continuous transfer service (minivan) will be provided for free during the evening events between the venue and the hostels.

INSTRUCTIONS FOR ORAL PRESENTERS

- Talks are scheduled in 20-minute time slots. We strongly encourage, do not talk more than 15 minutes to allow 5 minutes for discussion and questions from the audience. The time limit will be strictly enforced by the session chairs to facilitate keeping the time schedule of the symposium.
- Speakers should provide their presentation file on a USB memory stick / Flash drive during the registration or coffee breaks at the registration desk, but no later than 1 hour before their session. Speakers of the morning sessions, please hand over the day before.
- Presentation file must be compatible with MS PowerPoint (*.ppt, *pptx) or Adobe (*.pdf) formats.
- The name of the file should be as “name-session-slot”, for example JohnDoe-O1-1.ppt
- The presentation files will be uploaded onto the hard drive of the computer in the lecture room before the session and will be removed afterwards. A projector, laptop and laser pointers will be provided for presentation. It is not possible to use your own computer.

INSTRUCTIONS FOR POSTER PRESENTERS

- The poster boards / suspension tracks are located in the lobby of the conference venue.
- The maximum sizes of the posters are 120 cm in height and 90 cm in width. The recommended poster size is the A0 portrait format (118.9 cm x 84.1 cm).

**1st Central European Symposium for Aquatic Macroinvertebrate Research
April 10-13 2014, Szarvas, Hungary**

- Posters have to be printed on paper and will be present over the whole symposium. Mounting equipments will also be provided, please do not use other adhesive material.
- Short introductions during the poster sections will be scheduled in 7-minute time slots. Please do not be longer than 5 minutes to allow 2 minutes for short questions. Audiovisual equipment or additional presentation file is not allowed for poster presentations.
- Posters must be mounted up no later than 1 hour before the start of the first poster session. Organizers recommend mounting your poster(s) upon arrival after registration.
- Posters not removed by Saturday, 12 April 2014, 18:00 will be discarded by the organizers, we assume no liability.
- Poster presenters or co-authors who fail to show up at their scheduled presentations will be excluded from the best poster prize award.

AWARDS

“Best poster prize”

All presented posters will be judged by independent experts invited by the organization committee. Main criteria: presentation of the scientific content, clarity, structure, design. Based on the proposal of the jury one poster will be awarded.

“Best young oral presenter prize”

Oral presentations are held by undergraduate students and PhD students will be judged by independent experts invited by the organization committee. Main criteria: preparedness of the presenter, clarity, design. Based on the proposal of the jury one speaker will be awarded.

WORKSHOPS

W1: Intermittent streams - a neglected phenomenon in Central Europe?

Organizer/moderator: Petr PAŘIL

Schedule: Thursday, 10 April 2014, 17:00–19:30

Complete drying of small streams (up to Strahler order 4), which typically occurs in the Mediterranean type of climate, has occurred more frequently also in Central Europe in last decades. Many limnologists from this region have deliberately

neglected intermittent streams because of their unstable hydrological regime, which complicates not only standard sampling but especially the interpretation of results. The forthcoming climate change brings to this region a new situation, which requires novel methods and approaches to be developed especially for regularly drying up streams.

W2: Intercalibration and ecological assessment in the frames of the WFD

Organizer/moderator: Gábor VÁRBÍRÓ

Schedule: Friday, 11 April 2014, 17:00–19:30

European Water Framework Directive (WFD) requires that quality classifications and assessment of water bodies based on macro-invertebrates are harmonised via an intercalibration exercise, ensuring a consistent level of management, protection and restoration of surface water bodies across Europe. We will discuss on the workshop the milestones of the intercalibration process, review the achievements and debate about its benefits and drawbacks.

SOCIAL EVENTS

All participants are invited to attend on the Welcome Reception on Thursday, 10 April 2014 at 20:00–3:00 and on the Conference Dinner on Friday, 11 April 2014 at 20:00–2:00. A continuous transfer service (minivan) will be provided for free during the evening events between the venue and the hostel buildings.

POST CONFERENCE FIELD TRIP

Field trip to two strictly protected conservation areas of the Körös-Maros National Park.

Schedule: Sunday, 13 April, from 8 a.m. to cc. 16 p.m.

Bus will leave from the Venue at 8:00.

MORNING: Kardoskút: The Fehértó (White Lake) in Kardoskút is one of the most valuable sodic ponds of the South Tiszántúl region with its special water supply and its particular flora and fauna established due to the very high salinity and pH especially during the summer month. The pond and its surroundings are a strictly protected nature conservation area since 1966 and an important Ramsar site since 1979, as well. The high level protection is justified by the geographical, hydrological, ornithological and biological values of the pond and its environment. Beyond the preservation of beauty of the landscape, the unbroken horizon, the

mosaics of alcalic grasslands and waterlogged areas important task of the conservation unit is preserving gene pools of ancient Hungarian domestic animals and varieties. Visitors can see great stocks of Hungarian grey cattle, racka and cigaja sheep.

More detailed information: http://www.kmnp.hu/index.php?pg=menu_1361

Lunch in a 250 years old traditional Hungarian inn (Kondorosi Csárda).

AFTERNOON: Dévaványa grasslands: Highly diverse protected area around Dévaványa once was a part of the Nagy-Sárrét marshland and its image formed by the water for a long time. In the 19th century, the diversion of the Berettyó River and the drainage of the marshy wetlands launched the general salinisation of the area creating the conditions prevailing today. In Hungary, the name of Dévaványa is synonymous with the protection of Great Bustard (*Otis tarda*). The first repatriation station of Europe was established here in 1978, than in 2002 it was extended with a 400 hectares fenced area to protect repatriated animals and to establish undisturbed and spacious breeding grounds and nesting places. Endangered eggs from surrounding non-protected areas are taken to the bustard reserve, the hatching of which is impossible in the natural conditions. These are hatched in hatching machines, then the nestlings are reared in the farm and finally they are released back to their natural habitats. In the Réthelyi Education and Visitor Centre a unique exhibition can be viewed about the botanical and zoological values of the area and about the Great Bustard Hungarian Protection Project.

More detailed information: http://www.kmnp.hu/index.php?pg=menu_1357

LIABILITY AND INSURANCE

The organizers cannot accept liability for any personal accidents, loss of belongings or damage to private property of participants and accompanying persons that may occur during the meeting. Participants are advised to make their own arrangements to obtain health, travel and property insurance before their departure to the event.

SCIENTIFIC PROGRAMME

WEDNESDAY (9 April, 2014)

15⁰⁰ – 19⁰⁰ REGISTRATION

THURSDAY (10 April, 2014)

8⁰⁰ – 20⁰⁰ REGISTRATION/INFORMATION DESK

10⁰⁰ – 10³⁰ OPENING CEREMONY

Welcome speech

László Tirják (Director of Körös-Maros National Park Directorate, chair of the local organizing committee)

Zoltán Csabai (Co-chair of the scientific organizing committee)

Announcement of “Best young oral presenter prize” and “Best poster prize”

Arnold Móra (Co-chair of the scientific organizing committee)

10³⁰ – 11³⁰ PLENARY LECTURE 1

Péter Bánfi: Wetland restoration projects in the Körös-Maros National Park

12⁰⁰ – 13⁰⁰ Lunch

13⁰⁰ – 14²⁰ ORAL SESSION 1 (O1)

Chair: Petr Pařil

13⁰⁰ **Tadeusz Fleituch**: **Functional role of benthic invertebrate shredders in assessment of running waters: a new perspective**

13²⁰ **Gábor Horváth** - Miklós Blahó - Tamás Herczeg - György Kriska - Ádám Egri - Dénes Száz - Alexandra Farkas - Nikolett Tarjányi - László Czinke: **Changing shiny paintwork to matte one can enhance the polarized light pollution of cars to polarotactic aquatic insects**

13⁴⁰ **Gábor Várbíró** - Arnold Móra - Csaba Deák - Ildikó Szivák - Pál Boda: **The changes of the functional diversity patterns along a watershed**

14⁰⁰ **Vanda Rádková** - Michal Horsák - Vít Syrovátka - Jindřiška Bojková - Vendula Křoupalová - Jana Schenková: **The role of environment and dispersal mode in metacommunity structuring of aquatic invertebrates at isolated spring fens**

14²⁰ – 14⁴⁰ Coffee break

14⁴⁰ – 15⁴⁰ POSTER SESSION 1 (P1) – Faunistics

Chair: Gábor Várbíró

- Zoltán Csabai - Arnold Móra - Réka Boda - Erika Bódis - Tibor Danyik - Csaba Deák - Anna Farkas - András Kálmán - Zoltán Kálmán - Péter Mauchart - Kristóf Málnás - Pál Boda: Contribution to the aquatic macroinvertebrate fauna of Kis-Sárrét Nature Conservation area (SE, Hungary): A biodiversity hot spot or just accurate and thorough samplings?
- Csaba Deák - Daniel Dimitru Portelechi: First record of *Wormaldia subnigra* McLachlan, 1865 (Trichoptera) in Hungary
- Márk Ficsór: Contribution to the aquatic Mollusc fauna of Northern Hungary and the Northern Great Plain. Part II: Bivalvia
- Teofil Fülep: Distribution of triclads (Platyhelminthes: Tricladida) in the waters of the Bakony mountains, Northwestern Hungary
- Andor Lókkös - Krisztián Kovács: Contribution to the Minute Moss Beetle fauna (Coleoptera: Hydraenidae) of North-West Hungary
- Arnold Móra: Contribution to the Chironomidae (Diptera) fauna of the Lake Balaton and its catchment area with first records of nine species from Hungary
- Boris Novaković - Marija Ilić - Margareta Kračun-Kolarević - Nikola Marinković - Jelena Đuknić - Vanja Marković: Distribution of the freshwater crustacean *Asellus aquaticus* Linnaeus, 1758 (Isopoda; Crustacea) in Serbia (2007-2013 period)

15⁴⁰ – 16³⁰ POSTER SESSION 2 (P2) – Physiology, Toxicity, Urbanisation

Chair: Csaba Deák

- Katarina Bjelanović - Ivana Živić - Dalibor Stojanović - Dajana Todorović - Dejan Mirčić - Aleksandra Mrkonja - Vesna Perić Mataruga: Trout farm effect on antioxidative defense in *Dinocras megagephala* (Plecoptera: Perlidae) larvae
- Anna Farkas - Thomas Oliver Mérő - Arnold Móra: Urban dragonflies: gomphids (Odonata: Gomphidae) along the Danube at Budapest
- Kristóf Málnás - Sándor Harangi - Zsuzsanna Balogh - Edina Baranyai - Attila Szondi - György Dévai - Edina Simon: Toxic element analysis in larvae, adults and exuviae of *Stylurus flavipes* (Charpentier, 1825)

1st Central European Symposium for Aquatic Macroinvertebrate Research
April 10-13 2014, Szarvas, Hungary

- Vanja Marković - Anđelka Petković - Bojana Tubić - Marija Ilić - Margareta Kračun-Kolarević - Nikola Marinković - Boris Novaković - Zoran Gačić - Momir Paunović: Impact of heavy metals in sediments on the macroinvertebrates communities of some smaller streams in Belgrade Region (Serbia)
- Ivana Živić - Dejana Trbović - Katarina Bjelanović - Zorka Dulić - Marko Stanković - Zoran Marković: Evaluation of fatty acid profile of Chironomidae larvae as valuable food for carp fry

16³⁰ – 17⁰⁰ Coffee break

17⁰⁰ – 19³⁰ WORKSHOP 1 (W1)

Intermittent streams - a neglected phenomenon in Central Europe?

Organizer/moderator: Petr Pařil

INITIATIVE TALK

- Petr Pařil: Intermittent streams in Central Europe - future challenges for limnologists

CONTRIBUTIONS

- Světlana Zahrádková - Petr Pařil: Maps of drought risk - principals of their constructions
- Marek Polářek: Use of dataloggers for drought monitoring and discharge modeling
- Péter Mauchart: A new laboratory tool to reveal the response of macroinvertebrate species to drought

20⁰⁰ – 3⁰⁰ Welcome Reception

FRIDAY (11 April, 2014)

REGISTRATION / INFORMATION DESK: available during coffee breaks

8⁰⁰ – 9⁰⁰ Breakfast

9⁰⁰ – 10⁰⁰ PLENARY LECTURE 2

David Boukal: On life and death: factors shaping life histories and trophic interactions of aquatic insects

10⁰⁰ – 10³⁰ Coffee break

10³⁰ – 11⁵⁰ ORAL SESSION 2 (O2)

Chair: Tadeusz Fleituch

10³⁰ Erika Bódis - Bence Tóth - József Szekeres - Péter Borza - Ronaldo Sousa: **Empty native and invasive bivalve shells as benthic habitat modifiers in a large river**

10⁵⁰ Avar-Lehel Dénes - Levente Péter Kolcsár - Lujza Keresztes: **Complex evolution of aquatic and semi aquatic habitats in the Carpathians: case study of the micro endemic *Pedicia straryi* group (Insecta, Diptera)**

11¹⁰ András Cserecsa - Arnold Móra - Csaba Deák - Eszter Krasznai - Andrea Zagyva - Gábor Várbíró - Pál Boda: **Testing the adequacy of the Hungarian typological system on the watercourses of the Ipoly basin, based on the macroinvertebrate communities**

11³⁰ Gábor Széles: **Advanced water quality and flow measurement techniques for aquatic macroinvertebrate research**

12⁰⁰ – 13⁰⁰ Lunch

13⁰⁰ – 14²⁰ ORAL SESSION 3 (O3)

Chair: David Boukal

13⁰⁰ Denis Copilas-Ciocianu - Michal Grabowski - Adam Petrussek - Lucian Parvulescu: **Biogeography of epigeic freshwater Amphipoda (Crustacea: Malacostraca) of Romania**

13²⁰ Petr Pařil - Světlana Zahrádková - Vít Syrovátka - Michal Straka - Marek Polášek - Lenka Šikulová - Denisa Němejcová - Pavla Řezníčková: **Testing of different approaches for the indication of stream intermittency in the Czech Republic - the BIODROUGHT project**

13⁴⁰ Zoltán Csabai - Pál Boda: **Environmental and species trait filters driving dispersal flight and colonization cycle of primary aquatic insects: from easy and effective sampling to a comprehensive theory?**

14⁰⁰ Martin Černý - Barbora Hančíková: **Local dispersion of Golden-ringed Dragonfly (*Cordulegaster boltonii*)**

14²⁰ – 14⁴⁰ Coffee break

14⁴⁰ – 15⁴⁰ POSTER SESSION 3 (P3) – Ecology, Evolution

Chair: Pál Boda

- Réka Boda - Bálint Pernecker - Péter Mauchart - Csaba Bereczki - Zoltán Csabai: The effects of drought on the life-cycle of *Cordulegaster heros*
- Bianca-Vanesa Boros - Denis Copilas-Ciocianu - Lucian Parvulescu: Can distant evolutionary relationships promote coexistence in freshwater amphipods (Crustacea: Amphipoda)? A comparative fecundity study of coexisting species in western Romania
- Jelena Fressl - Maria Špoljar - Tvrtko Dražina - Ines Radanović - Jasna Lajtner - Ivana Zrinščak - Tea Tomljanović - Dora Tončić - Sandra Hodić - Biserka Primc: Predation risk within macrophyte stands
- Vendula Křoupalová - Jindřiška Bojková - Vít Syrovátka - Vanda Rádková - Michal Horsák: Dipteran fauna of the Western Carpathian spring fens
- Nataša Turić - Andreja Radović - Goran Vignjević - Mirta Sudarić-Bogojević - Martina Temunović - Enrih Merdić: Temporal dynamics of aquatic insect (Heteroptera and Coleoptera) assemblages in a temperate floodplain associated with flood pulses
- Ivana Vručina - Goran Vignjević - Nataša Turić - Mirta Sudarić-Bogojević - Željko Zahirović - Bistrović Mateja - Enrih Merdić: Spatiotemporal analysis of floodwater mosquito's dispersal towards city of Osijek, Croatia
- Barbara Žeželj - Ivana Zrinščak - Maria Špoljar - Tvrtko Dražina - Ana Ostojić - Maja Duić Sertić - Daniel Matulić - Jasna Lajtner: Epiphytic gastropods and food supplies in relation to macrophyte stands
- Milenka Žunić - Katarina Bjelanović - Jelena Đuknić - Boris Novaković - Dalibor Stojanović - Ivana Živić: Diversity of stoneflies larvae (Plecoptera) in Serbian streams and brooks

15⁴⁰ – 16³⁰ POSTER SESSION 4 (P4) – Water quality, Rehabilitation, Methodology

Chair: András Ambrus

- Zoltán Csabai - Péter Mauchart - Réka Boda - Gábor Széles: “Artificial stream system” at the University of Pécs: A new laboratory modeling equipment for wide spectrum of short-term aquatic macroinvertebrate studies
- Zoltán Csabai - Arnold Móra - Réka Boda - Erika Bódis - Csaba Deák - Zoltán Kálmán - Péter Mauchart - Adrienne Ortmann-Ajkai - Pál Boda: First lessons learned from side arms rehabilitation projects on Drava River – a case study
- Teofil Fülep: Utilization possibilities of distribution of freshwater triclads (Platyhelminthes: Tricladida) for determination of ecological water flow in mountains
- Kristóf Málnás - Viktória B.-Béres - Zsuzsanna Kókai - Edina Simon: Investigation of the diet of *Palingenia longicauda* (Olivier, 1791) larvae based on Diatoms
- Boris Novaković - Katarina Bjelanović - Dalibor Stojanović: Water quality assessment of Serbian watercourses based on aquatic macroinvertebrates in 2012
- Světлана Zahradková - Ondřej Hájek - Vít Syrovátka - Pavel Tremil - Petr Pařil - Marek Polášek - Denisa Němejcová - Yvonne Puchýřová: The risk of drying out of small streams: preliminary classification of the Czech Republic area

16³⁰ – 17⁰⁰ Coffee break

17⁰⁰ – 19³⁰ WORKSHOP 2 (W2)

Intercalibration and ecological assessment in the frames of the WFD

Organizer/moderator: Gábor Várbíró

INITIATIVE TALK

- Gábor Várbíró: Experiences of River /EC GIG/ benthic invertebrates intercalibration process from Hungarian view

CONTRIBUTIONS

- Tadeusz Fleituch: Standardisation of Polish benthic (multi)metric method, its development, application and intercalibration in the framework of national regulations and WFD requirements

20⁰⁰ – 2⁰⁰ Conference Dinner

SATURDAY (12 April, 2014)

8⁰⁰ – 9⁰⁰ Breakfast

9⁰⁰ – 10⁰⁰ PLENARY LECTURE 3

Béla Csányi: The third Joint Danube Survey (JDS3): New methodological strategies for large river research

10⁰⁰ – 10³⁰ Coffee break

10³⁰ – 11⁵⁰ ORAL SESSION 4 (O4)

Chair: Erika Bódis

10³⁰ Gavril Marius Berchi - László Rákósy: **Review of the aquatic and semiaquatic bugs (Heteroptera: Nepomorpha, Gerromorpha) of Romania**

10⁵⁰ Pál Boda - Tamás Bozóki - Gábor Várbbíró: **Revised and annotated checklist of Hungarian aquatic Heteroptera (Nepomorpha, Gerromorpha) with notes on occurrence frequency and conservation**

11¹⁰ Hana Mižičová - Aleš Dolný: **Occurrence of critically endangered dragonfly *Sympetrum depressiusculum* at artificial fishpond: population ecology and causes of vulnerability**

11³⁰ Eszter Krasznai - András Csercsa - Pál Boda - Márk Ficsór - Máté Bolbás - Gábor Várbbíró: **Distribution patterns of Gammaridae in the river Hernád and Sajó**

12⁰⁰ – 13⁰⁰ Lunch

13⁰⁰ -14²⁰ ORAL SESSION 5 (O5)

Chair: Arnold Móra

13⁰⁰ Csaba Deák: **Taxonomy and ecology of the subgenus *Hellichella* (Diptera: Simuliidae) in Europe and the first records from Hungary**

13²⁰ Nataša Turić - Martina Temunović - Ildikó Szivák - Róbert Herczeg - Enrih Merdić - Zoltán Csabai: **The influence of habitat features on the red listed beetle *Graphoderus bilineatus* (De Geer, 1774) in floodplain habitats**

13⁴⁰ András Ambrus - Noémi Gerencsér - Renáta Szita: **Population studies on mixed goldenring (*Cordulegaster heros* and *C. bidentata*) colonies at the Hungarian Prealps**

1st Central European Symposium for Aquatic Macroinvertebrate Research
April 10-13 2014, Szarvas, Hungary

14⁰⁰ Nikoletta Méhes - Csilla Kövér - Sándor Harangi - János Korponai:
Subfossil chironomid assemblages in alpine lakes of the Parâng and the Făgăraș mountains (Romania, South Carpathians)

14²⁰ – 14⁵⁰ Coffee break

14⁵⁰ – 16¹⁰ ORAL SESSION 6 (O6)

Chair: Martin Černý

14⁵⁰ Péter Mauchart - Bernadett Reitzl - Attila Czirok - Valér Horvai - Adrienne Ortmann-Ajkai - Ildikó Szivák - Zoltán Csabai: **Coexistence among native gammarids (Crustacea: Gammaridae): habitat utilization patterns along a stream**

15¹⁰ Marek Polášek - Petr Pařil - Jan Šupina - Světlana Zahrádková - Vít Syrovátka: **Impact of drought on mayfly taxocoenoses**

15³⁰ Arnold Móra - Tibor Danyik - Anna Farkas: **The Odonata fauna of the rivers in the Körös–Maros National Park (Hungary) with special emphasis on Gomphidae assemblages**

15⁵⁰ Adrienne Ortmann-Ajkai - Pál Boda - Réka Boda - Roland Hollós - Zoltán Kálmán - Péter Mauchart - Dragica Purger - Zoltán Csabai: **Beta diversity patterns in floodplain water bodies of Drava River: testing the SDR Simplex method**

16¹⁰-16³⁰ CLOSING CEREMONY

“Best young oral presenter prize” and “Best poster prize”

Arnold Móra (Co-chair of the scientific organizing committee)

18⁰⁰ – 20⁰⁰ Dinner

SUNDAY (13 April, 2014)

.....

7⁰⁰ – 8⁰⁰ Breakfast

8⁰⁰ – 16⁰⁰ **Post Conference Field Trip** – Kardoskút and Dévaványa Nature Reserve Areas, with lunch in a 200 years old Hungarian inn

A B S T R A C T S

ABSTRACTS – TABLE OF CONTENTS

PLENARY LECTURES

- Péter Bánfi:** Wetland restoration projects in the Körös-Maros National Park 27
- David Boukal:** On life and death: factors shaping life histories and trophic interactions of aquatic insects 28
- Béla Csányi, Momir Paunović, József Szekeres:** The third Joint Danube Survey (JDS3): New methodological strategies for large river research 30

ORAL AND POSTER PRESENTATIONS

- András Ambrus, Noémi Gerencsér, Renáta Szita:** Populations studies on mixed goldenring (*Cordulegaster heros* and *Cordulegaster bidentata*) colonies at the Hungarian Prealps 31
- Gavril Marius Berchi, László Rákósy:** Review of the aquatic and semiaquatic bugs (Heteroptera: Nepomorpha, Gerromorpha) of Romania 32
- Katarina Bjelanović, Ivana Živić, Dalibor Stojanović, Dajana Todorović, Dejan Mirčić, Aleksandra Mrkonja, Vesna Perić Mataruga:** Trout farm effect on antioxidative defense in *Dinocras megacephala* (Plecoptera: Perlidae) larvae 33
- Pál Boda, Tamás Bozóki, Gábor Várbíró:** Revised and annotated checklist of Hungarian aquatic Heteroptera (Nepomorpha, Gerromorpha) with notes on occurrence frequency and conservation 34
- Réka Boda, Bálint Pernecker, Péter Mauchart, Csaba Bereczki, Zoltán Csabai:** The effects of drought on the life-cycle of *Cordulegaster heros* 35
- Erika Bódis, Bence Tóth, József Szekeres, Péter Borza, Ronaldo Sousa:** Empty native and invasive bivalve shells as benthic habitat modifiers in a large river 36
- Bianca-Vanesa Boros, Denis Copilas-Ciocianu, Lucian Parvulescu:** Can distant evolutionary relationships promote coexistence in freshwater amphipods (Crustacea: Amphipoda)? A comparative fecundity study of coexisting species in western Romania 37
- Martin Černý, Barbora Hančíková:** Local dispersion of Golden-ringed Dragonfly (*Cordulegaster boltonii*) 38
- Denis Copilas-Ciocianu, Michal Grabowski, Adam Petrusek, Lucian Parvulescu:** Biogeography of epigeal freshwater Amphipoda (Crustacea: Malacostraca) of Romania 39
- Zoltán Csabai, Pál Boda:** Environmental and species trait filters driving dispersal flight and colonization cycle of primary aquatic insects: from easy and effective sampling to a comprehensive theory? 40

1st Central European Symposium for Aquatic Macroinvertebrate Research
April 10-13 2014, Szarvas, Hungary

- Zoltán Csabai, Péter Mauchart, Réka Boda, Gábor Széles:** “Artificial stream system” at the University of Pécs: A new laboratory modeling equipment for wide spectrum of short-term aquatic macroinvertebrate studies 41
- Zoltán Csabai, Arnold Móra, Réka Boda, Erika Bódis, Csaba Deák, Zoltán Kálmán, Péter Mauchart, Adrienne Ortmann-Ajkai, Pál Boda:** First lessons learned from side arms rehabilitation projects on Drava River – a case study 42
- Zoltán Csabai, Arnold Móra, Réka Boda, Erika Bódis, Tibor Danyik, Csaba Deák, Anna Farkas, András Kálmán, Zoltán Kálmán, Péter Mauchart, Kristóf Málnás, Pál Boda:** Contribution to the aquatic macroinvertebrate fauna of Kis-Sárrét Nature Conservation area (SE, Hungary): A biodiversity hot spot or just accurate and thorough samplings? 44
- András Csercsa, Arnold Móra, Csaba Deák, Eszter Krasznai, Andrea Zagyva, Gábor Várбірó, Pál Boda:** Testing the adequacy of the Hungarian typological system on the watercourses of the Ipoly basin, based on the macroinvertebrate communities 46
- Csaba Deák:** Taxonomy and ecology of the subgenus *Hellichella* (Diptera: Simuliidae) in Europe and the first records from Hungary 47
- Csaba Deák, Daniel Dimitru Portelechi:** First record of *Wormaldia subnigra* McLachlan, 1865 (Trichoptera) in Hungary 48
- Avar-Lehel Dénes, Levente Péter Kolcsár, Lujza Keresztes:** Complex evolution of aquatic and semi aquatic habitats in the Carpathians: case study of the micro endemic *Pedicia straryi* group (Insecta, Diptera) 48
- Anna Farkas, Thomas Oliver Mérő, Arnold Móra, György Dévai:** Urban dragonflies: gomphids (Odonata: Gomphidae) along the Danube at Budapest 49
- Márk Ficsór:** Contribution to the aquatic Mollusc fauna of Northern Hungary and the Northern Great Plain. Part II: Bivalvia 50
- Tadeusz Fleituch:** Functional role of benthic invertebrate shredders in assessment of running waters: a new perspective 51
- Jelena Fressl, Maria Špoljar, Tvrtko Dražina, Ines Radanović, Jasna Lajtner, Ivana Zrinščak, Tea Tomljanović Dora Tončić, Sandra Hodić, Biserka Primc:** Predation risk within macrophyte stands 52
- Teofil Fülep:** Distribution of triclads (Platyhelminthes: Tricladida) in the waters of the Bakony mountains, Northwestern Hungary 53
- Teofil Fülep:** Utilization possibilities of distribution of freshwater triclads (Platyhelminthes: Tricladida) for determination of ecological water flow in mountains 54
- Gábor Horváth, Miklós Blahó, Tamás Herczeg, György Kriska, Ádám Egri, Dénes Száz, Alexandra Farkas, Nikolett Tarjányi, László Zinke:** Changing shiny paintwork to matte one can enhance the polarized light pollution of cars to polarotactic aquatic insects 55

1st Central European Symposium for Aquatic Macroinvertebrate Research
April 10-13 2014, Szarvas, Hungary

- Eszter Krasznai, András Csercsa, Pál Boda, Márk Ficsór, Máté Bolbás, Gábor Várbíró:** 56
Distribution patterns of Gammaridae in the river Hernád and Sajó
- Vendula Křoupalová, Jindřiška Bojková, Vít Syrovátka, Vanda Rádková, Michal Horský:** 57
Dipteran fauna of the Western Carpathian spring fens
- Andor Lökkös, Krisztián Kovács:** Contribution to the Minute Moss Beetle fauna (Coleoptera: 58
Hydraenidae) of North-West Hungary
- Kristóf Málnás, Viktória B-Béres, Zsuzsanna Kókai, Edina Simon:** Investigation of the diet of 58
Palingenia longicauda (Olivier, 1791) larvae based on Diatoms
- Kristóf Málnás, Sándor Harangi, Zsuzsanna Balogh, Edina Baranyai, Attila Szondi, György 59
Dévai, Edina Simon:** Toxic element analysis in larvae, adults and exuviae of *Stylurus flavipes*
(Charpentier, 1825)
- Vanja Marković, Anđelka Petković, Bojana Tubić, Marija Ilić, Margareta Kračun-Kolarević, 60
Nikola Marinković, Boris Novaković, Zoran Gačić, Momir Paunović:** Impact of heavy metals
in sediments on the macroinvertebrates communities of some smaller streams in Belgrade
Region (Serbia)
- Péter Mauchart, Bernadett Reitz, Attila Czirok, Valér Horvai, Adrienne Ortmann-Ajkai, 61
Ildikó Szivák, Zoltán Csabai:** Coexistence among native gammarids (Crustacea: Gammaridae):
habitat utilization patterns along a stream
- Nikoletta Méhes, Csilla Kövér, Sándor Harangi, János Korponai:** Subfossil chironomid 62
assemblages in alpine lakes of the Parâng and the Făgăraș mountains (Romania, South
Carpathians)
- Hana Mižičová, Aleš Dolný:** Occurrence of critically endangered dragonfly *Sympetrum 63
depressiusculum* at artificial fishpond: population ecology and causes of vulnerability
- Arnold Móra:** Contribution to the Chironomidae (Diptera) fauna of Lake Balaton and its 64
catchment area, with first records of nine species from Hungary
- Arnold Móra, Tibor Danyik, Anna Farkas:** The Odonata fauna of the rivers in the Körös– 65
Maros National Park (Hungary) with special emphasis on Gomphidae assemblages
- Boris Novaković, Katarina Bjelanović, Dalibor Stojanović:** Water quality assessment of 66
Serbian watercourses based on aquatic macroinvertebrates in 2012
- Boris Novaković, Marija Ilić, Margareta Kračun-Kolarević, Nikola Marinković, Jelena Đuknić, 67
Vanja Marković:** Distribution of the freshwater crustacean *Asellus aquaticus* Linnaeus, 1758
(Isopoda; Crustacea) in Serbia (2007-2013 period)
- Adrienne Ortmann-Ajkai, Pál Boda, Réka Boda, Roland Hollós, Zoltán Kálmán, Péter 68
Mauchart, Dragica Purger, Zoltán Csabai:** Beta diversity patterns in floodplain water bodies
of Drava River: testing the SDR Simplex method

1st Central European Symposium for Aquatic Macroinvertebrate Research
April 10-13 2014, Szarvas, Hungary

- Petr Pařil, Světlana Zahrádková, Vít Syrovátka, Michal Straka, Marek Polářek, Lenka Šikulová, Denisa Němejcová, Pavla Řezníčková:** Testing of different approaches for the indication of stream intermittency in the Czech Republic - the BIODROUGHT project 69
- Marek Polářek, Petr Pařil, Jan Šupina, Světlana Zahrádková, Vít Syrovátka:** Impact of drought on mayfly taxocoenoses 71
- Vanda Rádková, Michal Horsák, Vít Syrovátka, Jindřiřka Bojková, Vendula Křoupalová, Jana Schenková:** The role of environment and dispersal mode in metacommunity structuring of aquatic invertebrates at isolated spring fens 72
- Gábor Széles:** Advanced Water Quality and Flow Measurement Techniques for Aquatic Macroinvertebrate Research 73
- Nataša Turić, Martina Temunović, Ildikó Szivák, Róbert Herczeg, Enrih Merdić, Zoltán Csabai:** The influence of habitat features on the red listed beetle *Graphoderus bilineatus* (De Geer, 1774) in floodplain habitats 74
- Nataša Turić, Andreja Radović, Goran Vignjević, Mirta Sudarić-Bogojević, Martina Temunović, Enrih Merdić:** Temporal dynamics of aquatic insect (Heteroptera and Coleoptera) assemblages in a temperate floodplain associated with flood pulses 76
- Gábor Várbiró, Arnold Móra, Csaba Deák, Ildikó Szivák, Pál Boda:** The changes of the functional diversity patterns along a watershed 77
- Ivana Vrućina, Goran Vignjević, Nataša Turić, Mirta Sudarić-Bogojević, Źeljko Zahirović, Bistriović Mateja, Enrih Merdić:** Spatiotemporal analysis of floodwater mosquito's dispersal towards city of Osijek, Croatia 78
- Světlana Zahrádková, Ondřej Hájek, Vít Syrovátka, Pavel Tremli, Petr Pařil, Marek Polářek, Denisa Němejcová, Yvonne Puchýřová:** The risk of drying out of small streams: preliminary classification of the Czech Republic area 78
- Barbara Źeželj, Ivana Zrinščak, Maria Špoljar, Tvrtko Dražina, Ana Ostojić, Maja Duić Sertić, Daniel Matulić, Jasna Lajtner:** Epiphytic gastropods and food supplies in relation to macrophyte stands 79
- Ivana Źivić, Dejana Trbović, Katarina Bjelanović, Zorka Dulić, Marko Stanković, Zoran Marković:** Evaluation of fatty acid profile of Chironomidae larvae as valuable food for carp fry 80
- Milenka Źunić, Katarina Bjelanović, Jelena Đuknić, Boris Novaković, Dalibor Stojanović, Ivana Źivić:** Diversity of stoneflies larvae (Plecoptera) in Serbian streams and brooks 81

ABSTRACTS OF PLENARY LECTURES

PLENARY 1: Thursday, 10³⁰-11³⁰

Wetland restoration projects in the Körös-Maros National Park

Péter Bánfi

Körös–Maros National Park Directorate, Anna-liget 1, H-5540 Szarvas, Hungary
E-mail: peter.banfi@kmnp.hu

The Körös-Maros National Park was established as the 7th national park in Hungary in 1997 with an area of 51 125 hectares. As a lowland area, human effects have had significant negative impacts, especially in the last 100-150 years, started with the river regulation activities in the second half of the 19th century. Regarding habitat rehabilitation works in the National Park, the main objectives are increase the proportion of the natural and semi-natural habitats, increase naturalness of the habitats and improve wilderness. The key activity for increase naturalness is water restoration, including water retaining, filling the drainage systems and in some cases, water pumping. Three quarters of the National Park territory, more than 40 000 hectares can be defined as wetland. Remarkable wetland restoration works has been started in the second half of the 2000s, thanks to EU funds. Between 2004 and 2013 wetland restoration interventions have been affected a total 3800 hectares. In the next EU funding period 2014-2020, wetland restoration projects with an additional 5600 hectares affected area are planned.

PLENARY 2: Friday, 9⁰⁰-10⁰⁰

On life and death: factors shaping life histories and trophic interactions of aquatic insects

David Boukal^{1,2}

¹Department of Ecosystems Biology, Faculty of Science, University of South Bohemia, Branišovská 31, CZ-370 05 České Budějovice, Czech Republic

²Biology Centre AS CR, Institute of Entomology, Laboratory of Aquatic Insects and Relic Ecosystems, Branišovská 31, CZ-370 05 České Budějovice, Czech Republic

E-mail: boukal@entu.cas.cz

The talk will provide an overview of our recent research inspired by aquatic invertebrate communities in small fishless water bodies. Their diversity provides an excellent opportunity to unravel mechanisms shaping individual life histories and community dynamics. It is now widely recognized that body size plays a central role in individual growth and trophic interactions in aquatic ecosystems. This has led to rapid development of size-based approaches to many ecological and evolutionary questions in the past 10-20 years. I will show that adding more traits, explicitly considering the role of external factors and using modern statistical methods can enhance our understanding of these ecosystems.

First, I will discuss how body size and additional morphological and behavioural traits jointly affect the strengths of trophic links. I will use results from several laboratory experiments to illustrate that intra- and interspecific trophic niche differentiation leads to compartmentalized food webs and should thus contribute to high biodiversity in small freshwater pools.

Second, I will consider how additional abiotic factors, such as temperature or habitat structure, affect trophic interactions. Our laboratory and mesocosm experiments reinforce previous results showing that habitat structure strongly affect trophic interactions and community assembly. However, our results also show that the net effects depend on species traits, which need to be considered on a case-by-case basis.

Third, I will consider the role of phenotypic plasticity in shaping individual life histories and trophic interactions. I will show that growth and/or body size of aquatic insects depends on both temperature and food availability, mostly in line with available theory. Moreover, the resulting individual phenotypic plasticity buffers against variable environment and undoubtedly allows aquatic insects to

colonize a wide range of water bodies. Phenotypic plasticity in key life history traits such as size and age at metamorphosis can be studied with bivariate (probabilistic) reaction norms. This statistical method provides an exciting tool to link the concepts of phenotypic plasticity and evolutionary change. To illustrate my point and to come back to the key question of trophic link strengths, I will briefly discuss a case study looking at the impact of predation risk on individual life histories.

PLENARY 3: Saturday, 9⁰⁰-10⁰⁰

The third Joint Danube Survey (JDS3): New methodological strategies for large river research

Béla Csányi^{1*} – Momir Paunović² – József Szekeres¹

¹MTA Centre for Ecological Research, Danube Research Institute, Jávorka S. u. 14, H-2131, Göd, Hungary

²Institute for Biological Research "Siniša Stankovic", Serbia, Belgrad

*Corresponding author, e-mail: csanyi.bela@okologia.mta.hu

The third Joint Danube Survey (JDS3) organized by the International Commission for the Protection of the Danube River (ICPDR) between 12 August and 26 September 2014 along the 2400 km Danube section had several new methodological approach comparing to the sampling strategy of JDS1 (2001) and JDS2 (2007). The number of chemical compounds investigated in water, sediment, suspended solids and the Biota tissue has continuously increased. Thanking to the in-kind contribution of several chemical laboratories around Europe the number of chemical variables reached more than 500 during the JDS3 applying several new sampling methods. The Large Volume Sampling (LVS) and the Passive Sampling (PS) were never applied before in the Danube River focusing on the screening of river basin specific Priority Substances, non-target compounds and a great number of pharmaceuticals. On-site and laboratory investigations of microbiological samples were grouped in different modules: the monitoring of the natural bacterial compartment and source tracking of microbial faecal pollution gave much more detailed description of the anthropogenic effects of the waste water discharges along the Danube. Very detailed hydromorphological survey provided large amount of abiotic data for evaluating the biological variables in the investigated cross sections. More precise sampling methods were used for the aquatic macroinvertebrate (Multi-Habitat, Kick&Sweep and dredging), and, the fish community (littoral day and night fishing, deep-water bottom electrofishing), respectively. The presentation introduces the logistic and equipment setup, the working team and the applied sampling methods during the seven week long time along the Danube River, illustrating the most important methodological development comparing to the two previous international Danube Surveys.

ABSTRACTS OF ORAL AND POSTER PRESENTATIONS

05 – Saturday, 13⁴⁰

Populations studies on mixed goldenring (*Cordulegaster heros* and *Cordulegaster bidentata*) colonies at the Hungarian Prealps

András Ambrus^{1*} – Noémi Gerencsér² – Renáta Szita²

¹Fertő-Hanság National Park, Sarród, Hungary

²Institute of Geomatics and Civil Engineering, Faculty of Forestry, University of West Hungary, Sopron, Hungary

*Corresponding author, e-mail: ambrus.andras@gmail.com

The intensive studies of the Balkan goldenring in Hungary have been started since 1992 when the first larval records have been found. The earlier reports of *Cordulegaster boltonii* can be regarded as misidentifications after the description of *C. heros* (1979), the distribution of this species does not enter the Carpathian basin. Some individuals collected at the Mecsek Mountains, stored at the collection of the Natural History Museum of Hungary were checked up and turned out to be *C. heros*. The recent known distribution of the *Cordulegaster heros* in Hungary is limited to the S, SW, W, and NW Transdanubia, namely: Zselic Hills, Mecsek Mountains, Örség, Kőszeg Mountains, Sopron Mountains. Single larval record is reported from the Bakony Mountains too. While the co-occurrence of the *C. heros* with the more widespread *C. bidentata* is known from several places (Sopron Mountains, Bakony Mountains, Kőszeg Mountains), the only spot where both species breed in relatively high abundance is the Kőszeg Mountains. That is why recent study focuses on this site. The baseline of the study was set up by Rozner et al (2010) with the larval records of both species from different streams of the Kőszeg Mountains, with additional data of adults and exuviae. Prior to that records only *Cordulegaster bidentata* was known from this area. In the framework of this study there were investigated 22 sections of 18 streams. Out of the 22 sections 18 contained at least one species, one of them was only adult, so we can calculate 17 sampling units. In case of the exuvia the distance from the stream, the height above the ground, the substrate and the orientation were measured. Additional information was taken from the stream bed where the specimen supposed to develop and basic physico-chemical attributes of the water. There

were analyzed the co-occurrence of the two species, in function of the distance from the spring. In some cases the hypothesis that the *C. bidentata* prefers the closest sections to the spring area became true but one stream showed sharply different pattern. It is supposed that the distance from the spring area together with the stream bed structure and material – influenced by the flowing velocity – should be investigated together so that to recognize the most important characteristics which determine the dominance of the two species in one spot.

.....

04 – Saturday, 10³⁰

Review of the aquatic and semiaquatic bugs (Heteroptera: Nepomorpha, Gerromorpha) of Romania

Gavril Marius Berchi* – László Rákossy

Department of Taxonomy & Ecology, Babeş-Bolyai University, 5-7 Clinicilor St., 400015, Cluj-Napoca, Romania

*Corresponding author, e-mail: marius@heteroptera.ro

In Romania, the aquatic and semiaquatic bugs of the infraorders Nepomorpha and Gerromorpha, have received little attention from specialists, either Romanian and foreign. Data was generally published only in scattered papers. Altogether, based on a survey of all published records as well as on recent material collected between 2011-2014, it follows that 14 families and 73 species were recorded until now in this country: Nepidae – 3, Belostomatidae – 1, Ochteridae – 1, Micronectidae – 5, Corixidae – 25, Naucoridae – 1, Aphelocheiridae – 1, Notonectidae – 6, Pleidae – 1, Mesovelidae – 3, Hebridae – 3, Hydrometridae – 2, Veliidae – 10, Gerridae – 11. Occurrences of 8 species, previously recorded from Romania, need further confirmation. Some species should be excluded from Romanian fauna as they are based on proven or suspected misidentifications or taxonomic confusion. Herein we give an account of the diversity of aquatic and semiaquatic true bugs from Romania, including biogeographic considerations.

.....

P2 – Thursday, 15⁴⁰

Trout farm effect on antioxidative defense in *Dinocras megacephala* (Plecoptera: Perlidae) larvae

Katarina Bjelanović^{1*} – Ivana Živić¹ – Dalibor Stojanović² – Dajana Todorović³ – Dejan Mirčić² – Aleksandra Mrkonja³ – Vesna Perić Mataruga³

¹University of Belgrade-Faculty of Biology, Studentski trg 16, 11000 Belgrade, Serbia

²State University of Novi Pazar, Vuka Karadžića bb, 36300 Novi Pazar, Serbia

³Institute for biological research “Siniša Stanković”, Blvd. despot Stefan 142, 11000 Belgrade, Serbia

*Corresponding author, e-mail: k.bjelanovic@bio.bg.ac.rs

Trout production represents one of the major agricultural activities in the first and second order streams of Serbia. Organic compounds are drained into the environment usually without previous sedimentation and thus affect stream biota. Since biological monitoring is commonly based on aquatic macroinvertebrates, we used *Dinocras megacephala* (Klapálek, 1907) larvae as the target organism in order to estimate trout farm effects on physiological stress. Four localities were chosen at the channel of the Raska River (in the vicinity of Novi Pazar, Serbia), two upstream localities and the other two downstream from the trout farm outlet. Specimens were collected with tweezers and placed in liquid nitrogen for further analysis. Basic physical and chemical water parameters were measured directly in the field: temperature, dissolved oxygen, pH and conductivity, and in the laboratory: total phosphorus (TP), orthophosphates (OP) and ionized ammonia (NH₄⁺). Even though the temperature stayed quite constant along the water course (11.1°C to 11.2°C), oxygen concentration decreased from the reference localities (10.4 mg/l and 11 mg/l) to the downstream localities (7 mg/l and 8 mg/l). Also, the concentration of ionized ammonia was almost ten times higher at the same localities (from 0.0319 and 0.0288 mg/l to 0.3141 and 0.2423 mg/l). The activity of superoxide dismutase (SOD), catalase (CAT) and the total glutathione amount (GSH) were analyzed in order to determine the level of oxidative stress caused by the increase of organic compounds originating from the trout farm. The activity of SOD and CAT enzymes was significantly higher in the samples collected at the both downstream localities. Total glutathione amount (GSH) decreases in the specimens collected at the first downstream locality, while the level of enzyme activity at the second downstream locality coincides with the samples from both upstream localities. The results indisputably indicate that

higher concentration of organic compounds from the trout farm induce the significant increase of the oxidative stress in the examined species.

.....

O4 – Saturday, 10⁵⁰

Revised and annotated checklist of Hungarian aquatic Heteroptera (Nepomorpha, Gerromorpha) with notes on occurrence frequency and conservation

Pál Boda^{1*} – Tamás Bozóki² – Gábor Várbíró¹

¹Department of Tisza River Research, Centre for Ecological Research, Hungarian Academy of Sciences, Bem tér 18/c, H-4026 Debrecen, Hungary

²Eszterházy Károly College, Eszterházy tér 1, H-3300 Eger, Hungary

*Corresponding author, e-mail address: boda.pal@okologia.mta.hu

In consequence of climate change the number of species, distribution of native species or frequency of their occurrences might be changed. Hence, countries might be aware the more knowledge of their fauna, and respectively the conservational status and frequency of occurrences of it. To find the answer to how shifts the distribution ranges of the species, how changes the frequency of occurrences, or how preventing the loss of biodiversity in this region, the first step is to define the “zero state”. But, across the aquatic Heteroptera as a whole, a comprehensive faunistical overview was not published yet in Hungary. These facts together create a growing need for a revised and completed Hungarian checklist with faunistical situation assessment. Thus, the main goals of recent study are to (1) complete a checklist of species so far detected, (2) briefly summarize the ancient and recent data to define the zero state as a base to evaluate long term changes in the future, (3) conservation evaluate of the species and (4) contribute the distributional map of each species.

.....

P3 – Friday, 14⁴⁰

The effects of drought on the life-cycle of *Cordulegaster heros*

Réka Boda^{1*} – Bálint Pernecker¹ – Péter Mauchart¹ – Csaba Bereczki² – Zoltán Csabai¹

¹Department of Hydrobiology, Institute of Biology, Faculty of Sciences, University of Pécs, , Ifjúság útja 6, H-7624 Pécs, Hungary

²Hortobágy National Park Directorate, Sumen utca 2, H-4024 Debrecen, Hungary

*Corresponding author, e-mail address: reka86@gamma.ttk.pte.hu

Aquatic ecosystems are especially vulnerable to extreme climatic events such as droughts. The studied Odonata species, *Cordulegaster heros* (Theischinger, 1979), is a Central and Southeastern European endemic taxon, a strictly protected dragonfly in Hungary and according to “The IUCN Red List of Threatened Species” its status is “Near Threatened”. Droughts are listed as one of the main threats to the species. The aim of this study was to find answers to how drought of stream habitats influence the life cycle of the *C. heros*. Larvae and exuviae were investigated at Hungarian upstreams in South-Western Hungary. Larvae were sampled monthly from June 2011 to May 2012, while exuviae were collected from May to August in three consecutive years (2011-2013). The main morphological characters of the larvae were measured. Based on the characteristics of the larval integument the time of moult were determined in cases of the last two instars. From August to September in 2012 a severe drought occurred at two of our sampled streams and the continuous surface flow was ceased for two month. Based on head width measurements we were able to identify the instars (F to F-3). Large numbers of larvae younger than F-3 instar were also found and are referred as early instars (E). Based on our results the species overwintered in the penultimate-instar (F-1). The two studied sampling sites differed from each other based on the distribution of instars. At the first site 75% of larvae were older (F and F-1 instars), contrarily at the second site 68% of larvae were younger (E and F-3 instars). In case of the first sampling site, we found large numbers of exuviae before drought, but very small number in the next year. However, based on the distribution of instars, we supposed that the species should have emerged in a larger proportion in both years. We believe that the drought affected the emergence of the species significantly. At the second sampling site the small number of emerged individuals was not surprising, because it could be

predictable based on the distribution of larval instars. Moreover, based on the surprisingly unusual distribution of instars it is supposed that there had been drought at this site prior to data collection as well. Our results suggest that, the drought affects the life-cycle of the species and a large number of individuals die under dry period lasting for several months.

.....

O2 – Friday, 10³⁰

Empty native and invasive bivalve shells as benthic habitat modifiers in a large river

Erika Bódis^{1*} – Bence Tóth¹ – József Szekeres¹ – Péter Borza¹ – Ronaldo Sousa^{2,3}

¹MTA Centre for Ecological Research, Danube Research Institute, Jávorka S. u. 14, H-2131, Göd, Hungary

²CBMA – Centre of Molecular and Environmental Biology, Department of Biology, University of Minho, Campus de Gualtar, 4710-057 Braga, Portugal

³Interdisciplinary Centre of Marine and Environmental Research (CIIMAR/CIMAR), University of Porto, Rua dos Bragas 289, P 4050-123 Porto, Portugal

*Corresponding author, e-mail: bodis.erika@okologia.mta.hu

Bivalves are remarkable ecosystem engineers and their long-lasting shells may provide important physical structure for benthic organisms. In the last decades the Danube River has experienced great changes in the bivalve fauna (i.e. several native species have been declining and several invasive species have been introduced). The invasive *Corbicula fluminea* and *Sinanodonta woodiana* are now widespread and capable of producing large amounts of shells. In this study empty shells of native (*Anodonta anatina*, *Unio tumidus*) and invasive (*C. fluminea*, *S. woodiana*) bivalves (including their mixtures) as benthic substrates and clay granules, which mimics the natural hard substrates in the Danube River (Hungary), as control substrate were used. Possible differences in macroinvertebrate colonization were assessed between i) empty shells and control substrate; ii) different bivalve species (native and invasive) and iii) three scenarios (before invasion, short and long time after invasion) by using a mix of empty shells (native, native plus invasive and invasive species). In comparison to control treatments the empty shells facilitated the presence of amphipods, caddisflies and isopods which contributed to a shift in the trophic structure by decreasing the proportion of gathering collectors while increasing the presence of

shredders and predators. In addition, results showed that shell size may be an important attribute because the most diverse macroinvertebrate community was detected on individual *A. anatina* and *S. woodiana* shells, which possess the largest size. Since this study showed differences in macroinvertebrate colonization between empty shells and control treatments, the effects of habitat modification by bivalve shells including the invasive *C. fluminea* and *S. woodiana* should not be neglected in future ecological studies. However, *S. woodiana* shells may have greater effects on macroinvertebrate communities due to its larger size and longer persistence.

.....

P3 – Friday, 14⁴⁰

Can distant evolutionary relationships promote coexistence in freshwater amphipods (Crustacea: Amphipoda)? A comparative fecundity study of coexisting species in western Romania

Bianca-Vanesa Boros^{1*} – Denis Copilas-Ciocianu² – Lucian Parvulescu¹

¹Department of Biology and Chemistry, Faculty of Chemistry, Biology, Geography, West University of Timișoara, Pestalozzi 16A, 300115, Timișoara, Romania

²Department of Ecology Charles University in Prague, Faculty of Science, Viničná 7, 12844, Prague, Czech Republic

*Corresponding author, e-mail: bianca_boros2006@yahoo.com

Across the lowlands of Romania an assemblage of 3 native amphipod species (*Gammarus balcanicus dacicus*, *Niphargus valachicus* and *Synurella ambulans*) belonging to 3 different families is present and in many instances they coexist. Native freshwater amphipods are rarely observed cohabiting because they frequently exhibit high levels of intra-guild predation. Therefore, the lowlands in Romania are good natural laboratories for studying the mechanisms of coexistence among freshwater amphipods. Fecundity studies of coexisting amphipods leaned mostly towards comparisons of native vs. invasive in the detriment of native vs. native species. Based on the distant evolutionary relationships of the mentioned species, we predict significant differences concerning their fecundities. We analyzed female body length and number of eggs per brood in order to determine their fecundity and to gather insight into their mechanism of coexistence. We further constructed a Bayesian phylogeny

based on 18S rDNA sequences that comprises the major recognized lineages within the Amphipoda so as to emphasize the distant phyletic relationships among the studied species. The most fecund species is *S. ambulans*, followed by *N. valachicus* and *G. dacicus*. The most precocious is *N. valachicus*, reaching maturity at a relatively small size. *S. ambulans* has the highest fecundity among native freshwater amphipod species studied thus far and *N. valachicus* has the lowest maturity index. Differences in mean brood size and mean breeding female size between species are statistically significant, confirming our hypothesis. We further propose that this difference in fecundity coupled with their distant evolutionary relationships is one of the possible mechanisms that promote coexistence among these native species.

O3 – Friday, 14⁰⁰

Local dispersion of Golden-ringed Dragonfly (*Cordulegaster boltonii*)

Martin Černý* – Barbora Hančíková

Department of Ecology, Faculty of Science, Charles University in Prague, Viničná 7, 12844, Prague, Czech Republic

*Corresponding author, e-mail: cerny@natur.cuni.cz

During 2010 and 2011, we studied 3 populations of adult Common Golden-ringed Dragonfly (*Cordulegaster boltonii*) in South Bohemia. We have covered three forest streams of a total length of about 10 km, all within a square of area ~ 20km². We used Mark-Release-Recapture technique to follow individual males. Altogether, we have captured 890 individuals, from which we have recaptured 292. Population densities of these dragonflies were very high, reaching more than 40 males per 100 m of a stream. Most of the males stayed on one stream (though some of them covered more than 1,5km of the stream length) but some (2%) have moved to another one, flying more than 3,5 km through forest. This suggests that the population of Golden-ringed Dragonflies are rather closed, but the observed interpopulation migration may ensure sufficient gene flow and, in a case of some local catastrophic disturbances, a rapid recolonization of a suitable habitat.

O3 – Friday, 13⁰⁰

Biogeography of epigean freshwater Amphipoda (Crustacea: Malacostraca) of Romania

Denis Copilas-Ciocianu^{1*} – Michal Grabowski² – Adam Petrussek¹ – Lucian Parvulescu³

¹Department of Ecology, Faculty of Science, Charles University in Prague, Viničná 7, 12844, Prague, Czech Republic

²Department of Invertebrate Zoology & Hydrobiology, Faculty of Biology and Environmental Protection, University of Łódź, Banacha 12/16, 90-237, Łódź, Poland

³Department of Biology and Chemistry, Faculty of Chemistry, Biology, Geography, West University of Timișoara, Pestalozzi 16A, 300115, Timișoara, Romania

*Corresponding author, e-mail: denis.copilas@yahoo.com

Epigean freshwater amphipods are prevalent and diverse in Romania thanks to its geographical position between the Balkans and the Ponto-Caspian region, and varied topography. Up to the present date, there were 11 formally recognized epigean freshwater species found in the country belonging to 3 genera, each representing another family: *Gammarus* (Gammaridae, 8 species), *Niphargus* (Niphargidae, 2 epigean species) and *Synurella* (Crangonyctidae, one species). Their large scale distribution patterns nevertheless remained obscure due to shortage of data, consequently limiting biogeographical interpretations. We provide extensive new data with relatively high resolution distribution maps, thus improving the knowledge on ranges of these taxa. *Gammarus* species display high altitudinal variability and patchy, fragmented distribution patterns, prevailing in springs and streams from lowlands to sub- mountainous and mountainous regions. In the light of recent molecular research, we hypothesize that the complex geomorphological dynamics of the Carpathian region during the Late Tertiary probably contributed to this allopatric distributional pattern. Contrasting with *Gammarus*, the genera *Niphargus* and *Synurella* exhibit low altitudinal variability, broad ecological valences and overlapping distributions, being widespread throughout the lowlands. The current distribution of *N. valachicus* reflects the extent of the Paratethys Sea during the Late Miocene, and it has been hypothesized that it colonized freshwaters through coastal lagoons in that period. The mosaic distribution of epigean freshwater amphipod species in Romania is noteworthy, suggesting that this region is particularly well suited for focused phylo- and biogeographical analyses.

O3 – Friday, 13⁴⁰

Environmental and species trait filters driving dispersal flight and colonization cycle of primary aquatic insects: from easy and effective sampling to a comprehensive theory?

Zoltán Csabai^{1*} – Pál Boda²

¹Department of Hydrobiology, Institute of Biology, Faculty of Sciences, University of Pécs, Ifjúság útja 6, H-7624 Pécs, Hungary

²Department of Tisza River Research, MTA Centre for Ecological Research, Bem tér 18/c, H-4026 Debrecen, Hungary

*Corresponding author, e-mail: csabai@gamma.ttk.pte.hu

On the theoretical basis of Poff's landscape filters framework theory, as an adopted extension and continuation of that, we aimed to summarize in a comprehensive view all regulative environmental factors and species traits. These can function as constraints which may have effects on dispersal flight and the composition of the aerial assemblages of aquatic Coleoptera and Heteroptera species in a given time, and it has definite connection with the colonization cycle. We summarized all aspects of driving factors and grouped them into different filter groups. Poff's landscape filters define the species composition and abundances which can exist in a given waterbody at a given time. Using this as an initiative point, further filter groups were defined, which govern the dispersal flight in consecutive phases: Launching, Timing and Colonization filter groups. Launching filters consisted of 1) various species traits (e.g. life cycle characteristics, K or r strategy, phenology, flying abilities) and 2) changes of the biotic or abiotic characteristics of the original habitat (e.g. drought, predators, food, chemistry, pollution). Launching filters define the group of species and numbers of individuals that must fly in the given period due to various motivations. Timing filters bring together all environmental factors that affect and modify seasonal and diel timing of the start and duration of dispersal flight (e.g. environmental light conditions and polarotactic detectability of water surfaces, temperature, wind, rain). Passing through these two filter groups a restricted number of species and individuals will appear in the actually dispersing assemblage at a given time in the air. But the dispersal flight can be successful if individuals can reach suitable new habitats. During flight another filter group (colonization filters) is coming into operation and further selects species and

individuals. It consisted of 1) various natural factors (e.g. size and ages of the waterbodies, distances between habitats must be overcome, various habitat characteristics such as vegetated/open surface structure, mosaicism, water depth) and 2) anthropogenic effects (photopollution and polarized light pollution, various water-mimicking surfaces). This filtering activity determines which species and individuals can be successful in colonization in case of a given waterbody in a given area during a given period. Structural organization of the three filter groups is different: Timing filters absolutely show nested organization, while Launching and Colonization filters can be applicable as groups of parallel filters in different, impermanent combinations. During the presentation a schematic and detailed views will be presented, which could be serve as an initial step towards complete understanding the role of the separate factors and their interacting groups in shaping dispersal behaviour and colonization process.

.....

P4 – Friday, 15⁴⁰

“Artificial stream system” at the University of Pécs: A new laboratory modeling equipment for wide spectrum of short-term aquatic macroinvertebrate studies

Zoltán Csabai^{1*} – Péter Mauchart¹ – Réka Boda¹ – Gábor Széles²

¹Department of Hydrobiology, Institute of Biology, Faculty of Sciences, University of Pécs, Ifjúság útja 6, H-7624 Pécs, Hungary

²Velinor Ltd., Kossuth Lajos utca 29, H-1162 Budapest, Hungary

*Corresponding author, e-mail: csabai@gamma.ttk.pte.hu

In stream ecology often happens that important field observations remain unproven, real effects were masked because of the high number of uncontrollable affecting factors. This urges researchers to search for alternative and/or complementary research opportunities and methods. Besides and based on field data, for instance inter- and intraspecific relationships and microhabitat use can be investigated adequately through laboratory experiments carried out in combinable model stream system, as an artificial mesocosm. Laboratory experiments under highly controlled circumstances can help to find answers to many unresolved questions. Based on this needs, a new, complex and fully variable lab equipment was built at University of Pécs in 2013. It could be used in many different aspects due to its high combinability. The length of the bed is 8 m,

while the maximal width is 2.4 m. The meandering characteristics of the artificial stream could be formed through arbitrarily modifying the length (up to 22 m) and the width (2.4, 1.6 or 0.8 m) by using flow controlling and blocking walls which could be inserted into slides on the bottom and side walls of the bed. The bottom of the bed could be separated into compartments, thus different sediments and stream bed types could be evolved during the experiments. Additionally, up to three parallel canals could be also configured, thence concurrent investigations can be conducted or experiments can be easily repeated. Water supply is provided by computer controlled, heavy-duty circulating pumps ensuring usability of variable flow velocity and different quantity of water (from 10 up to 1200 l/min, max. 5% difference). The water system is absolutely closed, not connected with natural streamflows, which provide opportunity to control or modify all quality parameters of the circulating water before or during the experiment. Physical environment (air temperature, humidity, light conditions) could be controlled with high performance air conditioners and solar light bulbs. Most of the natural habitats could be configured through adjust and change the attributes and characteristics of the system. Our artificial stream can be an appropriate tool for various studies included but not limited to test any kind of biotic interactions in any combination and quantitative distribution of various groups of stream dwelling invertebrates, microhabitat preferences with or without coexisting species, litter decomposition and biological production processes, responses of species to drought, flash flood effects, pollution tolerance, etc. Our artificial stream system project is open to any kind of national or international cooperation. The project was supported by the European Union and the State of Hungary in the framework of TIOP-1.3.1-10/1 -2010-0008 program.

.....

P4 – Friday, 15⁴⁰

First lessons learned from side arms rehabilitation projects on Drava River – a case study

Zoltán Csabai^{1*} – Arnold Móra² – Réka Boda¹ – Erika Bódis³ – Csaba Deák⁴ – Zoltán Kálmán^{1,5} – Péter Mauchart¹ – Adrienne Ortmann-Ajkai¹ – Pál Boda⁶

¹Department of Hydrobiology, Institute of Biology, Faculty of Sciences, University of Pécs, Ifjúság útja 6, H-7624 Pécs, Hungary

²Balaton Limnological Institute, MTA Centre for Ecological Research, Klebelsberg Kuno 3, H-8237 Tihany, Hungary

³Danube Research Institute, MTA Centre for Ecological Research, Jávorka Sándor utca 14, H-2131 Göd, Hungary

⁴National Inspectorate for Environmental Protection and Nature Conservation (Transtisza), Laboratory, Hatvan utca 16, H-4025 Debrecen, Hungary

⁵Vak B. u. 118/a, H-8651, Balatonszabadi, Hungary

⁶Department of Tisza River Research, MTA Centre for Ecological Research, Bem tér 18/c, H-4026 Debrecen, Hungary

*Corresponding author, e-mail: csabai@gamma.ttk.pte.hu

The national surveying of Drava side-arms was performed during the end of the 1990s, altogether 29 side-arms were reviewed, of which 16 were classified as “immediate action required” because of their high nature conservation significance. All of them were either silted up or had limited or completely no water supply due to cross-directional blockage. Hydrological rehabilitation of four side-branches at Drávamási (upper, DTU and lower, DTL), at Tótújfalu (TF) and at Drávapalkonya (DP) were launched in 2011 and fully completed in the end of 2012. In the frames of a monitoring programme, we conducted survey of the aquatic macroinvertebrate fauna of the side-arms in question using the AQEM method along three-units transects during the end of summer in 2012 and 2013. In 2012, the DTU side-branch was the only one where the rehabilitation had been entirely and properly accomplished, with appropriate passage of water, and continuous unidirectional flow. In the case of DTL the water can flow into the side-arm only at the highest floods of the Dráva River due to the high current threshold; as a consequence the extremely silted bed contains still water in most of the year and almost completely dried up in summer. TF side arm showed oxbow characteristics. Only the upper one-fourth of the bed had been re-shaped and dredged. Substantial amount of organic sediment had accumulated beneath the water chestnut stands of almost 100% coverage due to the stone barrier that had been built too high before. DP had been the most silted up side-arm; a layer of 0.5-2.5 m thick sediment was removed in 2012 but the lowermost 100 m long section belonging to Croatia was not rehabilitated. Thus the unidirectional flow cannot be reached during periods of average or low water level of the river. A total of 126 taxa were indentified (Annelida 1, Gastropoda 19, Bivalvia 15, Crustacea 8, Ephemeroptera 7, Odonata 14, Heteroptera 15, Coleoptera 18, Trichoptera 4, Diptera 24, Megaloptera 1) including six protected and ten non-native invasive species. The studied side-arms can be clearly separated into two groups, which are distinct in their physical appearance as well as in their species

composition. The side arms, where the rehabilitation works had been properly completed (DTU), or had already affected almost the entire bed (DP), may truly function as a side-arm (DTU), or can be rendered functioning with minor further efforts (DP). In these cases, the proportion of species preferring running water is higher, and taxa of stagnant waters are represented at lower rates only (DP) or were not found at all (DTU). The other group contains those side-arms in which rehabilitation had not been successful so far (DTA and TF). In these cases only a few rheophilic species were found, possibly as a result of high flooding, and stagnophilic species were quite highly represented. These beds rather show the species composition of an oxbow with no permanent connection to the main river bed or that of temporary floodplain pools. In these places considerable efforts are still needed to achieve the desired status and function as side-arms. Study was supported by OTKA-K104552.

.....
P1 – Thursday, 14⁴⁰

Contribution to the aquatic macroinvertebrate fauna of Kis-Sárrét Nature Conservation area (SE, Hungary): A biodiversity hot spot or just accurate and thorough samplings?

Zoltán Csabai^{1*} – Arnold Móra² – Réka Boda¹ – Erika Bódis³ – Tibor Dányik⁴ – Csaba Deák⁵ – Anna Farkas⁶ – András Kálmán⁷ – Zoltán Kálmán^{1,7} – Péter Mauchart¹ – Kristóf Málnás⁸ – Pál Boda⁹

¹Department of Hydrobiology, Institute of Biology, Faculty of Sciences, University of Pécs, Ifjúság útja 6, H-7624 Pécs, Hungary

²Balaton Limnological Institute, MTA Centre for Ecological Research, Klebelsberg Kuno 3, H-8237 Tihany, Hungary

³Danube Research Institute, MTA Centre for Ecological Research, Jávorka Sándor utca 14, H-2131 Göd, Hungary

⁴Körös–Maros National Park Directorate, Anna-liget 1, H-5540 Szarvas, Hungary

⁵National Inspectorate for Environmental Protection and Nature Conservation (Transtisza), Laboratory, Hatvan utca 16, H-4025 Debrecen, Hungary

⁶Tornóc u. 27, H-1141 Budapest, Hungary

⁷Vak B. u. 118/a, H-8651, Balatonszabadi, Hungary

⁸BioAqua Pro LTD. Soó Rezső utca 21, H-4032 Debrecen, Hungary

⁹Department of Tisza River Research, MTA Centre for Ecological Research, Bem tér 18/c, H-4026 Debrecen, Hungary

*Corresponding author, e-mail: csabai@gamma.ttk.pte.hu

The Kis-Sárrét is one of the most diversified and most precious protected areas of the Körös–Maros National Park, located near to the Hungarian-Romanian border. In the ancient times the Kis-Sárrét was regularly flooded by the water of the Körös River forming a huge marshland which was disappeared due to the canalization activities of 1860's. By now, only some wetland patches and small watercourses recall the earlier times: the Ugrai-rét and the Sző-rét are the last two remainders of the marshlands of Sárrét. Nearby natural watercourses, for example Korhány and its dead arm, also show something of bygone times. Thorough faunistical samplings were made in spring, summer and autumn at a total of 93 sampling points in the three mentioned units. Macroinvertebrates were sampled by using standard pond-nets, drift net for capturing chironomid exuviae and baited bottle traps for collecting predator organisms. More than 10000 individuals belonging to 358 species (Hirudinea 13, Mollusca 27, Malacostraca 5, Araneae 1, Ephemeroptera 5, Odonata 28, Heteroptera 30, Coleoptera 128, Trichoptera 16, Megaloptera 2, Diptera: Chironomidae 103) were identified. The species richness was the highest in the case of Ugrai-rét (259 species), while the other two units showed somewhat lower numbers of species (Sző-rét 210, Korhány 236). The relatively high numbers of species were impressive in themselves, but the composition was much more surprising. Nearly a quarter of the species (83 of 358, 23.1%) could be highlighted in various aspects. Three species were found in Hungary for the first time (*Enochrus* cf. *nigritus*, *Chironomus piger*, *Tanytarsus lactescens*), eight species are protected or IUCN red listed (e.g. *Niphargus hrabei*, *Hirudo verbana*, *Leucorrhinia pectoralis*, *Notonecta lutea*), further 73 species are rare or extremely rare in Hungary (e.g. *Pisidium obtusale*, *Sphaerium nucleus*, *S. rivicola*, *Proasellus pribenicensis*, *Batracobdelloides moogi*, *Mesovelgia thermalis*, *Anisops sardeus*, *Haliplus fulvicollis*, *Hydroporus scalesianus*, *Laccornis kocae*, *Agabus melanarius*, *Ilybius subtilis*, *Graphoderus zonatus*, *Helophorus arvernicus*, *Enochrus ater*, *E. fuscipennis*, *Laccobius syriacus*, *Hydrochara dichroma*, *Ochthebius lividipennis*, *Tricholeiochiton fagesii*, *Orthocladus excavatus*, *Polypedilum arundineti*, etc.), or their occurrence in a lowland area is surprising (e.g. hilly or mountainous species, such as *Glyphotaelius pellucidus*, *Micropterna nycterobia*). The faunal composition is an interesting mix of typical marshland species with acidophil bog-dwelling elements. Comparison with other territories of Hungary is almost impossible due to the lack of similarly detailed investigations. This may be possible only in the case of selected invertebrate groups. For example, in Coleoptera the proportion of valuable species in Kis-Sárrét area is much higher than that in other marshy sites. Regarding many

groups of macroinvertebrates, the number of curiosities is immensely remarkable, predicts the high natural value of the area.

.....

O2 – Friday, 11¹⁰

Testing the adequacy of the Hungarian typological system on the watercourses of the Ipoly basin, based on the macroinvertebrate communities

András Csercsa^{1,4*} – Arnold Móra² – Csaba Deák³ – Eszter Krasznai^{1,4} – Andrea Zagyva⁵ – Gábor Várbíró¹ – Pál Boda¹

¹Department of Tisza River Research, MTA Centre for Ecological Research, Bem tér 18/c, H-4026 Debrecen, Hungary

²Balaton Limnological Institute, MTA Centre for Ecological Research, Klebelsberg Kuno u. 3, H-8237 Tihany, Hungary

³National Inspectorate for Environmental Protection and Nature Conservation Management (Transtisza), Laboratory, Hatvan u. 16, H-4025 Debrecen, Hungary

⁴Doctoral School of Chemistry and Environmental Sciences, University of Pannonia, Egyetem u. 10, H-8200 Veszprém, Hungary

⁵General Directorate of Water Management, Márvány utca 1/d, H-1012 Budapest, Hungary

*Corresponding author, e-mail: csercsa.andras@okologia.mta.hu

The Hungarian typology of watercourses is based on abiotic factors and little is known about how this classification is reflected in macroinvertebrate communities. The Hungarian typology of running water bodies is based only on abiotic factors therefore we know little of how this classification is reflected in the inhabiting macroinvertebrate communities. The Hungarian Multimetric Macrozoobenthon Index (HMMI) is built by five indices, which suggests that a more robust typology could be sufficient based on them. We investigated the deviations between the typology and biota in samples taken from the catchment of the Ipoly River and revealed the causes in case of 5 types of running waters. Based on the macro-invertebrates, only the separation of the mountainous regions and the submontane zone was perceptible and Crustaceans were the main factors influencing the development of the groups. The quality of 61% of the water bodies in the catchment area of the Ipoly needs improvement to reach good ecological status. Community of the Nyerges-patak (mountainous region) shows more similarity to the communities of streams in the submontane zone. The assessment carried out based on the new categories had positive influence on the ecological status.

05 – Saturday, 13⁰⁰

Taxonomy and ecology of the subgenus *Hellichella* (Diptera: Simuliidae) in Europe and the first records from Hungary

Csaba Deák

National Inspectorate for Environmental Protection and Nature Conservation Management (Transtisza), Laboratory, Hatvan u. 16, H-4025 Debrecen, Hungary
E-mail: deacsa@gmail.com

Within the *Simulium* genus, the *Hellichella* subgenus is represented in the Holarctic. Four of the seven species existing in Europe are restricted to Northern Scandinavia and Russia. *Simulium* (*H.*) *latipes* is distributed in Western, Central and Eastern Europe, *Simulium* (*H.*) *saccai* is an endemite from the Lazio region in Italy, while *Simulium* (*H.*) *sedecimfistulata* has only been found in the Vistula lowlands near Warsaw, but recently it has been collected also from Germany. The preimaginal stages of the subgenus preferably live in small, eurythermal streams with many plants, as univoltine species they emerge in spring and regarded as ornithophilic. Within the scope of the water quality monitoring of the Hungarian Environmental and Nature Conservation Inspectorates has already provided a lot of useful data on several freshwater macro-invertebrate groups, such as blackflies. Regular samplings contribute to the knowledge of the distribution and ecology of particular macroinvertebrate taxa and in some cases species new for the Hungarian fauna could also be detected. A good example of the latter case is the first records of the subgenus *Hellichella* from Hungary. Larvae and pupae were collected from six calcareous streams and brooks in the north-western (Által-ér, Bikol-patak, Kardos-ér, Csenke-patak) and eastern (Fülöpi-ér, Villongó-ér) part of Hungary. According to the available keys based on morphological characters the collected specimens were *Simulium* (*H.*) *latipes*. Since this subgenus has already been found in lowland streams from Austria, its appearance in the local fauna could have been expected.

.....

P1 – Thursday, 14⁴⁰

First record of *Wormaldia subnigra* McLachlan, 1865 (Trichoptera) in Hungary

Csaba Deák^{1*} – Daniel Dimitru Portelechi²

¹National Inspectorate for Environmental Protection and Nature Conservation Management (Transtisza), Laboratory, Hatvan u. 16, H-4025 Debrecen, Hungary

²National Administration “Romanian Waters” - Crisuri Water Basin Administration (ABAC) 35, Ion Bogdan, 410125 Oradea, Romania

*Corresponding author, e-mail: deacsa@gmail.com

Within the framework of the border water agreement between Hungary and Romania, macroinvertebrate sample was taken in September 2013 from the Black Cris (Fekete-Körös) at Sarkad (Malom-fok). The sample included one larva of *Wormaldia subnigra*, a caddisfly species proved to be new to the Hungarian fauna. The larvae of this species inhabit rivulets and small to medium sized rivers; they can be found at various current velocities. *Wormaldia subnigra* is widespread in Europe and known from N- and NW-Russia. The appearance of the species is likely to be a consequence of a drift from the Romanian section of the river.

.....

O2 – Friday, 10⁵⁰

Complex evolution of aquatic and semi aquatic habitats in the Carpathians: case study of the micro endemic *Pedicia straryi* group (Insecta, Diptera)

Avar-Lehel Dénes* – Levente Péter Kolcsár– Lujza Keresztes

Hungarian Department of Biology and Geology, Babeş-Bolyai University, Clinicilor 5-7, Cluj Napoca 400006, Romania

*Corresponding author, e-mail: avar.lehel@gmail.com

The Carpathian Area is an important hotspot for the aquatic biodiversity in Europe, but data on the age and origin of its endemic fauna is scarce. In the present study morphological variability, phylogeographic and population genetic structures of three Carpathian range-restricted endemic diptera species (*P. apusenica*, *P. lobifera*, *P. straryi*) were analysed, based on linear morphometry and nucleotide sequences of the mitochondrial cytochrome c oxidase subunit I

(COI) gene. Results confirm the taxon status of the three species that have limited distribution in small enclaves in the Carpathians. This pattern shows long term isolation in microrefugia caused most probably by the fragmentation of the forest patches in the Pliocene period, due to the required headwater spring habitat of these species. Additionally in the case of the widest spread *Pedicia staryi* data revealed further divergent lineages between the populations from the Northern parts of the Eastern Carpathians and the Eastern parts of the Southern Carpathians. This indicates a more recent speciation event that was probably caused by the isolation in different microrefugia during the Pleistocene climate changes. The present study brings important evidence of the complex autohtonous speciation proceses of the spring habitats in the Carpathians and show the importance of these mountain regions as biodiversity centers and refugial areas, harbouring a high genetic diversity and complexity of these particular aquatic ecosystems.

.....

P2 – Thursday, 15⁴⁰

Urban dragonflies: gomphids (Odonata: Gomphidae) along the Danube at Budapest

Anna Farkas^{1*} – Thomas Oliver MÉRŐ² – Arnold MÓRA³ – György DÉVAI¹

¹Department of Hydrobiology, Faculty of Science and Technology, Centre of Arts, Humanities and Sciences, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary

²Department of Ecology, Faculty of Science and Technology, Centre of Arts, Humanities and Sciences, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary

³Balaton Limnological Institute, Centre for Ecological Research, Hungarian Academy of Sciences, Klebelsberg Kuno 3, H-8237 Tihany, Hungary

*Corresponding author, e-mail: flavipes@gmail.com

During previous studies along the Danube upstream Budapest all four Hungarian gomphid species (Gomphidae: *Gomphus flavipes*, *G. vulgatissimus*, *Onychogomphus forcipatus*, *Ophiogomphus cecilia*) were found. Moreover, *G. flavipes*, a species of community interest in need of strict protection (listed on Annex IV of the Habitats Directive of the European Union), was fairly abundant. Based on this knowledge, in 2013 we aimed to study the nearby Danube section in Budapest, where dragonflies face several unfavourable factors (e.g. water pollution, modification of the river-bed and river-bank, shipping). Our aims were

to find out the species composition and abundances of gomphids under urban conditions; and to quantify the ratio of mortality caused by anthropogenic factors during emergence. Exuviae were collected and mortality events were recorded at altogether four different sites ranging from close-to-natural to strongly modified. Based on our results, in *G. flavipes* the number of individuals was much lower along the Danube in Budapest than upstream Budapest. On the other hand, a few specimens of the much scarcer *O. forcipatus* and *O. cecilia* were found along this Danube section for the first time. In *G. flavipes* high mortality was attributed to the frequent ship-induced waves, especially on strongly modified (i.e. paved and/or built-up) sites, where the larvae emerged closer to the water line. This research was supported by the European Union and the State of Hungary, co-financed by the European Social Fund in the framework of TÁMOP 4.2.4. A/2-11-1-2012-0001 'National Excellence Program'.

P1 – Thursday, 14th

Contribution to the aquatic Mollusc fauna of Northern Hungary and the Northern Great Plain. Part II: Bivalvia

Márk Ficsór

National Inspectorate for Environmental Protection and Nature Conservation Management (Northern Hungary), Laboratory, Mindszent tér 4, H-3530 Miskolc, Hungary
E-mail: ficsor.mark@emikofe.kvvm.hu

Aquatic macroinvertebrate communities are regularly investigated by the North Hungarian National Inspectorate for Environmental Protection and Nature Conservation Management (ÉMI-KTF) in Northern Hungary since 2005 and in the Northern Great Plain region since 2007 as a part of the monitoring program connected to the Hungarian implementation of the European Union's Water Framework Directive. Due to their regularity and extensive spatial coverage these investigations provide valuable faunistic data, few of which have been published up to now. In this paper the faunistic data of freshwater Bivalvia investigations at 113 sampling sites are shown that arisen from collectings in Northern Hungary and in the Northern Great Plain between 2005 and 2011. New occurrence data are given for 16 species.

O1 – Thursday, 13⁰⁰

Functional role of benthic invertebrate shredders in assessment of running waters: a new perspective

Tadeusz Fleituch

Institute of Nature Conservation, Polish Academy of Sciences, al. Mickiewicza 33, Cracow, Poland
E-mail: fleituch@iop.krakow.pl

Direct measurements of ecological processes and functions are often neglected in management programmes and compared to structural approaches, much less effort has been devoted to evaluating their use in assessing the ecological integrity of streams. In this study invertebrate shredders were identified on alder and oak leaf litter in coarse-mesh bags exposed in reference sites and in sites altered by 1/ input of nutrients and by 2/ introduction of Norway spruce in riparian zones (southern Poland). Stoneflies were the most abundant shredders in the natural sites, whereas gammarids or dipterans dominated in the polluted sites. Dipterans colonized more frequently the alder leaves in bags than the oak ones. Cluster analysis based on shredder density on the alder leaf litter clearly separated natural sites from the degraded ones. High nutritional quality of alder leaves for shredders accompanied by increase of density of aquatic fungi could have stimulated the shredders' growth. Differences in the feeding behavior between gammarids and dipterans at the site degraded by nutrients may reflect a specific physiological adaptation of these shredders and their high potential for food assimilation. The sites affected by introduction of conifer plantations generally presented higher density of stoneflies than the polluted ones. The gammarids were more common on the oak leaf litter. The shredder diversity was: (1) higher on the oak leaves than on the alder ones and (2) negatively related to nutrient concentration in water. Shredder diversity differed significantly between the site types and between the leaf species. In comparison to nutrient polluted sites, the Norway spruce sites did not reduce shredder diversity. However, a negative effect of such disturbance on stoneflies was found (a decrease of relative abundance). The reasons for the relatively high shredder diversity in conifer degraded sites (not native vegetation for the studied region) are unclear but accessibility of an easy degradable substrate (i.e. deciduous leaf litter exposed in "conifer supported sites") could have played a role in animal attraction. It seems that functional measures (e.g. leaf litter breakdown rate, respiration rate,

shredders' diversity) contribute to a complementary assessment of stream ecosystems because they are affected by many abiotic and biotic variables, integrate environmental conditions over time, cover several habitats within streams simultaneously and are geographically more independent because they do not rely only on a specific set of species.

.....

P3 – Friday, 14⁴⁰

Predation risk within macrophyte stands

Jelena Fressl* – Maria Špoljar – Tvrtko Dražina – Ines Radanović – Jasna Lajtner – Ivana Zrinščak – Tea Tomljanović – Dora Tončić – Sandra Hodić – Biserka Primc

Division of Biology, Faculty of Science, University of Zagreb, Rooseveltov trg 6, 10000 Zagreb, Croatia
*Corresponding author, e-mail: jelena.fressl@gmail.com

Aquatic vegetated habitats are very important in shaping biotic interactions, acting as food resources and in predation opportunities and avoidance. We aimed to analyse summer macroinvertebrate community structure and functional feeding guilds in *Ceratophyllum* stand according to differences: 1) in microhabitats, within macrophyte stems (Cm) and macrophytes cover bed (Cb); and 2) in food resources and predation pressure. Water mites dominated as main predators in both microhabitats, and their abundance in macrophytes cover bed correlated negatively with dipteran larvae, as preferably food. Within stems, results suggested on their predation upon microcrustaceans. *Ceratophyllum* associated macroinvertebrate community within stems (Cm) dominated in predators presented by microturbellarians and adult heteropterans. *Ceratophyllum* associated benthic community (Cb) was numerous in detritivores mainly composed by oligochaets and mayflies. Presumably, results indicate that different macroinvertebrates functional feeding guilds within macrophyte stands preyed on wide spectra of zoepiphyton (gnoamoebae, testaceans, bdelloids) as well as rotifers, cladocerans and nauplii dominated in plankton. In opposite, more pronounced fish predation pressure over different macroinvertebrate groups was marked within macrophyte stems than in macrophyte cover bed. In general, macrophyte stands offer refuges for many macroinvertebrates, among stems and into the bed, thus attract their macroinvertebrates consumers and fish, consequently. Beside macroinvertebrates food webs, this study suggested on

existing of vertical migration of microzooplankton in shallow lakes macrophyte cover bed as refuge from predators.

P1 – Thursday, 14⁴⁰

Distribution of triclads (Platyhelminthes: Tricladida) in the waters of the Bakony mountains, Northwestern Hungary

Teofil Fülep^{1,2}

¹Institute of Environmental Management, Faculty of Earth Science and Engineering, University of Miskolc, Miskolc-Egyetemváros H-3515 Miskolc, Hungary, e-mail: f.teo73@freemail.hu

²Doctoral School in Animal and Agricultural Environment Sciences, Georgikon Faculty, University of Pannonia, Deák Ferenc utca 16, H-8360 Keszthely, Hungary

In 2012 faunistical studies were carried out on freshwater triclads (Platyhelminthes: Tricladida), in springs and water flows in the region of Zirc, Vinye, Ravazd and Bakonyhána, Bakony mountains, Hungary. The only research on triclads referred to the Bakony Mountains was published in 1925. The author reported the entire absence of mountainous triclad species from the mountains, but reported *Dendrocoelum lacteum*, *Dugesia lugubris* and *Polycelis nigra* lowland species from “the streams in the bottom of mountains”, peripheral regions. The same 3 triclad species were found in the region, by examination of 31 sampling sites. Finding of mountainous species also was not successful in my present research, which are probably completely absent from the mountainous Bakony. *Polycelis nigra/tenuis* was found in a spring of the peripheral lowland region (IV. Béla király King’s Well, new well, Ravazd, ~115 meter asl.). *Dendrocoelum lacteum* and *Dugesia lugubris* were found at hilly altitude, but in the karstic mountainous region (Hódos-ér Stream, ~250–350 meter asl. and Vadas-árok, Cuha-völgy Valley, ~340 meter asl.). Both species are lentic, which were reported from the peripheral Bakony in the 1925 publication, so their hilly/mountainous presences were not expected. *D. lacteum* occurred in the flow of the Hódos-ér Stream, with small abundance. The Hódos-ér Stream was dried up along several kilometres during summer drought. But a remaining puddle was found in the stream bed, where further *D. lacteum* specimens were found, also in small abundance. The puddle functioned as a refugium. Probably the increasing of the population size is not possible because of the drying outs, the species may totally disappear from the region due to extreme climatic and water flow changes.

P4 – Friday, 15⁴⁰

Utilization possibilities of distribution of freshwater triclads (Platyhelminthes: Tricladida) for determination of ecological water flow in mountains

Teofil Fülep^{1,2}

¹Institute of Environmental Management, Faculty of Earth Science and Engineering, University of Miskolc, Miskolc-Egyetemváros H-3515 Miskolc, Hungary, e-mail: f.teo73@freemail.hu

²Doctoral School in Animal and Agricultural Environment Sciences, Georgikon Faculty, University of Pannonia, Deák Ferenc utca 16, H-8360 Keszthely, Hungary

One of the most important unsolved tasks of biology is the determination of the ecological water flow. Because of the complexity of the water biocenosis there is not a generally usable solution for this problem. This method is not suitable for that either. Opposed to the most of the other invertebrates, the freshwater triclads (Platyhelminthes: Tricladida) are in water in every stage in their lives, there are not terrestrial periods of their lives. Survival strategy for desiccation is known only with a few species. Mountainous species are generally stenothermal and sensitive of water permanence in time. They cannot live or die out, disappear from periodic or casually drying out water. Because of the mountainous waters often have extreme water level fluctuations, there can be seen a connection between the occurrence of triclads and the water rate of flow. Triclads may show different faunistic features in each mountains and each watercourse-system which has significant permanence in time because of their small spreading skill. In mountainous springs and streams – if the physical features of the bed and the water do not change remarkably, and there is no water pollution, habitat destruction – the decrease of abundance or the disappearance of population is more or less the result of the actual or earlier drying out or an extreme water flow reduction in my experience. If there is a chance of resetting of the triclads (for example from a side-stream or a lower part), after the water flow return to normal, the abundance of the water body section set to the earlier. In case of sufficient water flow the abundance stays more or less average [~60–400 specimens/hour with timed collection], while the decreased abundance [~0–60–(80) specimens/hour] shows critical water flow reduction. The abundance of triclads may indicate the condition of the actual and earlier ecological water flow in the mountainous main stream lines and side tributaries. After getting to know their faunistics, the monitoring of populations may help the determination of the

ecological water flow. Anyway, the reaching conclusions are occasional and limited, because the reasons of the water flow reduction can be simultaneously manmade and natural.

.....

O1 – Thursday, 13²⁰

Changing shiny paintwork to matte one can enhance the polarized light pollution of cars to polarotactic aquatic insects

Gábor Horváth^{1*} – Miklós Blahó¹ – Tamás Herczeg¹ – György Kriska^{2,3} – Ádám Egri¹ – Dénes Száz¹ – Alexandra Farkas¹ – Nikolett Tarjányi³ – László Czinke²

¹Environmental Optics Laboratory, Department of Biological Physics, Physical Institute, Eötvös University, H-1117 Budapest, Pázmány sétány 1, Hungary

²Group for Methodology in Biology Teaching, Biological Institute, Eötvös University, H-1117 Budapest, Pázmány sétány 1, Hungary

³Danube Research Institute, Centre for Ecological Research, Hungarian Academy of Sciences, Alkotmány út 2-4., H-2163 Vácrátót, Hungary

*Corresponding author, e-mail: gh@arago.elte.hu

A new fashion fad is to make car-bodies matte black or grey. The horizontally polarizing surface parts of shiny dark cars (mimicking the reflection-polarization characteristics of water surfaces) attract water-seeking, flying, polarotactic aquatic insects. Thus, shiny black and dark-coloured cars are typical sources of polarized light pollution endangering aquatic insects. Since rough (matte) surfaces depolarize the reflected light, one of the ways of reduction of polarized light pollution is to make matte the concerned surface. Consequently, matte black/grey cars may not induce polarized light pollution, which would be an advantageous feature for environmental protection. To test this idea, we performed field experiments with horizontal shiny and matte, black and red car-body surfaces. We investigated the attractiveness of these surfaces to various polarotactic aquatic insects. We obtained the following results: (i) The attractiveness of black and red car-bodies to polarotactic insects strongly depends on the surface roughness (shiny, matte), colour (black, grey, red) and taxa (mayflies, dolichopodids, tabanids). (ii) Depending on taxa and colour, matte car-bodies can be less or more attractive to polarotactic insects than shiny car-bodies. (iii) Surprisingly, the polarized light pollution of the shiny body-work of black and

red cars usually cannot be reduced with the use of matte painting. (iv) Non-expectedly, replacing shiny car painting with matte one can even enhance the polarized light pollution of cars to mayflies, which are endangered and protected insects in many countries. (v) Depending on taxa, matte/shiny red cars can be more attractive to polarotactic insects than matte/shiny black cars. Gábor Horváth thanks the German Alexander von Humboldt Foundation for an equipment donation and a three-month research fellowship (3.3-UNG/1073032 STP, between 1 June and 31 August 2013) in Regensburg.

.....

O4 – Saturday, 11³⁰

Distribution patterns of Gammaridae in the river Hernád and Sajó

Eszter Krasznai^{1,4*} – András Csercsa^{1,4} – Pál Boda¹ – Márk Ficsór² – Máté Bolbás^{1,3} – Gábor Várbíró¹

¹Department of Tisza River Research, MTA Centre for Ecological Research, Bem tér 18/c, H-4026 Debrecen, Hungary

²National Inspectorate for Environmental Protection and Nature Conservation Management (Northern Hungary), Laboratory, Mindszent tér 4, H-3530 Miskolc, Hungary

³Debreceni Egyetem, TEK, TTK, Hidrobiológiai Tanszék, Egyetem tér 1, H-4032 Debrecen, Hungary

*Corresponding author, e-mail: krasznai.eszter@okologia.mta.hu

Benthic macroinvertebrates are one of the major biota in streams mainly composed in small streams of aquatic crustaceans. Aquatic organisms such as Gammarids are affected by various physical and chemical features that can be organized hierarchically along the spatial scale of a river network within landscapes. Base rock geology, watershed topography affects sediment supply and water chemistry in mesoscale. Land cover, valley landform, vegetation type, flood intensity, and morphodynamic processes in the smallest scale. These physical factors allow many stream reaches to have diverse habitats and influence both community structure and ecosystem functions. These habitat types have an effect on the function of stream ecosystems by considering the spatial distribution of invertebrates among various habitats. Aquatic Gammarids are the link between primary food sources (algae, microorganisms, and detritus) and their predators (fish) in a stream food web. The main question of the article is to describe the distribution gradient of major Gammarids (*Gammarus balcanicus*, *G. roeselii*, *G. fossarum*) of the Hernád-Sajó watersheds region.

P3 – Friday, 14⁴⁰

Dipteran fauna of the Western Carpathian spring fens

Vendula Křoupalová* – Jindřiška Bojková – Vít Syrovátka – Vanda Rádková – Michal Horskák

Department of Botany and Zoology, Masaryk University, Kotlářská 2, CZ-61137 Brno, Czech Republic

*Corresponding author, e-mail: vkroupalova@seznam.cz

Among the freshwater habitats, spring fens are unique biotopes with specific abiotic conditions supporting the occurrence of a high number of rare and threatened organisms. Their biota is strongly influenced by the chemistry of groundwater, which induces a stable gradient of mineral richness, water pH, and concentration of bivalent cations. Although many studies have dealt with spring invertebrate faunas, comprehensive research on dipteran fauna is still rather rare. This is despite the fact that Diptera are known to be the most diverse group of spring aquatic insects including a high proportion of specialized taxa. Dipteran fauna (excl. Chironomidae, Simuliidae) was studied on 62 small, treeless spring fens spanning from extremely mineral-rich tufa-forming calcareous fens to mineral-poor acidic Sphagnum-fens in 2006 and 2010–2012. At each site, two separate samples were taken from two mesohabitats: one from the flowing water and the other from the standing or slow-flowing water. In total, 135 taxa of 26 families comprising taxa characteristic for lotic, lenitic, semiterrestrial and terrestrial environments were found. Limoniidae (25 taxa) and Psychodidae (25) were the most taxa-rich families followed by Stratiomyidae (14). While the total number of taxa and individuals did not significantly differ between flowing and standing water habitat, the rarefied number of taxa was significantly higher at flowing water habitat. PCA on environmental data showed that a complex gradient of mineral richness (represented by changes in water pH, conductivity, Ca, Mg, total organic carbon, inorganic substrate characteristics, and soil reaction) was the most significant environmental gradient at both mesohabitats. Indicator species analysis identified taxa characteristic for calcareous (e.g. *Pericoma calcilega*, fam. Psychodidae), moderate (e.g. *Pseudolimmophila* sp., fam. Limoniidae) and acidic (e.g. *Atrichopogon* sp., fam. Ceratopogonidae) conditions. The study was supported by the research project of the Czech Science Foundation (P505/11/0779).

P1 – Thursday, 14⁴⁰

Contribution to the Minute Moss Beetle fauna (Coleoptera: Hydraenidae) of North-West Hungary

Andor Lókkös^{1*} – Krisztián Kovács²

¹Balaton Uplands National Park Directorate, H-8229, Kossuth u. 16, Csopak, Hungary

²National Inspectorate for Environmental Protection and Nature Conservation Management (Northern Transdanubia), Laboratory, Török Ignác u. 68, H-9028 Győr, Hungary

*Corresponding author, e-mail: a.lokkos@gmail.com

During a faunistical exploration in North-West Hungary carried out between 2006 and 2011, 14 Minute Moss Beetles taxa were recorded. Important faunistic records are new localities of *Hydraena nigrita* Germar, 1824, *H. pulchella* Germar, 1824, *H. pygmaea* Waterhouse, 1833 and *Ochthebius peisonis* Ganglbauer, 1901. *Hydraena nigrita* Germar, 1824 and *H. pulchella* Germar, 1824 is recorded for the first time for the region Alpokalja and we give the first findings of *Ochthebius peisonis* Ganglbauer, 1901 from Hungary after more than 50 years.

.....

P4 – Friday, 15⁴⁰

Investigation of the diet of *Palingenia longicauda* (Olivier, 1791) larvae based on Diatoms

Kristóf Málnás^{1*} – Viktória B-Béres² – Zsuzsanna Kóka² – Edina Simon³

¹BioAqua Pro LTD. Só Rezső u. 21, H-4032 Debrecen, Hungary

²National Inspectorate for Environmental Protection and Nature Conservation Management (Transtisza), Laboratory, Hatvan u. 16, H-4025 Debrecen, Hungary

³Department of Ecology, University of Debrecen, Egyetem ter 1, H-4032 Debrecen, Hungary

*Corresponding author, e-mail: malnask@gmail.com

Diatom assemblages derived from gut content of *Palingenia longicauda* larvae, phytobenthos of the clay surface around the burrows of larvae and seston of surface water samples were compared to ascertain the utility of diatom assemblages in order to functional feeding group classification. Furthermore we aimed to unravel whether the larvae of *Palingenia longicauda* belong to active filterer or detritus feeder. According to our results, diatom valves derived from

the gut contents of the mayfly larvae remained well preserved and could be used to identify whether valves belong to planktonic or benthic diatom group. Our results based on comparing the species composition of the samples demonstrated that the gut content revealed higher similarity with the seston than with the phytobenthos according to the diatom assemblages. The proportion of the planktonic and benthic diatoms of the gut content was also similar to the seston samples rather than the phytobenthos. These results suggested that *Palingenia longicauda* larvae are mainly belonged to the active filterer Functional Feeding Group. The investigation was supported by the TÁMOP-4.2.4.A/2-11/1-2012-0001 “National Program of Excellence”.

.....

P2 – Thursday, 15⁴⁰

Toxic element analysis in larvae, adults and exuviae of *Stylurus flavipes* (Charpentier, 1825)

Kristóf Málnás^{1*} – Sándor Harangi² – Zsuzsanna Balogh² – Edina Baranyai³ – Attila Szondi² – György Dévai⁴ – Edina Simon²

¹BioAqua Pro LTD. Soó Rezső u. 21., H-4032 Debrecen, Hungary

²Department of Ecology, University of Debrecen, Egyetem ter 1 H-4032 Debrecen, Hungary

³Department of Inorganic and Analytical Chemistry, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary

⁴Department of Hydrobiology, University of Debrecen, Egyetem ter 1 H-4032 Debrecen, Hungary

*Corresponding author, e-mail: malnask@gmail.com

Toxic element concentration was studied in larvae, adults and exuviae of river clubtail (*Stylurus flavipes*) with Microwave Plasma Atomic Emission Spectrometry (MP-AES). Samples were collected from the Hungarian reaches of the Upper-Tisza and the River Szamos. The aim of our study was to analyse the toxic element concentration in larvae, adults and exuviae of *Stylurus flavipes* to study which are suitable for monitoring the toxic element contamination. However, we studied the correlation between toxic element concentration of water, sediment and larvae, adults and exuviae of *S. flavipes*. Our results showed that studied toxic elements divided into two groups: in case of Al, Ba, Cr, Fe, Mn and Zn significant differences were found between the larvae and adults, and exuviae of *S. flavipes* samples. All toxic element concentrations were the highest in the exuviae, and the lowest in the adults. At the same time, the Cu, Pb and Sr concentrations did

not differ significantly in the adults and the larvae. But the concentrations of these elements were significantly higher in the exuviae than in larvae and adults. Based on rank correlation the toxic element concentration in the larvae, adults and exuviae of *S. flavipes* correlated significantly with the toxic element concentrations in the sediment. In spite of it, there was no significant correlation with the surface water samples. Our results demonstrated that the toxic element concentrations were higher in the larvae than in adults of *S. flavipes*. Based on our results we concluded that *S. flavipes* may detoxificate through the moult since the toxic element concentrations were the highest in the exuviae. On the other hand the left behind exuviae on the riverside are the most suitable for monitoring to assess the toxic element contamination. Since toxic element concentrations in exuviae were correlated with the toxic element concentration in sediment. The investigation was supported by the TÁMOP-4.2.4.A/2-11/1-2012-0001 "National Program of Excellence".

.....

P2 – Thursday, 15⁴⁰

Impact of heavy metals in sediments on the macroinvertebrates communities of some smaller streams in Belgrade Region (Serbia)

Vanja Marković^{1*} – Anđelka Petković² – Bojana Tubić¹ – Marija Ilić¹ – Margareta Kračun-Kolarević¹ – Nikola Marinković¹ – Boris Novaković³ – Zoran Gačić⁴ – Momir Paunović¹

¹Institute for Biological Research "Siniša Stanković", University of Belgrade, Despota Stefana 142, 11 060 Belgrade, Serbia

²Department of Water Supply, Sewerage, and Water Protection Institute for the Development of Water Resources "Jaroslav Černi", 11 226 Belgrade

³Serbian Environmental Protection Agency, Ministry of Energy, Development and Environmental Protection, Ruže Jovanovića 27a, 11 160 Belgrade, Serbia

⁴Institute for Multidisciplinary Research, University of Belgrade, Kneza Višeslava 1, 11 030 Belgrade, Serbia

*Corresponding author, e-mail: vanjam@ibiss.bg.ac.rs

Small streams and channels in the Belgrade Region are affected by heavy metals. This study deals with the effects of these pollutants on macroinvertebrate communities. In September of 2012, twelve streams in Belgrade Region were sampled. Macrozoobenthos (MZB) samples were taken along with samples for sediment analysis (sediment samples). In total 40 taxa were identified; the most

diverse were Oligochaeta with 11 and Mollusca with 9 taxa. *Limnodrilus hoffmeisteri* was the most abundant and frequent species found. In sediment samples ten elements were measured (9 metals: Fe, Mn, Zn, Cu, Cr, Pb, Ni, Cd, Co; and one metalloid - As). Concentrations of As, Cu, Ni and Zn were extremely high in samples from Turija stream, Topčiderski Potok stream and Barička Reka stream. Concentration of Ni was above maximum allowed concentration in all samples. Performed Forward Analysis (FA) showed relative significance of measured elements, revealing Cd as the most important for present MZB communities; Zn, Cu, Pb and Cr were also significant. Canonical Correspondence Analysis (CCA) was used to illustrate relationships between taxa, streams and chosen elements. Most tolerant to increased heavy metals concentrations were oligochaetes, in particular species *Aulophorus furcatus*, *Limnodrilus hoffmeisteri*, *L. udekianus* and *Potamothrix hammoniensis*. These species, especially *L. hoffmeisteri*, are also the most tolerant to organic pollution (alfa- to polysaprobies). As Turija stream being the most polluted, the only Oligochaeta species found was *L. hoffmeisteri*. The Leech (*Helobdella stagnalis*) seems to tolerate increased concentrations of heavy metals. Records of Trichoptera (*Hydropsyche contubernalis*) and Ephemeroptera (*Caenis horaria*) in this heavy polluted stream (Turija) could indicate their resistance to this particular pollution type. Further investigations should provide data for more reliable analysis.

.....

06 – Saturday, 14⁵⁰

Coexistence among native gammarids (Crustacea: Gammaridae): habitat utilization patterns along a stream

Péter Mauchart^{1*} – Bernadett Reitzl¹ – Attila Czirok² – Valér Horvai² – Adrienne Ortmann-Ajkai¹ – Ildikó Szivák³ – Zoltán Csabai¹

¹Department of Hydrobiology, Institute of Biology, Faculty of Sciences, University of Pécs, Ifjúság útja 6., H-7624 Pécs, Hungary

²Carpathes Nature Conservation Foundation, Radnóti Miklós Itp. 5., H-7700 Mohács, Hungary

³MTA, Centre for Ecological Research, Balaton Limnological Institute, Klebelsberg Kuno utca 3, H-8237, Tihany, Hungary

*Corresponding author, e-mail: mauchart@gamma.ttk.pte.hu

Closely related species share greatly similar niches, but are often found separated by one or more traits when they occupy the same habitat. Among the gammarids,

shifts in life-cycles, food specialization and changes in microhabitat preference could limit the niche overlap and competition between species. Our aim was to survey the distribution patterns and changes in habitat preference in macro-meso- and microhabitat scale, among gammarids. For the study we chose two native sympatric species (*Gammarus fossarum*, *G. roeselii*), which are showing similarity in several ecological traits. Furthermore, we made an attempt to reveal the variability in their biotic interactions. Therefore, we seasonally sampled stream sections in South Transdanubia (SW Hungary) in 2009. To identify the seasonal shifts in microhabitat preferences, Kruskal-Wallis tests were used within each season. To determine the biotic interactions between the gammarids, the co-existence index (C_{ij}) was calculated. We revealed different habitat preference of the gammarid species at sites where they co-occurred, compared to the habitat choice of single occurrences in each scales. Till *G. roeselii* had a definite microhabitat preference, *G. fossarum* showed preference only, if both species were co-occurred. In those cases, *G. fossarum* was mostly abundant in the optimal lithal and biotic microhabitats, whereas it was less dominant in gravel ones. On the contrary, *G. roeselii* was almost completely absent from the lithal microhabitats, but it was usually frequent in biotic microhabitats. The co-existence analysis showed mainly negative association, which has confirmed the influence of biotic interactions on the evolved microhabitat preference.

.....

05 – Saturday, 14⁰⁰

Subfossil chironomid assemblages in alpine lakes of the Parâng and the Făgăraș mountains (Romania, South Carpathians)

Nikoletta Méhes^{1,2*} – Csilla Kövér^{1,2} – Sándor Harangi³ – János Korponai¹

¹Department of Chemistry and Environmental Sciences, University of West Hungary, Károlyi Gáspár tér 4, H-9700 Szombathely, Hungary

²Kitaibel Pál Doctoral School of Environmental Sciences, Faculty of Forestry, University of West Hungary, Ady Endre út 5, H-9400 Sopron, Hungary

³Department of Ecology, University of Debrecen, Egyetem tér 1, H-4032 Debrecen, Hungary

*Corresponding author, e-mail: nikoletta.mehes@gmail.com

The Parâng and the Făgăraș mountains are the highest mountain ranges of the South Carpathians. Many alpine lakes are located in the valleys among the hills. The non-biting midge (Diptera, Chironomidae) fauna of the lakes are poorly

known and only sporadic information is available about the environmental parameters that influence their distribution. Our aim was to study the recent chironomid fauna of fifteen lakes (nine from Parâng and six from Făgăraș) and assess the environmental factors influencing the distribution of the assemblages. Water and surface sediment samples were collected in the summer of 2012 and 2013. The surface sediment samples were obtained from the deepest part of the lakes. Two cubic centimeters of sediment samples were processed to get the chironomid head capsules. The examined sediments contained 13 to 81 well-preserved head capsules. The most remains and taxa were found in lakes of the Parâng, tribe Tanytarsini, genus *Procladius* and *Psectrocladius sordidellus*-type were common in these lakes. Chironomid fauna of the Făgăraș was poor in remains, among them taxa of tribe Tanytarsini and genus *Pseudodiamesa* were specific for these lakes. According to the results of the multivariate statistical analysis (CCA, LDA), composition of the chironomid assemblages were different in the two mountains. Distribution of the chironomid assemblages was defined significantly by the maximum water depth and iron(III)-oxide concentration of the sediment of the lakes.

.....

04 – Saturday, 11¹⁰

Occurrence of critically endangered dragonfly *Sympetrum depressiusculum* at artificial fishpond: population ecology and causes of vulnerability

Hana Mižičová* – Aleš Dolný

Department of Biology and Ecology, Faculty of Science, University of Ostrava, Chittussiho 10, 710 00 Ostrava, Czech Republic

*Corresponding author, e-mail: h.mizicova@seznam.cz

Sympetrum depressiusculum (Sélys, 1841) is in Europe classified as vulnerable with a high risk of extinction in the wild. This species originally from central Siberia inhabits in Central Europe close range of natural habitats (alluvial areas of rivers and lakes and waterlogged meadows) which is even more reduced by anthropogenic changes in aquatic habitats. The distribution of the species in Central and Western Europe is restricted and its populations are declining. Despite the vulnerability of the species the populations can be locally very abundant, even at artificial habitats such as fish breeding ponds and rice fields. The main threat for this habitat specialist is the decline of suitable habitats caused

by anthropogenic interventions, other causes of its vulnerability are unknown. We investigated the persisting population at fish breeding pond in the Czech Republic (Moravian-Silesian Region). We compared the philopatry rate of *S. depressiusculum* and three other related but not endangered species of the same genus (*S. sanguineum*, *S. vulgatum*, *S. striolatum*). Using exuviae collection and capture-mark-recapture methods we obtained data allowing us to compare the numbers of emerged individuals and adults returning to the natal site. We also used Jolly-Seber model and generalized linear models to analyse seasonal and spatial patterns of routine movements of *S. depressiusculum* in a heterogeneous landscape. There was considerable difference between philopatry of *S. depressiusculum* and three other species (in *S. depressiusculum* philopatry was almost 100 %, in the other species <10 %). Using terrestrial habitats was selective and relatively long-term (approximately 3 mo). Adults preferred areas with rich vegetation, while they completely ignored production fields. There were also significant differences in dispersal between sexes. The high philopatry rate apparently contributes to the vulnerability of the species in landscape altered by humans. It is therefore essential to protect natal habitats of the species having this evolutionary strategy. It is also important to protect surrounding terrestrial habitats – even the species tightly linked to its natal site utilises an area which is much larger than the natal site. The severe decline of some dragonfly species may be caused not only by interventions in aquatic habitats but also by extensive changes in landscape structure.

.....

P1 – Thursday, 14⁴⁰

Contribution to the Chironomidae (Diptera) fauna of Lake Balaton and its catchment area, with first records of nine species from Hungary

Arnold Móra

MTA, Centre for Ecological Research, Balaton Limnological Institute, Klebelsberg Kuno 3, H-8237 Tihany, Hungary, e-mail: mora.arnold@okologia.mta.hu

Between 2006 and 2013 chironomid larvae and exuviae were sporadically collected at five sites in Lake Balaton and at 23 sites in springs and along watercourses in its catchment area. Altogether 3450 specimens (3140 exuviae and 310 larvae) were identified at species level, belonging to 128 species and two pupal exuvial forms. Nine species proved to be new to the Hungarian fauna

(*Chaetocladius insolitus*, *Cladotanytarsus lepidocalcar*, *Eukiefferiella fuldensis*, *Limnophyes asquamatus*, *Metriocnemus tristellus*, *Orthocladius excavatus*, *Polypedilum arundineti*, *Tanytarsus excavatus*, *Tanytarsus glabrescens*). Moreover, seven species were collected in Lake Balaton for the first time, while 34 species were first recorded in its catchment area. In spite of the continuous intensive investigations, the strikingly large number of new species and new occurrences, with the fact that only sporadic collections were carried out, suggests that our knowledge on the chironomid fauna of the studied area is still limited.

.....

06 – Saturday, 15³⁰

The Odonata fauna of the rivers in the Körös–Maros National Park (Hungary) with special emphasis on Gomphidae assemblages

Arnold Móra^{1*} – Tibor Danyik² – Anna Farkas³

¹MTA Centre for Ecological Research, Balaton Limnological Institute, Klebelsberg Kuno 3, H-8237 Tihany, Hungary

²Körös–Maros National Park Directorate, Anna-liget 1, H-5540 Szarvas, Hungary

³Tornóc u. 27, H-1141 Budapest, Hungary

*Corresponding author, e-mail: mora.arnold@okologia.mta.hu

Four riverine dragonfly (Odonata: Gomphidae) species occur in Hungary, all of which are protected, moreover *Gomphus flavipes* and *Ophiogomphus cecilia* are species of community interest according to the Habitats Directive of the European Union. The main aims of our study were to find out in details the occurrence and abundance of Gomphidae species along the entire Hungarian sections of four rivers (Fehér-Körös, Fekete-Körös, Kettős-Körös and Maros), located in the operational area of Körös–Maros National Park Directorate. Although the distribution of gomphids is relatively well known along these rivers, no accurate information on their abundances have so far been reported. In 2013 systematic collections of Gomphidae exuviae were carried out at altogether 37 sampling sites along the studied rivers, at four times during the emergence period. Besides gomphids, exuviae of other species were also collected and observational data on adult specimens were occasionally recorded. During this work 5640 exuviae (5291 Gomphidae) were collected and 112 adults were observed. Altogether 17 species were identified (13 as exuviae and 12 as adults). The four gomphid species co-

occured along all four studied rivers, among them exuviae of *O. cecilia* and *Onychogomphus forcipatus* were first recorded from the Fehér-Körös and the Kettős-Körös as well. Furthermore, our collections resulted in several new localities for gomphid species, which was especially evident for *O. cecilia* and *O. forcipatus* and therefore their distributional areas were remarkably expanded. In the Gomphidae assemblages *G. flavipes* and *G. vulgatissimus* were the most frequent and abundant, while *O. cecilia* was frequent and less abundant, and *O. forcipatus* proved to be the rarest species. Comparing the studied rivers, apparently the Maros was the most favourable for gomphids: mean number of exuviae was much higher here than at the other three rivers, which also suffered from larger anthropogenic modifications (e.g. deforestation, damming up, channelization). However, composition of Gomphidae assemblages varied widely not only among rivers but even within a given river, according to habitat characteristics. Contrary to our expectations, no negative effect of artificial paving on abundances could have been revealed. At the same time, damming remarkably influenced the Gomphidae assemblages along the Kettős-Körös river: although all four species occurred along both the dammed and non-dammed reaches, at the river section with retained water *G. flavipes* was dominant, whereas downstream from the dam *G. vulgatissimus* was the most abundant. At the dammed sections the changes in habitat is also indicated by presence of riverine species (e.g. Gomphidae) together with typical lentic ones (e.g. *Anax* species). Besides Gomphidae occurrences of other species are also discussed from faunistical point of view.

.....

P4 – Friday, 15⁴⁰

Water quality assessment of Serbian watercourses based on aquatic macroinvertebrates in 2012

Boris Novaković^{1*} – Katarina Bjelanović² – Dalibor Stojanović³

¹Serbian Environmental Protection Agency, Ruže Jovanovića 27 a, 11 160 Belgrade, Serbia

²Faculty of Biology, University of Belgrade, Studentski trg 16, 11 000 Belgrade, Serbia

³State University of Novi Pazar, 36 300 Novi Pazar, Serbia

*Corresponding author, e-mail: boris.novakovic@sepa.gov.rs

Biological monitoring represents one of the major tools for water quality assessment. Aquatic macroinvertebrates are commonly used organisms in

biological monitoring; they have long life-cycles, their communities are stable and can be easily identified using appropriate literature. During the field work in 2012, aquatic macroinvertebrates were collected in total of 89 sampling sites throughout Serbia. All the sites belong to the five ecoregions: V, VI, VII, XI, XII and according to the national typology of watercourses, to six types of surface waters (Type 1- 5 of rivers and artificial waterbody type). For this water quality assessment, Zelinka & Marvan Index is used as measure of saprobity as well as three types of biotic indices: Biological Monitoring Working Party (BMWP), Average Score per Taxon (ASPT) and Ephemeroptera, Plecoptera, Trichoptera (EPT) taxa richness. Taking into consideration selected indices for all ecoregion and watercourse types in the territory of Serbia, it was noted that 24.53% belongs to high, 35.77% to good, 21.95% to moderate, 13.01% to poor and 4.88% to bad water quality class. Also, it was observed that water quality varied equally among different ecoregions. Each of ecoregions is characterised by approximately the same percentage of high and good water quality (~50%); poor and bad water quality varied between 20-30%. Based on specific type of watercourses, it was concluded that the most pressures are present at Type 3 of rivers (small to medium streams, altitude to 500 m, with domination of large fractions of substrate); the high water quality conditions are at Type 4 (small to medium streams, altitude up to 500 m, with domination of large fractions of substrate).

.....

P1 – Thursday, 14⁴⁰

Distribution of the freshwater crustacean *Asellus aquaticus* Linnaeus, 1758 (Isopoda; Crustacea) in Serbia (2007-2013 period)

Boris Novaković^{1*} – Marija Ilić² – Margareta Kračun-Kolarević² – Nikola Marinković² – Jelena Đuknić³ – Vanja Marković²

¹Serbian Environmental Protection Agency, Ministry of Energy, Development and Environmental Protection, Ruže Jovanovića 27 a, 11 160 Belgrade, Serbia

²Institute for Biological Research “Siniša Stanković”, University of Belgrade, Despota Stefana 142, 11 060 Belgrade, Serbia

³Faculty of Biology, University of Belgrade, Studentski trg 16, 11 000 Belgrade, Serbia

*Corresponding author, e-mail: boris.novakovic@sepa.gov.rs

In this study the distribution of the widespread and common Palearctic freshwater isopod *Asellus aquaticus* (Linnaeus, 1758) in Serbia is presented.

Extensive field research carried out during 2007 – 2013 period and covered entire territory of Serbia. According to our data, the species is widely distributed throughout the investigated area. It was registered in vast variety of habitats, from large Pannonian/lowland rivers, to clean highland streams. It was found to be an important member of benthic communities and the dominant crustacean species in some habitats, such as small Pannonian streams. Regarding its high tolerance to organic pollution, and high overall adaptability, such wide distribution is expected. It is also a rather diversified taxon, with a number of subspecies. The most of overall range is inhabited by populations of the nominotypic subspecies *A. aquaticus aquaticus*. Dinaric and Karst Balkan are considered hotspots of this species' diversity, with a few endemic and endangered subspecies in its northwestern part. Populations of *Asellus* are of particular interest in less explored cave-reach eastern parts of Serbia (Stara Planina Mountain). Therefore, more detailed survey should be performed to provide more complete set of data. Obtained data will lead to better understanding of this species diversity, resulting in more effective involvement of this species in a system of freshwater ecological status assessment.

.....

O6 – Saturday, 15⁵⁰

Beta diversity patterns in floodplain water bodies of Drava River: testing the SDR Simplex method

Adrienne Ortmann-Ajkai^{1*} – Pál Boda² - Réka Boda¹ – Roland Hollós¹ – Zoltán Kálmán¹ – Péter Mauchart¹ – Dragica Purger³ – Zoltán Csabai¹

¹Department of Hydrobiology, Institute of Biology, Faculty of Sciences, University of Pécs, Ifjúság útja 6, H-7624 Pécs, Hungary

²Department of Tisza River Research, MTA Centre for Ecological Research, Bem tér 18/c, H-4026 Debrecen, Hungary

³National Institute for Environment, Kőztársaság tér 7, H-7623 Pécs, Hungary

*Corresponding author, e-mail: aadrienn@gamma.ttk.pte.hu

Beta diversity of 18 water bodies (side arms and regularly flooded oxbows) of the active Drava floodplain (Southern Hungary) was analysed using the SDR Simplex method developed by J. Podani and D. Schmera. Floodplain-level metacommunity structure was characterized by similarity (S), richness difference (D), species replacement (R), beta diversity and anti-nestedness, based on binary data of aquatic beetle and bug species and plant-based habitat types (Á-NÉR). Water

bodies were grouped into “flooded” (6) and “standing” (12) types, according to their connection with the main river. In the whole floodplain 11 habitat types (Á-NÉR) were recorded (riparian forests excluded), 5 (45%) in flooded, 9 (82%) in standing types. All SDR Simplex analyses show rather random patterns: S, D and R values are close to each other. Altogether 63 aquatic beetle species were collected, 24 (38%) in “flooded”, and 53 (84%) in “standing” types. Simplex diagram of flooded type shows small similarity, medium replacement and high richness difference and high beta diversity. This pattern may be due to less successful colonization and too much extinction. Standing type and all-floodplain diagrams show higher similarity and replacement, and lower richness difference and beta diversity values, implying later successional stages of water bodies. As for bugs, 27 species were collected altogether, 20 (74%) in flooded and 19 (70%) in standing types. Metacommunity patterns were close to random in standing types, till flooded as well as all-floodplain values were similar than that of the beetles. Comparing the two insect groups, aquatic beetle assemblages of flooded and standing habitats are more clearly separated (only 22% common species), and both well-structured. Bug species separation is less between the two types of habitats (44% of species shared). Both groups are less structured (closest to random) in the standing water types. On the whole floodplain, beetle assemblages have low similarity and medium species replacement and richness difference values, bugs have higher similarity, otherwise show similar picture. Habitats are more randomly distributed than the insect groups. They have higher similarity and far lower beta diversity values for the whole floodplain and also of separated types, implying that their metacommunity structure may appear on higher spatial scale. Study was supported by OTKA-K104552.

.....

O3 – Friday, 13²⁰

Testing of different approaches for the indication of stream intermittency in the Czech Republic - the BIODROUGHT project

Petr Pařil^{1,2*} – Světlana Zahrádková^{1,2} – Vít Syrovátka^{1,2} – Michal Straka⁴ – Marek Polášek^{1,2} – Lenka Šikulová^{2,4} – Denisa Němejcová¹ – Pavla Řezníčková³

¹T. G. Masaryk Water Research Institute, public research institution, Mojžírovo náměstí 16, 612 00 Brno, Czech Republic

²Department of botany and Zoology, Faculty of Science, Masaryk University Brno, Kotlářská 2, 611 37 Brno, Czech Republic

³Department of Fishery and Hydrobiology, Faculty of Agronomy, Mendel University Brno, Zemědělská 1, 613 00 Brno, Czech Republic

⁴WELL Consulting Ltd., Úvoz 52, 602 00, Brno, Czech Republic

*Corresponding author, e-mail: paril@sci.muni.cz

The percentage of partially or fully drying streams has increased during the last decades not only in the Mediterranean, but also in the Central Europe. This gradual disappearance of formerly permanent water-courses is associated not only with hydrological alterations of anthropogenic origin, but probably also with changing climate. Regardless of the origin of this phenomenon, ecologists and water managers need an effective tool for the evaluation of the drought impact on aquatic ecosystems. Therefore, it can be very useful to develop (i) risk maps assessing stream vulnerability to drought and (ii) a hydrobiological method evaluating the presence and possibly also the extent of dry periods in stream's recent history. These two outcomes are the main goals of the BIODROUGHT project (2012-2015) www.biodrought.eu supported by the Technology agency of the Czech Republic no. TA02020395. The development of the indication method is based on a presumed "drought footprint" that is detectable in stream macroinvertebrate assemblages for a certain period of time, corresponding with the extent of impairment. Each dry period can probably act as an ecological filter eliminating sensitive taxa from the assemblage or remarkably reducing their abundances. While these taxa are depleted, other taxa (e.g. good colonizers or highly resistant or ecologically plastic taxa) are able to exploit the re-flooded habitats. Changes in proportional representation of advantageous/disadvantageous species traits in the community can also help to detect the intermittency of streams. Potential permanency/intermittency indicators can be derived from data on the presence/absence and abundance of taxa in the studied streams. A combination of indices derived from community composition and traits' representation will enable the evaluation of the presence of dry periods in stream's history with a defined probability rate. Preliminary results, which are only available for the time of being, suggest several major trends in the analyzed data from the analysed Czech national SALAMANDER database (state monitoring 1996-2010). Apart from the expected lower abundances and number of taxa in the intermittent streams, remarkable changes in the representation of specific traits (e.g. flow velocity preferences, locomotion type, voltinism etc.) were identified too. Also some higher taxonomic groups show a high sensitivity to drought impact, for instance EPT taxa as a whole and namely Plecoptera. Potential indicators were found in many taxonomic groups; however, their drought

sensitivity must be evaluated with regard to season (spring/autumn). The presence of dry periods is detectable also by some indices, for instance by saprobic index, although the separation of organic pollution from drought impact may be problematic. The combination of the presented methods can help to uncover drought in the stream's history, though the response of invertebrates may differ slightly in relation to local conditions.

.....

O6 – Saturday, 15¹⁰

Impact of drought on mayfly taxocoenoses

Marek Polášek^{1,2*} – Petr Pařil^{1,2} – Jan Šupina² – Světlana Zahrádková^{1,2} – Vít Syrovátka^{1,2}

¹T. G. Masaryk Water Research Institute, public research institution, Mojžírovo náměstí 16, 612 00 Brno, Czech Republic

²Department of Botany and Zoology, Faculty of Science, Masaryk University, Kotlářská 2, CZ-61137 Brno, Czech Republic

*Corresponding author, e-mail: m.polasek@mail.muni.cz

Global climate change nowadays is a frequently discussed topic. In Central Europe it brings new phenomena, like more frequent floods and drying up of watercourses. The project "Drying up of streams during climate change" (acronym BIODROUGHT) is focused on drying up of brooks and small rivers (up to the 4th Strahler's order). One of the project's aims is to develop a method of retrospective biological indication of dry episodes based on the analysis of taxonomic and functional composition of benthic macroinvertebrate assemblages. Mayflies (Ephemeroptera) are known for their sensitivity to disturbances, therefore they are often used for bioindication. That is also why we first compared their taxocoenoses between permanent and intermittent brooks of the Czech Republic. The dataset used for the comparison consisted of data from (i) a former state monitoring of small watercourses in 1996–2010 (110 permanent sites and 50 sites with at least one known episode of drought) and (ii) an ongoing research within the BIODROUGHT project (2012–2013; 13 pairs of permanent + intermittent sites). In all cases a semiquantitative sample was taken in spring and autumn and all the sites were without an obvious pollution and/or hydromorphological impact. The preliminary results show an apparent impact of drought on mayfly taxocoenoses.

The intermittent streams had lower mayfly abundance and taxa richness, as well as the representation of specific species-traits (for example semivoltinism). Moreover, it appeared that some sensitive taxa may be considered as permanency indicators (e.g. *Ephemera danica*, *Rhithrogena semicolorata*). This study was supported by the Technology Agency of the Czech Republic (No. TA02020395 and Project No. MUNI/A/0888/2013).

.....

O1 – Thursday, 14⁰⁰

The role of environment and dispersal mode in metacommunity structuring of aquatic invertebrates at isolated spring fens

Vanda Rádková* – Michal Horsák – Vít Syrovátka – Jindřiška Bojková – Vendula Křoupalová – Jana Schenková

Department of Botany and Zoology, Masaryk University, Kotlářská 2, CZ-61137 Brno, Czech Republic
*Corresponding author, e-mail: vanda.radkova@gmail.com

Recent explanation of the processes driving ecological metacommunities aim to integrate two opposing paradigms: (1) Species exhibit different environmental niches and ecological communities are consequently structured by habitat features (species sorting paradigm); (2) Species are environmentally equivalent and ecological communities are therefore determined by species dispersal abilities (neutral model). It has been proved that relative importance of these two processes differ among different types of metacommunities and spatial scales, nevertheless no study has been conducted at spring fens so far. Available predictions are based on previous studies from headwater streams and expect dominant effect of abiotic factors in this environment. Spring fens are unique aquatic habitats primarily for their very stable environmental conditions and specific communities of organisms with a high proportion of habitat specialists. Furthermore, they are highly isolated from each other and can be regarded as islands in surrounding terrestrial matrix, thus dispersal abilities can significantly affect species composition of particular assemblages as well. In this study of 59 springs from the Western Carpathians (ca 200 km), five taxocenosis were compared considering their different dispersal abilities (ordered from the poorest dispersers: Clitellata, Ephemeroptera, Plecoptera, Trichoptera, Chironomidae). However, dispersal abilities can differ even within these taxocenosis (rare vs.

common species, specialists vs. generalists). For instance, the importance of dispersal- and niche-based processes for specialists and generalists is almost unexplored due to the difficulty in defining specialists in aquatic environment. In contrast, specialists inhabiting spring fens can be easily defined as species strictly bound to this environment, unable to colonize surrounding aquatic habitats. We expected important spatial structuring of passive dispersers, habitat specialists and also common species. Our results showed prevalent influence of environmental factors for almost all groups, which supports findings of previous studies. We found substantial difference between passive (Clitellata) and active (Insect) dispersers with only significant effect of environment factors for all insect taxocenosis. The strongest spatial structuring was observed in Clitellata specialists, contrary to insect taxa inhabiting all suitable sites regardless habitat specialization. Our predictions on spatial structuring were all confirmed; moreover generalists divided into passive and active dispersers showed significant spatial patterns as well. Dispersal mode (active/passive) was the decisive criterion giving priority to one of the models, neither species specialization nor rarity. This study was financially supported by Czech Science Foundation P505/11/0779 and MUNI/A/0788/2013.

.....

O2 – Friday, 11³⁰

Advanced water quality and flow measurement techniques for aquatic macroinvertebrate research

Gábor Széles

Velinor Ltd., Kossuth Lajos utca 29, H-1161 Budapest, Hungary, e-mail: g.szeles@velinor.hu

Let it be water scarcity at less lucky parts of the world, increasing agricultural demand or pollution of drinking water reserves, water quality plays an ever increasing role in our lives. Even ordinary people start to realize the importance of water management from household to industrial scales. Today's scientists have the ability to use advanced instrumentation to spot sample, monitor or profile water bodies. One of the most advanced techniques is using multiparameter sondes for the purpose. These intelligent, self-contained instruments are capable of measuring up to 20 (!) parameters simultaneously. Parameters include pH, ORP, temperature, dissolved oxygen, conductivity, salinity, ammonium, nitrate,

chloride, algae, chlorophyll, fluorescent dissolved organic material, turbidity. On top of all the advantages of such a system it even can be integrated with an autonomous underwater vehicle. The submarine being a dream of all the scientists who want spatial monitoring for water quality and bathymetry with the least effort, cost, time expended and the most sophisticated data. Flow and discharge instruments also show a huge advance for the last years. Instruments based on the Doppler principle are able to measure 3 dimension water flow extra precisely, thus offering a very viable alternative where traditional methods and instruments struggle or fail. The same Doppler principle can be applied to measure discharge from small streams to the biggest rivers. The above instruments can be successfully applied to all kinds of environmental, hydrobiological and macroinvertebrate studies and research. Using this kind of modern instrumentation offers tremendous advantage over traditional methods / instruments. Quality instrumentation also allows the scientists to focus on their primary interests, without the need to worry too much about data quality.

.....

05 – Saturday, 13²⁰

The influence of habitat features on the red listed beetle *Graphoderus bilineatus* (De Geer, 1774) in floodplain habitats

Nataša Turić^{1*} – Martina Temunović² – Ildikó Szivák³ – Róbert Herczeg⁴– Enrih Merdić¹ – Zoltán Csabai⁵

¹Department of Biology, Josip Juraj Strossmayer University, Cara Hadrijana 8/A, HR-31000 Osijek, Croatia

²Department of Forest Genetics, Dendrology and Botany, Faculty of Forestry, University of Zagreb, Svetošimunska 25, HR-10000 Zagreb, Croatia

³MTA, Centre for Ecological Research, Balaton Limnological Institute, Klebelsberg Kuno utca 3, H-8237, Tihany, Hungary

⁴Department of Ecology, Institute of Biology, Faculty of Sciences, University of Pécs, , Ifjúság útja 6, H-7624 Pécs, Hungary

⁵Department of Hydrobiology, Institute of Biology, Faculty of Sciences, University of Pécs, Ifjúság útja 6, H-7624 Pécs, Hungary

*Corresponding author, e-mail: nturic@biologija.unios.hr

As a typical freshwater species, the dytiscid water beetle *Graphoderus bilineatus* represents one of few beetles in EU legislation, protected by EU Habitat Directive and Bern Convention. Until the recent past, only two historical records were

known in Croatia from 1907 to 1943 and two recent findings from 1990 to 2005. Formerly, Croatia was not included in the range of *G. bilineatus*. During 2010 we conducted a survey at 30 sampling sites across three largest floodplain complexes in Croatia: Nature Park Kopački rit, Nature Park Lonjsko polje and Spačva basin. We carried out a detailed survey on the influence of habitat features on *G. bilineatus* occurrence and abundance. We hypothesised that the water beetle assemblages of the three localities are remarkably different and *G. bilineatus* occurs where the overall water beetle diversity is high. In addition, key environmental factors linked to the variation of water beetle assemblage structure and occurrences of *G. bilineatus* were identified. Furthermore, we explored which species *G. bilineatus* is associated with. Sampling was performed by pond-net and baited bottle traps. Eleven environmental variables and plant community types based on Croatian National Habitat Classification were measured and/or estimated for each sampling site. To test our hypothesis, to explore biological patterns and prove our findings multivariate anovas (ADONIS), linear discriminant analysis, partial canonical correspondence analysis, linear regression models with Helmert coding and coexistence analysis were used. A total of 4,339 water beetle specimens belonging to 98 species were recorded. *G. bilineatus* was recorded at 14 of 30 sampling sites and at 2 of 3 floodplains (Kopački rit- Danube and Lonjsko polje-Sava). Majority of specimens occurred in flooded meadows and in canals or oxbows with riparian and aquatic vegetation of medium density. By analysing the total species dataset of three localities significant differences in water beetle assemblages were found, accompanied by different environmental background and vegetation composition, confirming that localities also differ in their habitat features. A set of environmental variables (density of riparian vegetation, permanent water durability, shading, type of bank) and plant communities (*Carex versicaria*, *Spirodela polyrrhizae*, *Salvinia natans*) best explain the distribution of the water beetle species. Based on the regression model, human impact and shading have significant effects on the abundance of *G. bilineatus* which indicates the negative effects of the anthropogenic disturbance. Sites with *G. bilineatus* have significantly higher species richness compared to the sites without. Co-existence analysis indicates positive, negative and neutral associations between *G. bilineatus* and other water beetle occurrences.

.....

P3 – Friday, 14⁴⁰

Temporal dynamics of aquatic insect (Heteroptera and Coleoptera) assemblages in a temperate floodplain associated with flood pulses

Nataša Turić^{1,4*} – Andreja Radović² – Goran Vignjević¹ – Mirta Sudarić-Bogojević¹ – Martina Temunović^{3,4} – Enrih Merdić¹

¹Department of Biology, Josip Juraj Strossmayer University, Cara Hadrijana 8/A, HR-31000 Osijek, Croatia

²Department of Botany, Faculty of Science, University of Zagreb, Marulićev trg 20/II, HR-10000 Zagreb, Croatia

³Department of Forest Genetics, Dendrology and Botany, Faculty of Forestry, University of Zagreb, Svetošimunska 25, HR-10000 Zagreb, Croatia

⁴Association BIOM, Croatian Institute for Biodiversity, HR-10000 Zagreb, Croatia

*Corresponding author, e-mail: nturic@biologija.unios.hr

Lowland riverine floodplains are regarded as one of the most dynamic and heterogeneous ecosystems. When are in natural state, they cover a variety of water bodies related with flood pulses, representing the hot spots of high and specific biodiversity that is often under protection. The abundance and assemblage structure of aquatic insects (Heteroptera and Coleoptera) between different hydrologic phases caused by various intensity and duration of flooding in Danubian floodplain were investigated in order to determine how flood pulses and other hydrological conditions affect the structure of aquatic insect assemblages. In addition, we assessed if survival of threatened aquatic insects (*Graphoderus bilineatus* and *Berosus geminus*) depends on extreme floods. Aquatic insects were collected every two weeks from April through November during 2005 and from 2007 to 2011 in the Kopački rit floodplain (Croatia). Years with prolonged floods of high intensity supported greater total abundance and richness of aquatic insect fauna in contrast to the frequent and intermittent flooding characterising the hydrological regime in 2007 and 2008 or extremely dry year of 2011. Assessment of hydrological conditions pointed out the importance of the temporal scale of a perturbation where spring floods have a more pronounced effect on aquatic insect assemblages compared to autumn floods. Expected “time lag” between the flood occurrence and their apparent effect on aquatic insects is 17 to 31 day which is related with their life cycles. Modelling the abundance of two threatened water beetle species indicates their dependence on extreme floods. Abundance of *Graphoderus bilineatus* (Coleoptera: Dytiscidae) is

affected by the number of days with water levels higher than +250 cm, whereas abundance of *Berosus geminus* (Coleoptera: Hydrophilidae) is related with prolonged high floods. Changes in flow management of river Danube could remove the structuring influence of floods on aquatic insect communities and can lead to dramatic loss of threatened species. These groups of aquatic insects could be valuable for evaluation and prioritization of international floodplain conservation effort.

.....

O1 – Thursday, 13⁴⁰

The changes of the functional diversity patterns along a watershed

Gábor Várbiro^{1*} – Arnold Móra² – Csaba Deák³ – Ildikó Szivák² – Pál Boda¹

¹Department of Tisza River Research, Centre for Ecological Research, Hungarian Academy of Sciences, Bem tér 18/c, H-4026 Debrecen, Hungary

²Department of Hydrozoology, Balaton Limnological Institute, MTA Centre for Ecological Research, Klebelsberg Kuno utca 3, H-8237 Tihany, Hungary

³National Inspectorate for Environmental Protection and Nature Conservation Management (Transtisza), Laboratory, Hatvan u. 16, H-4025 Debrecen, Hungary

*Corresponding author, e-mail address: varbiro.gabor@okologia.mta.hu

In case of physically heterogeneous environments such as streams, benthic macroinvertebrates have evolved distinct morphological and behavioural feeding strategies of which could be the basis of categorizing these diverse benthic macroinvertebrates into several functional groups. The distributions of different functional groups are adapted to the physical environment of different habitat types within a stream segment. Higher numbers of shredders are in the headwaters while scrapers are abundant in mid-reaches with an open canopy, whereas collector–gatherers dominate pool habitats and collector–filterers prefer to colonize high-flow water sections. In this study we try to delineate the by the dominant functional groups the different river sections along the Sajó-Hernád watershed. We also try to describe the population structure, similarity and dissimilarity of the two water current.

.....

P3 – Friday, 14⁴⁰

Spatiotemporal analysis of floodwater mosquito's dispersal towards city of Osijek, Croatia

Ivana Vručina – Goran Vignjević* – Nataša Turić – Mirta Sudarić-Bogojević – Željko Zahirović – Bistrović Mateja – Enrih Merdić

Department of Biology, University Josip Juraj Strossmayer of Osijek, Cara Hadrijana 8A, 31000 Osijek, Croatia

*Corresponding author, e-mail: goran@biologija.unios.hr

Cities and other human settlements in proximity of river flooding areas usually deal with floodwater mosquitoes. These species often produce very large populations of mosquitoes which rapidly infest surrounding areas. The city of Osijek is situated in eastern Croatia near the one of the biggest floodplains in Europe Kopački rit, defined by Drava and Danube, two lowland rivers. The aim of this study was determination of the source and direction of mosquito infestation. A total of 16 dry ice baited CDC traps were set up as a grid (2.5X2.5 km) in the area of Osijek. Sampling was carried out twice a month from May to September during 2012 and 2013. For the spatiotemporal analysis of distribution Gaussian covariance kriging method was used. A total number of 192,067 mosquitoes were captured, and 15 mosquito species were determined. Investigated years differ in spatiotemporal mosquito dispersion, but source of dispersion was the same. The most abundant species were floodwater mosquitoes such as *Aedes vexans* (66%), *Ochlerotatus caspius* (14%) and *Ochlerotatus sticticus* (10%). Model of distribution has shown some valuable information for dispersal of the floodwater mosquitoes towards city of Osijek from its surroundings.

.....

P4 – Friday, 15⁴⁰

The risk of drying out of small streams: preliminary classification of the Czech Republic area

Světlana Zahrádková^{1,2*} – Ondřej Hájek² – Vít Syrovátka^{1,2} – Pavel Tremel² – Petr Pařil^{1,2} – Marek Polášek^{1,2} – Denisa Němejcová¹ – Yvonne Puchýřová¹

¹T.G. Masaryk Water Research Institute, public research institution, Mojmírovo náměstí 16, 612 00 Brno, Czech Republic

²Masaryk University Brno, Faculty of Science, Department of Botany and Zoology, Kotlářská 2, 611 37 Brno, Czech Republic

*Corresponding author, e-mail: svetlana_zahradkova@vuv.cz

The phenomenon of drought is currently addressed from various points of view. An important aspect is the drying of small streams, which occurs in the warm part of the year even in Central Europe. Small watercourses represent a high proportion of the total length of streams in the Czech Republic and have a great importance to the landscape, as well as to the ecological status of larger rivers. The information about the vulnerability of streams to drought, which differs within the area of the Czech Republic, is an important input for water management, nature conservation or renaturation projects. Czech Republic has been tentatively divided into 4 categories of stream vulnerability to drought based on the results of a 15 year monitoring of benthic macroinvertebrates of small streams and a subsequent analysis. These categories may be well delimited by the combination of Palmer Z Index, altitude and hydrogeology. The classification is currently processed in more detail with the use of regional and local conditions (climate, land use, etc.), and compared with the occurrence of indicator species and biotic metrics developed in the project BIODROUGHT (www.biodrought.eu). The study is supported by the Technology Agency of the Czech Republic (project no. TA02020395).

.....

P3 – Friday, 14⁴⁰

Epiphytic gastropods and food supplies in relation to macrophyte stands

Barbara Žeželj* – Ivana Zrinščak – Maria Špoljar – Tvrtko Dražina – Ana Ostojčić – Maja Duić Sertić – Daniel Matulić – Jasna Lajtner

Department for Fisheries, Beekeeping, Game management and Special Zoology, Faculty of Agriculture, University of Zagreb, Svetošimunska 25, 10000 Zagreb, Croatia

*Corresponding author, e-mail: barbara.zezelj@gmail.com

Macrophyte stands constitute numerous diverse habitats and determine environmental conditions suitable for communities rich in diversity and abundance of protozoans, micro- and macroinvertebrates. We studied gastropod and epiphyton structure in three water bodies differing in morphometry (depth, area), transparency, nutrient concentrations, macrophyte cover percentages and plant architecture types (undissected, floatant, *Nuphar luteum*; dissected,

submerged, *Ceratophyllum demersum*). The main goals were to ascertain: 1) spatial changes of epiphytic gastropod communities in stands with different plant architecture; 2) influence of environmental factors and epiphytic food supplies in the gastropod community structuring. Results of our study suggest that plant coverage and architecture are main factors governing differences in the zoepiphyton and gastropod community structures, in *Ceratophyllum* pond up to 70 % of macrophyte coverage and in *Nuphar* water bodies with less than 20 % of coverage. Small sized planorbid snails, mainly presented with *Gyraulus* taxa, showed affinity to *Ceratophyllum* stands characterised by higher algal biomass, zoepiphyton diversity and abundance. Larger sized physid snail, *Physella acuta*, showed preference to *Nuphar* stands, marked by lower epiphyton abundance and biomass. Grazers were dominant gastropod functional feeding guild in both macrophyte stands. Consequently, attached protozoans (gymnoamoebae, testaceans) and bdelloid rotifers constitute major amount in their feeding preferences. Thus, changes in macrophyte coverage would switch biotic interactions and concomitantly gastropod and aquatic community structures.

.....

P2 – Thursday, 15⁴⁰

Evaluation of fatty acid profile of Chironomidae larvae as valuable food for carp fry

Ivana Živić¹ – Dejana Trbović² – Katarina Bjelanović^{1*} – Zorka Dulić³ – Marko Stanković³ – Zoran Marković³

¹ Faculty of Biology, University of Belgrade, Studentski trg 16, 11 000 Belgrade, Serbia

² Institute of Meat Hygiene and Technology, 11000 Belgrade, Serbia

³ Faculty of Agriculture, University of Belgrade, 11000 Belgrade, Serbia

*Corresponding author, e-mail: k.bjelanovic@gmail.com

Chironomid larvae are natural food of common carp in fish ponds. The aim of this study was to analyze the fatty acid composition of Chironomids in carp ponds and consider possibilities for their inclusion in feed mixtures for fish. Chironomid larvae were obtained from two experimental fish ponds, L1 and L2, located at the Center for fishery and applied hydrobiology (University of Belgrade, Faculty of Agriculture) and a fish farm “Despotovo” placed at the North of Serbia. In the studied fish pond ecosystems fish were fed with extruded and pellet feed. Larvae in the IV and V stage were collected using Eckman-Birg dredge modified for usage

in fish ponds with an 87.55cm² sampling area. Fatty acid analysis of carp meat was done by the Institute of Meat Hygiene and Technology in Belgrade (Serbia). Considering that farmed fish have a lower n-3/n-6 polyunsaturated fatty acid (PUFA) ratio compared to natural fish populations, one way for the improvement of carp meat could be through stimulation of natural food production in fish ponds. Larvae of Chironomidae, especially *Chironomus plumosus*, as the dominant species in fish ponds, are rich in n-6 polyunsaturated fatty acids, primarily in linoleic acid, compared to the n-3 fatty acids. This is especially important for cyprinids since their nutritional needs are higher for n-6 than for n-3 PUFA. Additionally, these organisms have the highest n-3 PUFA (mostly linolenic acid) content among most of the benthic macroinvertebrates. The results of this study show that the saturated fatty acids were in the range from 45.36% to 53.47% with the dominating palmitic acid (26.15-32.27%). Monounsaturated fatty acids accounted for 27.87-28.11% with the most abundant 18:1n-9 (11.41-15.95%), 16:1 (4.20-9.71%) and 18:1n-7 (6.75-7.01%). Polyunsaturated fatty acids were represented with 18.38-25.85% with a high proportion of n-6 (10.16-21.37%) and n-3 (4.47-8.22%). It has been confirmed that chironomid larvae are a significant source of essential fatty acids: linoleic (9.77-21.37%) that was the prevailing n-6 PUFA and linolenic (3.20-7.78%) that was the dominant n-3 polyunsaturated fatty acid. Furthermore they contain eicosapentaenoic acid (0.44-1.57%). Adding natural food as *Ch. plumosus* and producing fish feed enriched with these larvae can be a key factor that could positively affect fish growth and their health. Introducing natural food in feed mixtures can improve the quality of fish meat and moreover have a positive impact on human nutrition and health.

.....

P3 – Friday, 14⁴⁰

Diversity of stoneflies larvae (Plecoptera) in Serbian streams and brooks

Milena Žunić¹ – Katarina Bjelanović^{1*} – Jelena Đuknić¹ – Boris Novaković² – Dalibor Stojanović³ – Ivana Živić¹

¹University of Belgrade, Faculty of Biology, Studentski trg 16, 11 000 Belgrade, Serbia

²Serbian Environmental Protection Agency, Ruže Jovanovića 27a, 11160 Belgrade Serbia

³State University of Novi Pazar, Vuka Karadzica bb, 36300 Novi Pazar, Serbia

*Corresponding author, e-mail: k.bjelanovic@bio.bg.ac.rs

The stoneflies larvae are one of the major components of benthic macroinvertebrate communities in sub-mountain and mountain streams and brooks. Their presence indicates a good water quality, they are sensitive to the most of environmental pressures. They belong to the primary and secondary consumers and represent important food source for other macroinvertebrates and fishes. The survey presents the results of long-term study of stoneflies larvae in Serbian streams and brooks. Specimens were collected using qualitative and quantitative methods at 126 watercourses. In Serbian waters, Plecoptera are represented with 7 families: Chloroperlidae, Perlidae, Perlodidae, Capniidae, Leuctridae, Nemouridae and Taeniopterygidae. A total of 74 taxa were identified, 61 to the species and 13 to the the genus level. The highest diversity was recorded in the family Nemouridae (24 taxa). In the opposite, the lowest diversity was found in the family Capniidae (3 taxa). The most common species are: *Amphinemura sulcicollis* (Stephens, 1836), *Protonemura praecox* (Morton, 1894), *Isoperla grammatica* (Poda, 1761), *Dinocras cephalotes* (Curtis, 1827), *Perla marginata* (Panzer, 1799), *Brachyptera risi* (Morton, 1896) and some taxa from family Leuctridae (*Leuctra inermis* Kempny, 1899 and *Leuctra hippopus* Kempny, 1899). During the research, a new species for Serbian fauna is recorded - *Leuctra braueri* Kempny, 1898. Nowadays, some stonefly species in Serbian sub-mountain and mountain streams and brooks are endangered due to various types of environmental pressures (in the first place organic pollution, nutrients enrichment, stream and brook bed degradation and habitat deterioration).

INDEX of AUTHORS and PARTICIPANTS

	A		Deák, Csaba*	42, 44, 46, 47, 48, 77
Ambrus, András*	31		Dénes, Avar-Lehel*	48
	B		Dévai, György	49, 59
B. Béres, Viktória	58		Dimitru, Portelechi Daniel	48
B. Muskó, Ilona*			Dolný, Aleš	63
Balogh, Zsuzsanna	59		Drávecz, Eszter*	
Bánfi, Péter*	27		Dražina, Tvrtko	52, 79
Baranyai, Edina	59		Duić Sertić, Maja	79
Berchi, Gavril Marius*	32		Đuknić, Jelena	67, 81
Bereczki, Csaba	35		Dulić, Zorka	80
Bjelanović, Katarina*	33, 66, 80, 81			
Blahó, Miklós	55		Egri, Ádám	55
Boda, Pál*	34, 40, 42, 44, 46, 56, 68, 77			
Boda, Réka*	35, 41, 42, 44, 68			
Bódis, Erika*	36, 42, 44		Farkas, Alexandra	55
Bognár, Gréta*			Farkas, Anna*	44, 49, 65
Bojková, Jindřiška	57, 72		Ficsór, Márk*	50, 56
Bolbás, Máté*	56		Fleituch, Tadeusz*	51
Boros, Bianca-Vanesa*	37		Fressl, Jelena*	52
Borza, Péter*	36		Fülep, Teofil*	53, 54
Boukal, David*	28			
Bozóki, Tamás*	34		G	
	C		Gačić, Zoran	60
Černý, Martin*	38		Gerencsér, Noémi	31
Copilas-Ciocianu, Denis*	37, 39		Grabowski, Michal	39
Csabai, Zoltán*	35, 40, 41, 42, 44, 61, 68, 74		Gyenes, Nóra*	
Csányi, Béla*	30		Gergely, Mariann*	
Cser, Balázs*			H	
Csercsa, András*	46, 56		Hájek, Ondřej	78
Czinke, László	55		Hančíková, Barbora	38
Czirok, Attila*	61		Harangi, Sándor	59, 62
	D		Herczeg, Róbert*	74
Danyik, Tibor*	44, 65		Herczeg, Tamás	55
			Hodić, Sandra	52
			Hollós, Roland	68

1st Central European Symposium for Aquatic Macroinvertebrate Research
April 10-13 2014, Szarvas, Hungary

Horsák, Michal	57, 72	Méhes, Nikoletta*	62
Horvai, Valér*	61	Mesaroš, Gabor*	
Horváth, Gábor*	55	Merdić, Enrih	74, 76, 78
	I	Méró, Thomas Oliver	49
		Mirčić, Dejan	33
Ilić, Marija	60, 67	Mižičová, Hana*	63
	K	Monoki, Ákos*	
		Móra, Arnold*	42, 44, 46, 49, 64, 65, 77
Kálmán, András*	44	Mrkonja, Aleksandra	33
Kálmán, Zoltán*	42, 44, 68		N
Keresztes, Lujza	48		
Kiss, Gábor*		Nagy, Péter*	
Kókai, Zsuzsanna	58	Nagy-László, Zsolt*	
Kolcsár, Levente Péter	48	Németh, Dániel*	
Koncz, Zsófia*		Németh, Julianna*	
Korponai, János*	62	Němejcová, Denisa	69, 78
Kovács, Éva*		Novaković, Boris*	60, 66, 67, 81
Kovács, Krisztián*	58		O
Körömi, Krisztina*			
Kövér, Csilla	62	Oros, Mónika*	
Kračun-Kolarević, Margareta	60, 67	Ortmann-Ajkai, Adrienne*	42, 61, 68
Krasznai, Eszter*	46, 56	Ostojić, Ana	79
Kriska, György	55		P
Křoupalová, Vendula*	57, 72		
	L	P. Holló Ildikó*	
		Pařil, Petr*	69, 71, 78
Lajtner, Jasna	52, 79	Parvulescu, Lucian	37, 39
Lestyán-Goda, Judit*		Paunović, Momir	30, 60
Lókkös, Andor	58	Pernecker, Bálint*	35
	M	Petković, Anđelka	60
		Petri, Attila*	
Málnás, Kristóf*	44, 58, 59	Petrusek, Adam	39
Marinković, Nikola	60, 67	Polášek, Marek*	69, 71, 78
Marković, Vanja	60, 67	Primc, Biserka	52
Marković, Zoran	80	Puchýřová, Yvonne	78
Mataruga, Vesna Perić	33	Purger, Dragica	68
Mateja, Bistrovic	78		R
Matulić, Daniel	79		
Mauchart, Péter*	35, 41, 42, 44, 61, 68	Radanović, Ines	52
Mayer, Rezső*		Rádková, Vanda*	57, 72

**1st Central European Symposium for Aquatic Macroinvertebrate Research
April 10-13 2014, Szarvas, Hungary**

Radović, Andreja	76	Tarjányi, Nikolett	55
Rákosy, László	32	Temunović, Martina	74, 76
Reitzi, Bernadett*	61	Tirják, László*	
Řezníčková, Pavla	69	Todorović, Dajana	33
		Tomljanović, Tea	52
S		Tončić, Dora	52
Sallai, Zoltán*		Tóth, Bence	36
Schenkóvá, Jana	72	Trbović, Dejana	80
Šikulová, Lenka	69	Tremel, Pavel	78
Simon, Edina	58, 59	Tubić, Bojana	60
Sousa, Ronaldo	36	Turić, Nataša*	74, 76, 78
Špoljar, Maria	52, 79		
Stanković, Marko	80	V	
Stojanović, Dalibor	33, 66, 81	Várbíró, Gábor*	34, 46, 56, 77
Straka, Michal	69	Vignjević, Goran*	76, 78
Sudarić-Bogojević, Mirta	76, 78	Vručina, Ivana*	78
Šupina, Jan*	71		
Syrovátka, Vít	57, 69, 71, 72, 78	Z	
Száz, Dénes	55	Zagyva, Andrea	46
Szekeres, József	30, 36	Zahirović, Željko	78
Széles, Gábor*	41, 73	Zahrádková, Světlana*	69, 71, 78
Szita, Renáta*	31	Zay, Andrea*	
Szivák, Ildikó	61, 74, 77	Žeželj, Barbara*	79
Szondi, Attila	59	Živić, Ivana	33, 80, 81
		Zrinščak, Ivana	52, 79
T		Žunić, Milenka	81
Tallósi, Béla*			

*Conference participants

ORGANIZERS



Department of Hydrobiology, University of Pécs



Centre for Ecological Research of the Hungarian Academy of Sciences



Körös–Maros National Park Directorate

SPONSOR



Velinor Ltd.

Kossuth Lajos utca 29, H-1161 Budapest, Hungary, e-mail: g.szeles@velinor.hu



Points of interest in Szarvas

1. Körös Valley Visitor Centre
2. Csáky-Bolza Mansion
3. Mansion of Bolza Family
4. Lutheran Old-Church

Points of interest in Szarvas

5. Samuel Tessedik Museum
6. Statute of Samuel Tessedik
7. Mittrovsky Mansion
8. Memorial tree
9. Hotel Árpád

Points of interest in Szarvas

10. Lengyel Palace
11. Slovakian Folk House
12. Horse Mill
13. Tessedik Farm
14. Centre of Historical Hungary

Points of interest in Szarvas

15. Historical Events Path
16. Péter Vajda Cultural Centre
17. Water Theatre
18. Town Library
19. SPA

Points of interest in Szarvas

20. Bus station
21. Railway station

