The Mayfly Newsletter

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The Mayfly Newsletter

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The Mayfly Newsletter is the official newsletter of the Permanent Committee of the International Conferences on Ephemeroptera

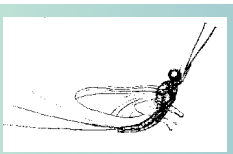
In this issue

Feature Photo

Greg Courtney, Department of Entomology, Iowa State University, continues his quest to photograph living aquatic insects both near his home and worldwide. In this issue, he shares this view of *Ametropus ammophilus* (Ametropodidae) from Oregon.

G.Courtney

Ametropus ammophilus Allen & Edmunds (Ametropodidae), Wood River, Oregon, reared from nymph collected on 18 June 2021.



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(see link on Ephemeroptera Galactica: http://www.ephemeroptera-galactica.com/)
contact: Donna J. Giberson, Editor
email giberson@upei.ca
Masthead image: *Hexagenia* sp. Andy Usher (Indiana University, Purdue University, Indianapolis)

2022 XVIth INTERNATIONAL CONFERENCE ON EPHEMEROPTERA AND XXIth INTERNATIONAL SYMPOSIUM ON PLECOPTERA:

Mayfly/Stonefly Virtual Conference 2022

Organizers Ed DeWalt (dewalt@illinois.edu), Boris Kondratieff (boris.kondratieff@gmail.com)

We have received over 60 presentations. Approximately 75 presentations were given in Brazil. Video oral and poster pdf presentations were requested for 25 June. Still a few are coming in.

We are still setting up times for presentations, much of this given to the need to accommodate presenters from over the globe. Depending upon where you live, talks will start on the 25th July (Asia) and the 26th (North America and Europe). Save two more adjacent days for presentations. We will stagger time blocks to distribute the pain of meeting attendance evenly. Access to all presentations will be available throughout the meeting.

More to come.

Check for updates at http://plecoptera.speciesfile.org)

Call to be a part of the Mayfly Phylogenomics Consortium

Dear colleagues:

I am proposing to schedule a time during the international conference online meeting to invite colleagues to be a part of what I am calling the "Mayfly Phylogenomics Consortium". This working group will discuss and plan how to accomplish two main goals, (and it is possible to only work on one of the two main goals).

Goal 1) Initiate a conversation and then plan to create a proposal for a new higher-level Mayfly Classification (based on all the evidence, molecular and morphological) as part of a publication.

Goal 2) Establish a group of investigators to be part of a NSF proposal (Ogden will submit later this year) to acquire and sequence around 300 selected species to carry out targeted capture/Genomic/transcriptomic sampling and data generation.

Essentially, I am looking for potential Co-PIs, Senior Collaborators, and collaborators for this project. If you would like to be part of the consortium (or are simply interested at this point) please sign up using this form: https://forms.gle/LH5m4sbcdDq9gaPCA

T. Heath Ogden, Ph.D.
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Some News: Nikita Kluge elected to ICZN!

The International Commission on Zoological Nomenclature (ICZN) has recently conducted an election for five new Commissioners, who have started their terms on 1 January 2022. Among these is our Ephemeroptera colleague, **Nikita Kluge**. More about Nikita: https://www.iczn.org/about-the-iczn/commissioners/nikita-kluge/

Request for Specimens

Steve Burian
Southern Connecticut State University, New Haven, Connecticut
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I am looking for reared specimens of:

Rhithrogena undulata (Banks) (male and females with nymphal exuviae intact) from anywhere in North America, but specimens from the northern midwestern U.S. and/or central to eastern Canada are preferred.

Paraleptophlebia ontario (McDunnough) (male and females with nymphal exuviae intact); *Paraleptophlebia praepedita* (Eaton) (males and females with nymphal exuviae intact); and a few clean intact specimens of mid to late instar nymphs of both species from anywhere in North America.

For ongoing systematic studies of the genus *Rhithrogena* and *Paraleptophlebia* in northeastern North America. Anyone who has specimens of these species that would be willing to loan them for taxonomic analysis please contact Steven K. Burian (burians1@southernct.edu).

Mayflies in the news!

Streetlights in Lake Erie communities to go dark for 'weeks' to deter mayfly swarms

A power company in Ohio USA (Ohio Edison) will be turning off some streetlights along Lake Erie to prevent swarms of mayflies (*Hexagenia*) from accumulating on the roads, where they are can cause hazardous driving conditions on roads and bridges.

Mayflies cover car in Port Clinton, from a 2019 Facebook post (from the article on the Cleveland 19 News (a local CBS station).

Read the June 16, 2022 story at: https://www.cleveland19.com/2022/06/16/streetlights-lake-erie-communities-go-dark-weeks-deter-mayfly-swarms/

Feature article

View from the river: Observations of an invasive weed along the Goulburn River, Victoria, Australia

Rod Barford
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flytrek@waterfront.net.au

As a fly fishing guide in Victoria, Australia, I have had a unique opportunity to observe local rivers over several decades, especially the Goulburn River (Figures 1,2) which I have fished for ~60 years. The river was characterized by having a clean freestone bottom (Figures 3,4) which supported a wide array of typical riverine aquatic insects, including at least 9 distinct species of mayfly. Then about 10 years ago, I noticed an invasive species of milfoil aquatic weed (*Myriophyllum variifoliium*) moving into the river, and since then it has colonized vast areas of the river bed in the mid-Goulburn, a stretch of river between the Eildon Dam and Goulburn weir (~75 km downstream). In this note, I would like to report my observations on the invasion of this aquatic weed, some of our efforts to clear it, and the responses of some of the mayflies and fish.

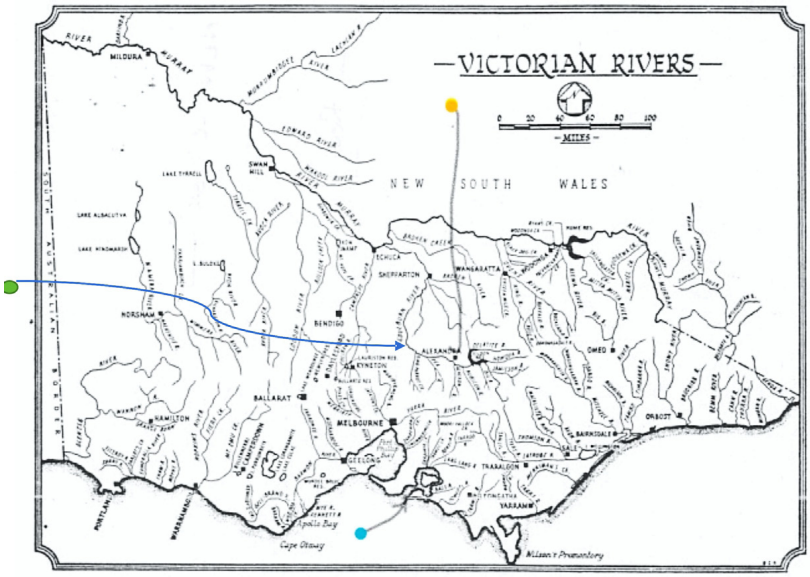

Figure 1 **Left:** The Goulburn River flows north into the Murray River, which forms 80% of the border between Victoria and New South Wales. (**Blue** dot = Eildon district, **Yellow** dot = Cowes, Phillip Island where I now live. **Green** dot = Nagambie, where I was born and raised, some 80kms downstream. **Right**: Eildon District

R. Barford

Figure 2. This 2007 photo shows a Rainbow Trout I caught in the Breakaway Bridge location, some 5kms downstream from Gilmore's Bridge (see Fig. 3 for an image of this site, showing the pristine freestone bottom). This location had always been a good spot to witness large hatches of *Coliburiscoides* (Ephemeroptera: Coloburiscidae).

R. Barford

Figure 3: This is a 2007 photo of the Breakaway Bridge, some 5kms downstream from Gilmore's Bridge. Note the clean freestone bottom the river bottom. Looking upstream, you can see another broad reach of bare gravel. This area hosted some of the best fishing in the river, mostly due to the high population numbers of mayflies and caddisflies. Fifteen years on, this whole reach is now covered in weed and that upstream gravel bed is now completely covered by a 'new' island of basket willows and weed.

R. Barford

Figure 4. A 2004 photo of a reach 5 kms upstream of Gilmore's Bridge, also showing a nice clean river bed. The flow here is typical early trout season (early October) flow, probably 400mlg/day.

Some Local Context

Eildon Dam (Figure 1) was built in the 1950s to replace a smaller dam wall built in the 1920s. The 'new' dam holds (at capacity) something close to 9 times the volume of Sydney Harbour, a massive amount of water (3.4GL, av. depth 24m, catchment 3,400 km^2). The original dam was only 1/10th of that size, and when full, overflowed via a stepped cascade. Five rivers join to form the Goulburn River: The Howqua, Delatite, Jaimeson, Upper Goulburn and Big Rivers.

The flow of the Goulburn River downstream of Eildon Dam is controlled by seasonal demand for irrigation by Goulburn Valley farmers. Over winter, flow from the dam is all but cut off, issuing a meagre 285 mgl/day (megalitres/day), considered a riparian flow issued purely for the sake of the river health. This only began in 2002 after intense lobbying by angler groups (Figure 5) and the Victorian Fisheries Authority (VFA). Prior to this, the flow was cut off entirely.

This flow is added to by the Snobs Creek which joins the river a few hundred metres below the Pondage Weir, the Rubicon River which joins it a kilometre below Gilmore's Bridge, and the Acheron River which joins it a kilometre below the Breakaway Bridge (Figures 6,7).

During a normal irrigation season (Nov-Mar), the flow is stepped up from 285mgl/day to as much as 7,500 mgl/day, but more typical is 5,000mgl/day. I have seen it, during a hot dry summer, flowing at 12,000mgl/day, but that is a rare occurrence. The flow rate was increased only last week from 4,000 to 7,500mgl/day, the highest it's been since summer of 2019.

There is also a small hydroelectric generator built on the Pondage Weir wall which also affects river flows.

Figure 5. A 2006 photo of one of my fly fishing schools at the Breakaway, again showing a clean river bottom. Within a few weeks, this was all underwater following a flow increase from 400mgl to 1,500mgl/day.

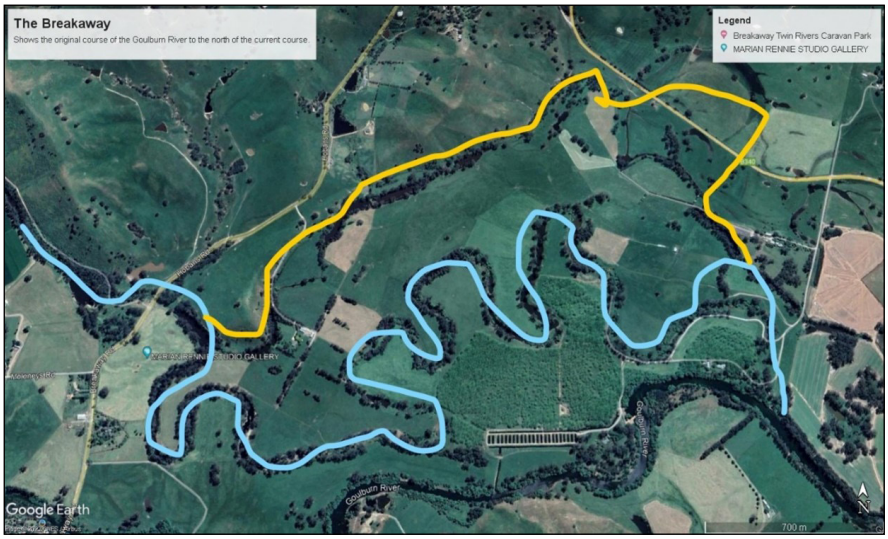

Figure 6. This Google Earth image shows the current course of the Goulburn, with the 1889 course in yellow, and the 1915 course in blue. Catastrophic floods forced the course changes in both instances. This is where the Breakaway title came from. You will also see a row of ponds that belong to one of the several trout farms along the upper reaches.

Figure 7. This image shows the Breakaway Bridge and caravan park, with Acheron River confluence downstream of the bridge. The pronounced S-bend at far right was where I last saw a good appearance of *Atalophlebia australis***,** some 25 years ago.

The operators might demand a flow increase of 2,000mgl for a few days, then it reverts to its previous flow level. This typically occurs several times during the irrigation season and has led to some more or less permanent changes in insect behaviours, which I have termed the *'Bath Ring Effect'.* Now, few aquatic insects (mayfly, stonefly, etc.) are found inhabiting the river margins, as those that do so often become stranded in what is basically dry land. Very few manage to scuttle the distance back to flowing water, so this has led to only the more reliably inundated part of the river course being host to most of the aquatic insects, hence my *'Bath Ring Effect'* name.

Invasion of a milfoil weed in the river

Within the last decade or so, the effects of the flow changes from the dam have been further compounded by the negative effects of the weed growth. Because I have spent upwards of 60 years fishing this river, I was able to document changes as they occurred. A species of milfoil aquatic weed (*Myriophillum variifolium*) not previously noted in this river has spread rapidly in the river. I first observed its presence around ten years ago, and since then it has colonised vast areas of riverbed (Figure 8). As the new roots establish, they begin to trap the finer silts and sands. Once the clump is at least 30 cm in length, it is already beginning to trap coarser silts and sand (Figure 8). This increases as the plant grows bigger, and by the time it has reached a stage of maturity, it is trapping stones as large as 5 cm. Once the weed has colonised an area larger than a few square metres, this trapping process has the overall effect of raising the riverbed at the same time as suffocating whatever life existed in the freestone gravel layer. It is fast-growing and able to withstand substantial flow, so is very firmly rooted. You will see there is a layer of fine silt against the weed, which has been trapped by this weed (Figure 8). You only need look both upstream and downstream from the bridges to see just how extensive this weed growth has become in the last decade. Whole sections of the river that were largely free of weed are now covered with it.

You can by now, I'm sure, imagine the total effect when it colonises an area several hundred metres long across the breadth of the river. It completely changes the hydrodynamics of the river, as well as permanently altering the insect community.

Figure 8. This is the weed (*Myriophyllum variifolium*) causing the problems. **Left:** it typically grows into long tresses from a base clump around 50cm long by 30cm wide at the base, with the tress growing up to 5 metres long. **Right**: a closeup of the weed.

Source of the invasion

The invasive milfoil appears to be associated with one of the five trout farms on the along the mid-Goulburn River (the stretch of river between the Eildon Dam and Goulburn Weir some 75kms downstream) as it is particularly abundant above and below that trout farm. This species of milfoil can spread upstream as well as downstream. By uprooting large quantities of it, I observed that it sends very fine horizontal roots upstream through the finer substrate, typically no more than 10-15 cm each time. These then send vertical risers up into the water column. These then grow into the tresses seen here. When the new clump is around 60 cm in length, it is already sending new upstream roots to establish more growth.

This trout farm (Figure 9) has an intake approximately 300 m upstream of Gilmore's Bridge, and an outflow channel right at the upstream foot of the bridge. Currently, the milfoil is abundant in the earthen ponds of the trout farm, and swimming activity by large brood stock trout causes segments of live milfoil to be separated from the main plant and exit the ponds via the trout farm outflow, entering the river at the bridge. It has also spread far downstream from what I believe to be the source.

Figure 9. In this photo from Google Earth, you can see the full footprint of the trout farm with the river below it. The intake is directly below the track along the bank, shown as a dark straight line. The outflow is via a tree-lined channel alongside the road, meeting the river at the foot of the bridge.

Impacts on the stream

The overall effect of this invasive weed on the river has been to suffocate a previously clean freestone bottom which supported a wide array of typical riverine aquatic insects, including at least 9 distinct species of mayfly (as well as at least 4 species of stonefly and 8 species of caddisfly). The weed growth has caused a marked decline in numbers of all three groups in the mid-Goulburn River.

I first began to notice substantial changes in insect numbers in 2010. I have held fly fishing schools out of a caravan park on the Breakaway, downstream of Thornton, from 1989 to 2020, some 32 years. As part of the school activities, I had the participants use sieve nets to capture nymphs of the various species and try to identify them. At first, I attributed the declines to possible agricultural overspray, but upon checking on farm spraying in the area, discovered spraying had actually decreased over that same period.

As the weed spread in the river, we simply weren't finding as many nymphs, and those we were finding were much further away from where we had normally found them in abundance. One of our more prominent mayflies, and our 2nd largest, *Colisburiscoides* (Ephemeroptera: Coloburiscidae), aka the 'Kosciusko Dun', has crashed in number in the river over the last decade or so. The famous Kosciusko Dun hatches were once so regular and dependable you could almost set your watch by them. I cannot accurately remember the last date on which I witnessed a normal sized hatch of *Coliburiscoides*, but it is definitely longer than 12 years. *Coliburiscoides* is a species that requires a clean freestone bottom to thrive. It will inhabit deeper, slower sections of river, but only if the bottom is reasonably free of dense weed cover. Numbers across the whole range of species appear to have dropped by at least 50%, with mayflies suffering the biggest losses at 70-80%. This has been further borne out by observing a huge decline in dun hatches and spinner swarms. The same can be said of a number of caddis species, and virtually all the stonefly species.

To this day, I am yet to see a single mention of any of these changes in any official document, website or electronic communication and neither the Victorian Fisheries Authority (VFA) nor the Goulburn-Broken Catchment Management Authority (GBCMA) are actively monitoring the impacts of the invasive weed.

Figure 10. The anabranch directly below the bridge, which has been a handy subject study, is formed by a long narrow island, rejoining the river under a cover of willow trees. Midway along the anabranch is a rock barrage which forms a convenient division which has aided my work in clearing the weed from the bottom.

Trial project to assess effects of removing the invasive weed

I began a trial project on a small 250m long anabranch immediately downstream of the trout farm (my suspected source) and Gilmore's Bridge (Figure 10), removing measured sections of weed and monitoring regrowth and fish reaction. This weed's root base has a tiny footprint compared to the area covered by its tendrils, commonly to a length of 3-4 metres, so when you uproot and remove a root base measuring 30cm x 15cm, you're actually exposing 2-3 square metres of gravel, often for the first time in many years.

Over the last 4 years I have trialled physical removal of the weed in 4 sites at Gilmore's Bridge (Figures 11-13). The first was in the anabranch immediately below the bridge. It only obtains a reasonable flow once the release from Eildon dam reaches 1,500 mgl/day. Because of the improvements to the anabranch overseen by Paul Brown (Senior Fisheries Scientist, Dept. Primary Industries, Victorian Fishing Authority) this anabranch has become a great fishery in its own right, but that is now threatened by weed growth. I first cleared a section 15m long x 3m wide. To my utter amazement, within 2 hours of finishing the work, I sighted 4 trout sitting over the now-bare gravel bottom. This has become the expected outcome each time I strip a section of bottom.

Along the way I have had several conversations with anglers interested in what I was doing. All of them assumed that the weed played host to an increased insect population. They were all shocked when I revealed to them that this weed in fact holds few insects. In fact, pretty much zilch. This discovery came as a great surprise to me initially as well.

Figure 11. This area was stripped in December 2019 and again in November (2021), but new patches of weed have recolonized (seen clinging to the island on the left). It has only regrown a few small patches of the weed in the time since. The whole bottom was thickly covered before I began work. In January 2022 I used a scythe to cut away almost all the weed in this middle section, right down to the rock barrage about 30m behind where I stood to take this photo. Upstream you can see smaller areas I stripped at the same time. It was all bare gravel when I left it in November, so this is testimony to its ability to force changes to the river bed. Note also that the weed species I stripped has not grown back in any quantity over that 8-month period. Next time I visit here I will be bringing hedge clippers to cut back the material growing outward from the island which appears to be a new weed, of unknown origin.

Figure 12. In these January 2022 photos you can see the coverage of the weed prior to the removal trials. Pulling it out by the roots, I was amazed at just how much material was trapped in the interior of the plant stalks, including kilograms of silt, sand, and stones in a typical clump.

The last section I stripped was in the main river channel, on the Thornton side of the island that forms the anabranch. It took me 3 hours to strip a very thickly weeded section 20 metres long x 3m wide. Given the time of year, I did not expect to see any trout move into that space, but was very pleasantly surprised to see, next morning, 5 trout sitting in the current. Two were sizable fish, around 2kgs each. These of course did not hang around long, they continued upstream on their spawning quest. But once they left, more smaller fish moved in. It would be great to strip a much larger area of the main river channel and then once flow is raised, install some floating emerging insect traps to assess aquatic insect recolonization.

As noted, the trout move rapidly into the cleared areas (often I've seen them sitting over the newly-cleared area within 30 mins of it being exposed), but the aquatic insects take a bit longer to recolonize the cleared areas. One of the most dramatic and exciting changes I've noticed is a return of a swarm of spinners/imagos of Red Spinners (*Atalophlebia australis,* Ephemeroptera: Leptophlebiidae) over a section I cleared 12 months ago. These had been essentially extirpated in this part of the river, as I hadn't seen a single example since the late-1990s. The last time I had seen them in any number, they were so thick over the water I was unable to see the opposite bank. So, as you can imagine I was a little excited at seeing them busy mating and ovipositing. I assume they have re-established following clearing of that part of the anabranch of the milfoil.

Figure 13. **Left:** Visible on the right is a narrow strip I cleaned off 6 months earlier to enable water to enter the anabranch during periods of low flow. Almost zero regrowth. This area was free of this weed up until 2005 though some cress and ribbon weed were present. The object in the middle foreground is one of the old original bridge pilings, built in the early 20th century. **Right:** Note the dark weed covering all the way to the island bank. This growth extended well down the full length of the island. Since this photo I have stripped it down past the over-hanging bushes. That bank had probably not felt the historical flow for some years, so it will be interesting to see how many fish are utilising it now.

Future plans

My efforts have been noticed by a few people within the fishery management sphere, and I have been approached (unofficially) regarding partnering with one of the Victorian Fisheries Authority (VFA) scientists in a 1-year pilot project to officially document everything, then a much larger follow-up project over 3 years to see if it is possible to eradicate the milfoyle and return this rivers insectae to normal population levels.

A pilot project, if approved, would be funded under the Fisheries Small Grants Program, and a larger project would come under the Large Grants Program. Considering how much work I have done to date, and how well I have documented it, I feel confident it will be approved. But naturally before that happens, there will be the usual mountain of official paperwork to be submitted before the VFA are satisfied this is a project worth spending $120,000 on in the first instance, and another $450,000 in the second instance.

I am confident they will accept my premise, i.e., that this weed growth represents a clear and growing threat to the biodiversity of the river. The only question mark of course, is whether or not the funds will be available.

It would be fair to say that I have seen more changes to the riverine environment around here in the past few years than in the previous 60 years. I would be interested in hearing from other readers to know if you have ever received reports of this kind of problem with aquatic weeds affecting river health.

Zootaxa Ephemeroptera Editors' Annual Summary and Acknowledgements (2021)

Luke M. Jacobus[1], Michel Sartori, Carlos Molineri, Tatyana Tiunova, & Lyndall Pereira
[1]Division of Science, Indiana University Purdue University Columbus, Indiana, USA.
Email: luke.jacobus@gmail.com

A total of 316 papers with a primary focus on Ephemeroptera have been published in *Zootaxa*, from 2002–2021. Twenty-eight of those appeared in 2021. Families treated include: Baetidae (3), Caenidae (4), Ephemerellidae (2), Heptageniidae (4), Isonychiidae (1), Leptohyphidae (1), Leptophlebiidae (6), Polymitarcyidae (1), Potamanthidae (1), Teloganodidae (1), and Tricorythidae (3). One editorial about the history of mayfly publication appeared in May. Eleven manuscripts were rejected, and two that were submitted remain unpublished, pending major revisions. Another seven submitted during 2021 remain in the review and revision process and likely will be published during 2022.

We will accept only papers with a sole or primary focus of mayfly taxonomy, classification and nomenclature. All nomenclatural acts must conform to the 1999 edition of the *International Code of Zoological Nomenclature*, with 2012 amendments pertaining to e-publication. The Code is available online at https://www.iczn.org/. Papers strictly about phylogeny will be considered on a case by case basis. Manuscripts that only report new record data will not be considered. In order to accelerate the processing of papers by us, please check before you submit that your manuscript meets the subject matter criteria described above, and also consult Dubois et al. (2011) (Recommendations about nomenclature for papers submitted to *Zootaxa*, *Zootaxa* 2943: 58–62; https://www.mapress.com/zootaxa/2011/f/zt02943p062.pdf) and the journal Guidelines, available at https://www.mapress.com/zt/about/submissions. All submissions to *Zootaxa* require that authors include their ORCIDs. For more information about ORCIDs, visit https://orcid.org/.

All papers must be well-written in English. Please consider having a native English speaker check your manuscript before submission and help revise it as necessary. We suggest that you model your work after previously published papers in *Zootaxa*, use recently published descriptions of related taxa to guide your work, and consult the journal Guidelines carefully. Manuscripts are limited to two rounds of review; if manuscripts still require significant revision, they will be rejected and not sent through further review.

While no fees are required to publish in *Zootaxa*, you are encouraged to purchase "open access" if funds are available in order to ensure the widest readership of your work.

Numbers of manuscripts handled by each of us were as follows: Molineri (14), Sartori (13), Jacobus (11), Tiunova (1) and Pereira (1) [as guest editor]. Head editor Zhang accepted two mayfly papers. In 2021, an erratum was published (*Zootaxa* 4903(4):600) for a paper by Nikita Kluge (2020. *Zootaxa* 4820: 438-464), correcting mistakes with the acceptance date and subject editor attribution; this was accepted from Jacobus by G. Watson.

Michel Sartori will gradually retire from *Zootaxa* work during 2022, and Fred Salles will help with the workload during this period and while Jacobus takes a short sabbatical. Current co-editors and their subject areas include: Jacobus (Leptophlebioidea), Molineri (Caenoidea, Ephemerelloidea, Ephemeroidea) and Tiunova (Baetidae, Heptagenioidea, other families). Contact information and these taxonomic responsibilities are found on the *Zootaxa* Ephemeroptera Editors page https://www.mapress.com/zt/Ephemeroptera.

The success of the Ephemeroptera section of *Zootaxa* would be impossible without the many manuscript reviewers who volunteer their time and expertise to ensure quality scientific publications, often many times per year. We extend our apologies to anyone who may have been excluded from this list inadvertently. For reviews, we thank:

S. Anbalagan
Yeon Jae Bae
C. Balasubramanian
Helen Barber James
Ernst Bauernfeind
Rafael Boldrini
Boonsatien Boonsoong
Steve Burian
Rogério Campos
Daniel Emmerich
Wills Flowers
Jhoana M. Garces
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Ji Hyoun Kang
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Lucas Lima
Peter Malzacher
Rodolfo Mariano Lopes Silva
Alexander Martynov
Fabiana Massariol
Jeane Marcelle Cavalcante do Nascimento
Dimitry Palatov
Jan Peters
Kanyakorn Piraonapicha
Erikcssen Raimundi
Fred Salles
C. Selvakumar
K.G. Sivaramakrishnan
Paula Souto
Pavel Sroka
Chanaporn Suttinun
Xiaoli Tong
Jeff Webb
Changfa Zhou

2021 Ephemeroptera Bibliography

Compiled by Donna Giberson

The Ephemeroptera Bibliography is published annually in the June issue of the Mayfly Newsletter, and includes papers and reports with an emphasis or mention of mayflies that were published in the previous year. The list is not exhaustive, as it is compiled by searching on-line sources such as Web of Science and Google Scholar, so some titles may have been missed. You can ensure that papers are included by sending the full citation to the editor (giberson@upei.ca) before the June issue of the following year. If a paper has been missed in the June issue, send the citation to the editor, so an update can be published in the next Newsletter.

Papers missed from previous bibliographies.

Macadam CR and Stockan JA. 2015. More than just fish food: ecosystem services provided by freshwater insects. Ecological Entomology, 40: 113–123.

Engblom, E. 2020. Contribution to the understanding of the Fennoscandian *Baetis vernus* group: *B. liebenauae* [Ephemeroptera]. Ephemera, 2019 (2020), 21(2): 123–132.

2021 Ephemeroptera bibliography

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Arana Maestre J, Carrasco Badajoz C, Coayla Peñaloza P, Rayme Chalco C, and Sánchez Peña M. 2021. Aquatic macroinvertebrates of arid and semi-arid ecosystems of Peru. Frontiers in Environmental Science, 9:658940. https://doi.org/10.3389/fenvs.2021.658940

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PDFs for Ephemeroptera Galactica

Two questions:

Have you published a paper on mayflies?
If so, did you send a PDF to EG?

Ephemeroptera Galactica (EG) is a web site that was developed by Mike Hubbard and is now maintained by Arnold Staniczek. One of the great features of EG is the bibliography of mayfly literature at this site. PDFs of hundreds of mayfly articles are available. To keep this bibliography updated, please send a PDF of your articles on mayflies (if allowed by the journal) to Arnold (arnold.staniczek@smns-bw.de).

Arnold Staniczek Staatliches Museum für Naturkunde, Abt. Entomologie, Rosenstein 1, D-70191 Stuttgart, Germany

How to Donate to the International Permanent Committee on Ephemeroptera Scholarship Fund

This fund (Canadian Tax Reg. No. BN 88915 1379 RR001) provides travel scholarships to assist upcoming scientists to attend our international conferences. You have several options to donate to the mayfly travel fund. The committee can accept a cheque, a wire transfer or you can use our PayPal account. More details are provided below.

1) Cheque. Please make cheque payable to: "International Permanent Committee on Ephemeroptera" and mail to Alexa at the address below.
2) Wire transfer. Wire transfer. By arrangement with the treasurer. Please email alexa@ecobmi.com
3) PayPal. Business account: International Permanent Committee for Ephemeroptera Scholarship Fund, https://www.paypal.com/paypalme/Ephemeroptera Email: alexa@ecobmi.com.

Do let me know how I can help if any of this information is unclear.

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And a reminder to think about items to donate to the silent auction supporting meeting scholarships during the next in-person meeting (2024)! More details on how to donate items will be available in the issue leading up to that meeting.

There will not be a silent auction at the virtual 2022 meeting; consider making a cash donation to the travel scholarship fund if you are able!

Mayflies in the news!

A Jurassic Mayfly Swarm

The magazine, the Economist, had an article on June 8, 2022, highlighting a major fossil find in China (https://www.economist.com/science-and-technology/2022/06/08/the-oldest-mayfly-swarm). An article in Phys.org also mentioned the discovery (https://phys.org/news/2022-06-oldest-insect-resource-pulses-revealed.html), referring to it as "...the earliest-known mayfly swarm—in a newly discovered fossil locality in the Xiwan Basin of Hezhou City, in southern China's Guangxi Zhuang Autonomous Region".

Check out the amazing images from these articles at the links, and see the original research at:
Zhang Q-Q, Zheng D-R, Jarzembowski EA, Wang X-H, Li J-H and Engel MS. 2022. The first Sharephemeridae (Insecta: Ephemeroptera) from the Jurassic Shiti Formation of South China. Historical Biology. https://doi.org/10.1080/08912963.2022.2077649

We're looking for submissions to the *Mayfly Newsletter*!

Do you have anything you'd like to share with your fellow ephemeropterists? In addition to the Notices, Mayfly Bibliography, and information about the upcoming International Meeting, we'd like to include project updates, book reviews, notices of upcoming meetings of interest to Ephemeroptera workers, requests for collaboration, and any interesting notes about mayflies.

So - my questions to you - Are you looking for collaborators on a project? Do you have some spectacular mayfly photos that you'd like to share with your colleagues? Is there a special collecting site or new collecting method whose details would be of interest to other mayfly workers? Have you ever had an adventure in collecting mayflies? We publish our data in our research papers, but sometimes the story behind the story is equally interesting!

Deadlines:
- June issue: May 15 - December issue: Dec. 1

The *Mayfly Newsletter*

Starting with the Winter 2016 issue, the Mayfly Newsletter is digital! You will be able to find the link to the issues on the Digital Commons site: https://dc.swosu.edu/mayfly/ (or see link on *Ephemeroptera Galactica* (http://www.ephemeroptera-galactica.com). If you wish to receive notifications when new issues are posted, contact Donna (giberson@upei.ca) with your email address. Unfortunately, due to costs of printing and postage, we won't be able to send a printed newsletter out by post.

As of January 2022, the newsletter's issues have been downloaded 6,389 times from 546 institutions in 127 countries since we started uploading them on 6/17/2016.

Note: original copies of many of the printed issues are still available Contact Peter Grant if you would like a set and he can arrange to send them to you: peter7grant@gmail.com

The Mayfly Newsletter is the official newsletter of the Permanent Committee of the International Conferences on Ephemeroptera and is published to facilitate communication among ephemeropterists.

Subscriptions to the Newsletter are free. To place your name on the e-mailing list or to contribute information for the next issue, contact:
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