PERLA

Annual Newsletter and Bibliography of The International Society of Plecopterologists

Tallaperla cornelia **(Needham & Smith, 1916) U.S.A., North Carolina: Macon Co., Robin Branch, Wayah Bald, 24 June 2006. Photograph by Bill P. Stark**

PERLA NO. 35, 2017

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PERLA
Annual Newsletter and Bibliography of the International Society of Plecopterologists Available on Request to the Managing Editor

TABLE OF CONTENTS

PERLA SUBSCRIPTION POLICY

Dues for membership in the International Society of Plecopterologists are $15 U.S. per year. Members will automatically receive PERLA. Libraries or other institutions may receive PERLA by making a $10 annual donation, or through an exchange of publications agreement approved by the Managing Editor and Editorial Board. Five dollars ($5) of the dues will become part of the Scholarship Fund of the Society, to be used for helping active and deserving workers or students participate in future symposia.

Persons or institutions who have no support or are financially unable to pay dues may continue to receive PERLA by writing a brief note to the Managing Editor requesting a waiver of dues and to be retained on the mailing list.

It is therefore important that you respond to this receipt of PERLA 35 (2017) in one of the following ways, in order to be kept on the mailing list for PERLA 36 (2018): (1) pay your annual dues, (2) make a $10 donation (institutions), or (3) request a waiver. A form and self-addressed envelope are included with this issue, (PERLA 35) for your convenience in responding.

You may send your dues or donation in the form of a personal check, bank note, cashier's check, or postal money order designated in U.S. funds to the Managing Editor. Because of high bank costs for exchange in some countries, you may send cash, in which case the Managing Editor will respond with a personal acknowledgment when received. NO CREDIT CARD CHARGES CAN BE ACCEPTED.

Dues and donations are used to help pay the costs of publishing and mailing PERLA, for Lifetime Achievement Award plaques presented by the Society at International Symposia and for the Scholarship Fund. The Managing Editor will make a financial report to the International Committee at each International Symposium Business Meeting or at any other time when requested.

Members or institutions whose dues remain unpaid for two consecutive years, or have not been granted exchange, waiver or emeritus status, will be dropped from the PERLA mailing list.

XI North American Plecoptera Symposium 2016

Reported by B. C. Kondratieff and C. R. Nelson

The 2016 meeting of the eleventh **North American Plecoptera Symposium** was held from 17-19 May 2016 on the eastern slopes of Mount Timpanogos in the Wasatch Mountains of scenic northern Utah, U.S.A. The meetings were organized by Boris C. Kondratieff and C. Riley Nelson. Our accommodations were at the historic Timp Lodge of Brigham Young University. This site is adjacent to the Sundance Ski Area with its rich history of environmental and cultural awareness. The weather was spectacular and the papers, collecting and socializing were notable. The program included:

Tuesday, 17 May 2016 (afternoon/evening)
Check-in at Timp Lodge in the afternoon. Socializing and collecting near Timp Lodge, nearby Stewart Falls (where the relatively uncommon and often local *Perlomyia utahensis* Needham & Claassen, 1925) were bouncing off our beating sheets. The stonefly fauna was a mixture of winter emerging capniids and nemourids and spring taxa. Members of the symposium collected from North Fork, South Fork, Cascade Springs, and other local streams. The Brigham Young University class, "Integrated Natural History of Utah" joined our meeting and catered the breakfasts and lunches. This group of students came out of the field in southern Utah where they had been camping for several weeks, including a rafting trip down the famous "Cataract Canyon" of the Colorado River. After the meeting they continued on to streams in northern Utah and southern Idaho.

6:00pm. Catered dinner at Timp Lodge.

After dinner welcome and introduction to area by **Dr. C. Riley Nelson** (a signature presentation by **Prof. Nelson**!).

Socializing by the fire and sorting the day's catch.

Wednesday, 18 May 2016

8:00am. Breakfast at Timp Lodge

Box Lunches hand-packed by attendees at breakfast

9:00am. Welcome and talks.

Noon: Box lunch at the lodge and nearby collecting.

12:30pm. Trips to BYU's Monte L. Bean Life Science Museum (https://mlbean.byu.edu/) hosted by **Dr. Richard W. Baumann** to visit the R. W. Baumann Aquatic Insect Collection or to collect at the Diamond Fork River. This river is located in the Spanish Fork Canyon and flows into the Spanish Fork River. Diamond Fork is well-known with many local fishermen as a wonderful place for flyfishing for trout. Stonefly collecting was excellent! Catches included species of *Isoperla*, *Pteronarcella badia* (Hagen, 1874), and *Isogenoides zionensis* (Hanson, 1949). Many

were pleased to collect trout stream beetles (*Amphizoa lecontei* Matthews, 1872[Amphizoidae]) both larvae and adults from a log jam containing also a nice assortment of discarded or lost flip flop sandals.

6:00pm. Catered Dinner at Timp Lodge

Socializing and sorting the day's catch. After dinner concert by local artists Cat Leavy and Chris Bennion.

Thursday, 19 May 2016

8:00am. Breakfast at Timp Lodge

Box Lunches hand-packed by attendees at breakfast

9:00am. Updates on current research with stoneflies and business meetings.

11:00am. Clean up lodge and check out.

Meeting wrap up.

Titles of presentations at NAPS 2016

Kevin D. Alexander. Reintroduction of *Pteronarcy*s in West-central Colorado: a Video.

Richard W. Baumann. The Stonefly Fauna of Nevada (Insecta: Plecoptera).

Richard W. Baumann. The *Sweltsa lamba* Complex a Potential New Genus in North America (Chloroperlidae: Plecoptera).

Jackson H. Birrell and **C. Riley Nelson**. The Decline of the Giant Stonefly *Pteronarcys californica* in Utah.

R. Edward DeWalt and **Y. Cao**. Museum Specimens Document Historical Changes in Stonefly (Plecoptera) Assemblages: Fixed Sites Lose Both Species and Traits.

Jane I. Earle. Conservation Rankings of Pennsylvania Stoneflies, Results and Challenges in Using the NatureServe Rank Calculator with Invertebrates Species.

Makani L. Fisher and **C. Riley Nelson**. Stonefly Nymphs of Western North America: Freshwater Invertebrate Identification Guide (FIIG).

Scott A. Grubbs. Male genitalic features of the *Leuctra biloba* Claassen and *L. grandis* Banks species groups with an assessment of the placement of *L. crossi* James and *L. alta* James.

Charles H. Nelson. Notes on the external cephalic anatomy of the suborder Antarctoperlaria (Plecoptera).

Andrew L. Sheldon and **Scott A. Grubbs**. Partitioning Time and Space: Leuctridae Plecoptera: Leuctridae) in the Talladega Mountains, Alabama.

Andrew L. Sheldon. Mutualism (carpooling) of Ecologists and Taxonomists.

Bill P. Stark and Audrey B. Harrison. *Moselia infuscata* (Claassen) (Plecoptera: Leuctridae), a species complex?

Chris J. Verdone. Conservation of Stoneflies in the United States.

Attendees. Back row, **B. C. Kondratieff, C. R. Nelson, E. L. South, C. H. Nelson, G. Z. Jacobi, A. L. Sheldon, and J. J. Lee.** Front row, **R. E. DeWalt, K. D. Alexander, J. I. Earle, B. P. Stark, C. J. Verdone, and S. A. Grubbs**.

Dr. **Bill Stark**, **Chris Verdone**, **Dr. Charles Nelson**, and **Jonathan Lee** preparing for a "stonefly assault."

Jane Earle checking for stonefly adults walking on the bridge.

Left to right: Row 1: The convener, **Dr. C. Riley Nelson** (the "Renaissance Man"**)**; the group ready to collect stoneflies near Timp Lodge, with the beautiful mountain scenery of Mount Timpanogos as a back drop; Row 2: **Dr. Bill P. Stark** (always happy); **Dr. Richard W. Baumann** (the "legend"); **Dr. R. Edward DeWalt** (the "Editor").

ILLIESIA
INTERNATIONAL JOURNAL OF STONEFLY RESEARCH

Illiesia: Twelve Years of High Quality Stonefly Papers

R. Edward DeWalt, B. P. Stark & N. Sivec.

Output in 2016 and comparison to other years and journals

Illiesia (http://illiesia.speciesfile.org/index.html) began publication in 2005 with the aim to provide a high quality, free, and open access outlet in which plecopterologists could publish. So far 197 articles have been published (Fig. 1). From a slow start, published papers rose to 28 in 2011, declining thereafter to a low point in 2014. In 2016, we accepted 13 papers for print, while in comparison *Zootaxa* published 25 stonefly articles, *Aquatic Insects* two, and ZooKeys three.

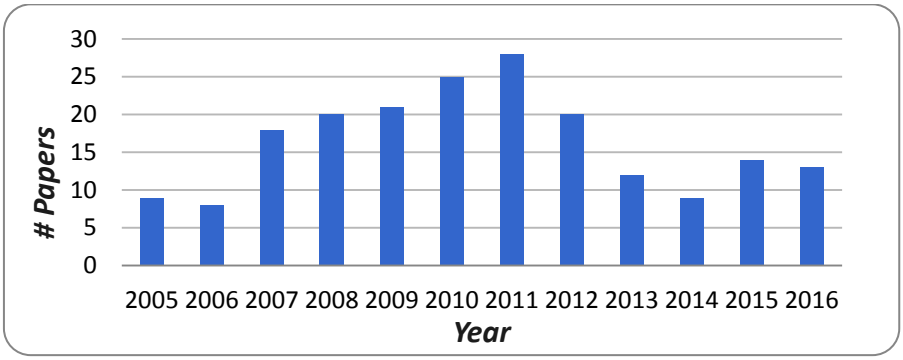


Fig. 1. Number of papers published each year since inception of *Illiesia*.

The 2016 *Illiesia* articles were written by 15 authors, some of whom authored multiple papers. For instance, Kondratieff, Stark, and Harrison authored three papers each (Fig. 2). Illiesia attracted

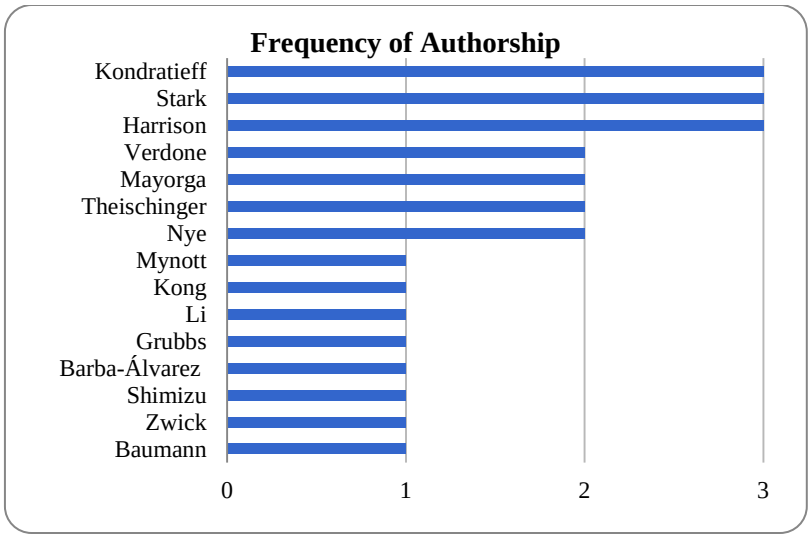


Fig. 2. Frequency of authorship in *Illiesia* during 2016.

the attention of the "old masters", mid-career scientists, and some young scientists too. We are especially glad to see the young scientists publishing in *Illiesia*, including Mayorga, Harrison, and Nye, who represent the future of stonefly science.

The 2016 authors hailed from six countries (Fig. 3). Nearly 47% of authors originated from the USA, with Australia, China, and Mexico being the next most frequent origins.

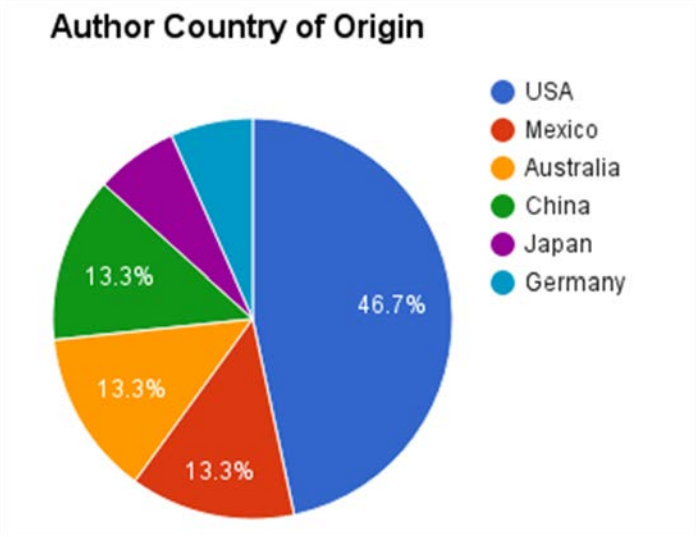


Fig. 3. Country of origin of Authors publishing in *Illiesia* in 2016.

The 2016 papers treated at least 25 species, including the description of five new species and the complete or partial revision of 8 more. Types of papers included biogeographic, species description, nomenclatural, and revisionary categories. The taxa most frequently treated were in the arctoperlarian families Capniidae, Leuctridae, Nemouridae, Taeniopterygidae, Perlidae, and Perlodidae. Among the antarctoperlarians, only the Gripopterygidae were treated. The species treated originated from at least seven countries (Fig. 4). The USA contributed the largest number

of treated species, followed distantly by Japan. The origin of species does not follow closely the origin of new species, e.g. China and South American countries.

The journal moved
Last year we officially moved the journal to the University of Illinois, Illinois Natural History Survey (INHS). The journal is still free, open access, and it's new home has stable servers and skilled technicians to keep the journal running smoothly.

Improvements to the journal
We have made some improvements to the journal. First, we have joined the publication of the journal with updating of Plecoptera Species File (PSF, http://plecoptera.speciesfile.org). New and revised taxa are linked with PSF by a stable Life Science Identifier (LSID)--a stable URL. Editors add new taxa into the database, hide them until publication, and make them active as soon as the paper goes to print.

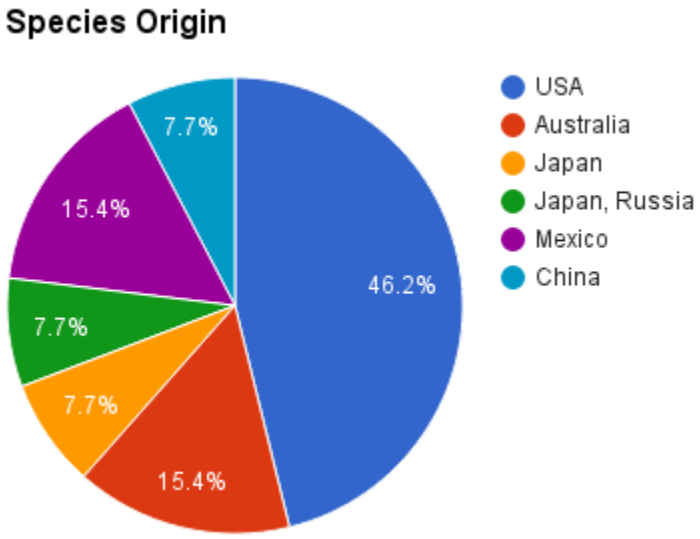


Fig. 4. Country of origin of species appearing in *Illiesia* in 2016.

In addition, we have been using Dropbox--a cloud based system--to accept manuscripts and share versions with authors and between editors. If you have large files, email the editor and we will provide you with access to our Dropbox.

Authors who have large data sets may request "comma separated values" (CSV) template from the editors to enhance data preservation and sharing of data with others. This template is composed of a subset of Darwin Core Archive (DwC-A) fields that are routinely used by the Global Biodiversity Information Facility (GBIF, http://www.gbif.org/) and iDigBio (https://www.idigbio.org/) to exchange specimen data in a globally accepted format. When you submit your paper, editors will examine the amount of data present and suggest use of the template if appropriate. A direct link from the published paper will allow readers to obtain a copy of the data.

This year we will register the journal with Crossref (http://www.crossref.org). This will allow us to obtain a digital object identifier (DOI, another stable URL) for the journal and each article

published by *Illiesia*. This will allow your paper to resolve back to our server location even if we someday move to a different server. An added feature that we will obtain from this registration is the ability to track who cites your work. In order for this to work, we contribute to the community of users at Crossref by submitting properly formatted references from your paper. There will be some cost for registration (born by INHS), but the editors believe that the result will help you to justify publishing in *Illiesia*.

Once again in 2016, we continued to register journal articles with ZooBank (http://zoobank.org) and have archived papers in CLOCKSS (https://www.clockss.org). If you have other ideas on how to improve the jour al, please send them by email to dewalt@illinois.edu.

ANNOUNCEMENTS

First announcement

The 2018 Joint Meeting of the XV International Conference on Ephemeroptera and XIX International Symposium on Plecoptera will take place in **Aracruz, Brazil**, from **03 - 08 June 2018**. The conference will be held at the SESC Praia Formosa, a pleasant place located less than one hour (or 45 km) from the airport of Vitória, capital of Espírito Santo. With more than 200 rooms, conference halls, exposition areas, restaurants, and a huge area in front of the beach, SESC Praia Formosa is the perfect place for hosting the conference in Brazil. Further details about the program, accommo dations and post-conference trip will be given in the second an nouncement (scheduled for May). The third announce ment (scheduled for August) will contain details on fees, availability of conference scholar ships, call for papers and instructions for authors, and forms for con ference registration and dormitory reservation.

Please, if you wish to receive the next announcements, fill the attendance interest form at the following link https://goo.gl/forms/aBm4has2kUWMmWcJ2.

You can also access information on our website (http://ephemeroptera.com.br/jointmeeting/), on our page on Facebook (International Conference on Mayflies and Stoneflies, BRAZIL, 2018) or contact us by e-mail (ffsalles@gmail.com).

Organizing committee

Dr. Frederico Falcão Salles
Universidade Federal do Espírito Santo

Dr. Rodolfo Mariano
Universidade Estadual de Santa Cruz

Dra. Roberta Paresque
Universidade Federal do Espírito Santo

Caddis Press Books Available
Ed DeWalt

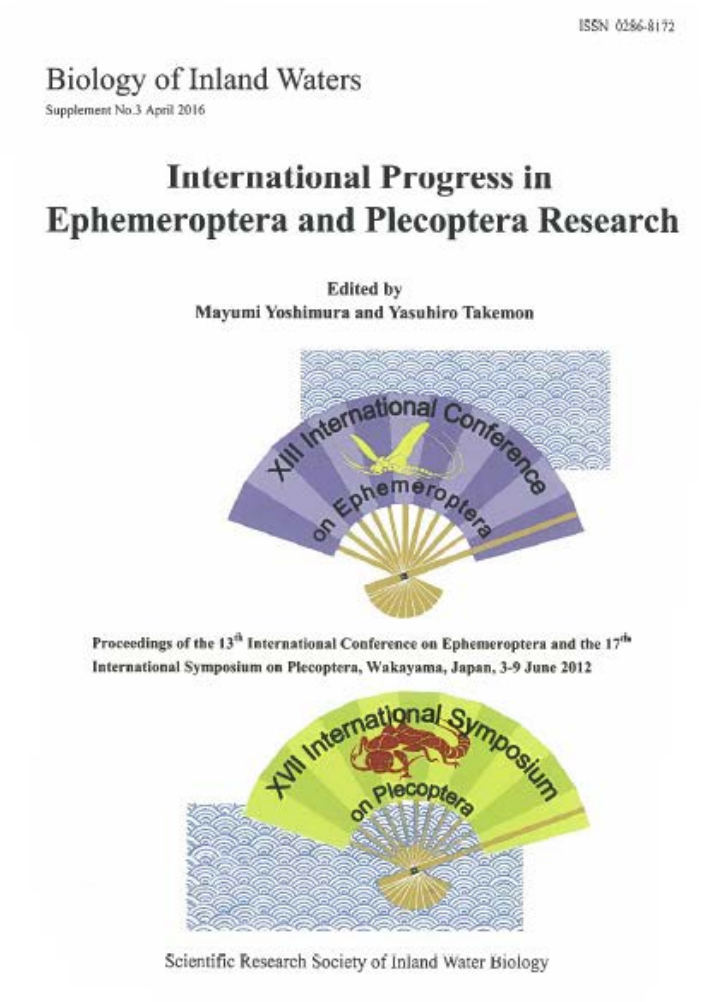
Brian Armitage, former Director of the Ohio Biological Survey (OBS) and editor of the Caddis Press retired a few years ago to the mountains of Panama. I took on much of his collection from the OBS and currently have an NSF grant to incorporate specimens and digitize label data—a big job because Brian was an avid collector!

Recently, he offered me at no cost (well, I had to drive to Ohio and overload my pickup) the remainder of his Caddis Press books (three Plecoptera titles, Diptera & Trichoptera as well). I will begin selling these books as soon as I can get the mechanism in place to put the proceeds into a gift account at the INHS. I will use the funds to support costs of *Illiesia* and *Perla*. The first batch of books is being sold to Bioquip this month, and I will know more soon about how this works. I have some 500 books to get rid of before I retire, so please buy them. Below is a list of what I have. Contact me at dewalt@illinois.edu if you want one.

Titles	Count	Original Price	Clearance Price
American Stoneflies: A Photographic Guide to Plecoptera. Stark, Szczytko & Nelson. 1998.	19	50	35
Nymphs of the North American Stonefly Genera, 2nd Edition. Stewart & Stark. 2002.	186	75	60
Stoneflies (Plecoptera) of Alaska and Western Canada. Stewart & Oswood. 2006.	37	65	50
slightly damaged, but still in good shape	13	60	45
Contributions to the Systematics and Ecology of Aquatic Diptera: A Tribute to Ole Saether. T. Andersen (Ed.). 2007.	96	70	45
The Longhorn Caddifly Genus *Triaenodes* (Trichoptera: Leptoceridae) K. Manuel. 2010.	31	25	15
Glossary of Aquatic Insect Morphology. M. Allen. 2006.	7	5	5

Diagnostic Atlas of the North American Caddisfly Adults. Volume II. Ecnomidae, Polycentropodidae, Psychomyiidae, & Xiphocentronidae. Armitage & Hamilton. 1990.	1	25	20
Diagnostic Atlas of the North American Caddisfly Adults. Volume I. Philopotamidae. Armitage. 1996.	5	20	15
Proceedings of the XIIth International Symposium on Trichoptera. Bueno-Soria, Barba-Alvarez, Armitage (editors). 2007.	119	80	45

The proceedings of the XVII International Symposium on Plecoptera and the XIII International Conference on Ephemeroptera, held June 3–9, 2012 in Wakayama, Honshu, Japan is now available. Please contact with Mayumi Yoshimura (yoshi887@ffpri.affrc.go.jp) if you wish to obtain a copy of the Proceedings. Costs are 9,000 yen per one copy + postage (1,000 yen) = 10,000 yen (about US$88.00) .



The "Proceedings of the Joint Meting of the XIV International Conference on Ephemeroptera and XVIII International Symposium on Plecoptera" is now also available. See http://www.mapress.com/j/zs/pages/view/htorder to obtain a copy.

Zoosymposia 11: 005–006 (2016)
http://www.mapress.com/j/zs

ISSN 1178-9905 (print edition)
ZOOSYMPOSIA
ISSN 1178-9913 (online edition)

http://dx.doi.org/10.11646/zoosymposia.11.1.3
http://zoobank.org/urn:lsid:zoobank.org:pub:7C980871-F623-420B-9B50-699D15DE1D62

Preface: Proceedings of the Joint Meeting of the XIV International Conference on Ephemeroptera and XVIII International Symposium on Plecoptera

CRAIG R. MACADAM[1] & JENNI A. STOCKAN[2]

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OBITUARIES

Per Simon Valdemar Brinck

(4 September 1919 – 6 October 2013)

Per Brinck was one of the seven founders of post-war European Plecoptera studies who gathered in Lausanne for the First International Symposium on Plecoptera in 1956. Per Brinck was a veterinary surgeon from Skåne, Sweden, doing his military service in Lapland. He subsequently started to study stoneflies, resulting in a large monograph on the Swedish fauna (1949). His papers include a key to the Swedish Plecoptera (1952) and various other papers on stoneflies from elsewhere. He took an interest in morphological and functional aspects of Plecoptera reproduction, examined their internal and external genitalia (1956, 1962a) and produced the first significant contribution to this field of study since Klapálek (1896). Per Brinck also trained visiting colleagues, participated in the 3rd Plecoptera Symposium (Plön, 1964), and was an excellent host of the 4th Symposium at Abisko, in 1968 (Fig. 1). He also attended the 12th Symposium in Lausanne (1995), although at that time he no longer worked on Plecoptera.

The Plecoptera were Per Brinck's initial entomological interest. As an entomologist, he is, however, best known as a world specialist of Coleoptera: Gyrinidae. He travelled the world to collect whirligig beetles. He loved Africa most and was co-editor of 15 monumental volumes on *South African Animal Life* (1955-1973). From 1958 to 1986 Per Brinck was Professor of Zoology at the University of Lund. Together with his colleagues and students he worked on Baltic ecology, Nordic pine forests, impacts of hydropower plants, etc. Ecology became his main interest, and for almost thirty years he edited the journal Oikos. He was an active and successful organizer of integrated Scandinavian ecology, with global connections. His initiatives led, among others, to the establishment of an Ecology Building (1994) in Lund, open to other universities, and the foundation of a Nordic Editorial Office publishing new ecological journals.

In his spare time and after retirement he invested a lot of effort to re-establish an old farm on Öland, learning and practising all the crafts and skills needed to run and maintain it. The Plecoptera work of Per Brinck represents only a small part of his lifetime activity, but Plecoptera students will remember him for his important contributions.

For details on Per Brinck's activities refer to the *In memoriam* by Enckell et al. (Oikos 123: 1-2, 2014) and the following links: http://www.sydsvenskan.se/2013-10-26/per-brinck; https://en.wikipedia.org/wiki/Per_Brinck; https://thesmallermajority.com/2013/12/19/who-was-per-brinck/

Acknowledgements

G. N. Foster (Ayr) is thanked for a copy of the beetle newsletter *Latissimus* through which I first learned of the death of Per Brinck. I sincerely thank John Brittain (Oslo) for help, also with literature, and for a linguistic review.

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Peter Zwick

Per Brinck's publications on Plecoptera

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Brinck, P. 1949b. Catalogus insectorum sueciae. X. Plecoptera. Opuscula Entomologica 14: 177-183.

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Brinck, P.; Illies, J. 1965. *Leuctra* Stephens, 1835 (Insecta, Plecoptera) proposed designation of a type-species under the plenary powers. Z.N.(S.) 1671. Bulletin of Zoological Nomenclature 22(2): 108-109.

Brinck, P.; Wingstrand, K.G. 1949. The mountain fauna of the Virihaure area in Swedish Lapland. I. General account. Lunds Universitets Årsskrift, N. F., Avd. 2: 45(2): 51-137 and Kunglig Fysiografiska Sällskapets Handlingar , Lund, N. F., 60(2): 1-70.
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Per Brinck, S. Ulfstrand and A. Lillehammer at the symposium in Abisko, 1968.

David Ralph Lenat
April 17, 1950-April 28, 2016

David R. Lenat, 66, died April 28, 2016 from complications of myelodysplastic syndrome (MDS). He was born on April 17, 1950 in Boston, Massachusetts. He was married to Georgia Kaye Hagen. Dave completed his undergraduate studies at Johns Hopkins University and graduate studies at the University of North Carolina. He enjoyed a distinguished career as a stream ecologist, retiring from the North Carolina Division of Water Quality and later working as a private consultant. Dave took great pleasure in collaborating with biologists across the country in the discovery of new species occurring in North Carolina. He authored and co-authored 66 scholarly papers which have been cited more than 3,000 times. For example**,** his papers entitled **"**Effects of land use on water quality and aquatic biota of three North Carolina

Piedmont streams" (1994) [cited as of December 2016, 559 times]", and "A biotic index for the southeastern United States: derivation and list of tolerance values, with criteria for assigning water-quality ratings" (1993) [cited as of December 2016, 466 times], and "Water quality assessment of streams using a qualitative collection method for benthic macroinvertebrates" (1988) [cited as of December 2016, 416 times] are considered classics in North American aquatic ecology. Dave had many other interests including birding (with a life list of over 600 species), traveling, running, and cycling. He was also an avid book collector and rare book seller.

Dave was a connoisseur of all aquatic insects, even noninsect groups such as Oligochaeta. I had the great privilege to accompany Dave on numerous productive field excursions throughout his home state, North Carolina, U.S.A. Numerous new species of Plecoptera were discovered during these field trips. Dave assisted in the descriptions of several of these including *Haploperla fleeki* Kondratieff, Kirchner & Lenat, 2005, *Perlesta bjostadi* Kondratieff & Lenat, 2006, *P. georgiae* Kondratieff, Zuellig & Lenat, 2008 [honoring his wife], and *P. beatyi* Kondratieff, Zuellig & Lenat, 2011. He was honored for his zeal of collecting and understanding the biodiversity of the Plecoptera of North Carolina, U.S.A. by colleagues, naming two patronyms, *Alloperla lenati* Kondratieff & Kirchner, 2004 and *Isoperla lenati* Szczytko & Kondratieff, 2015.

Boris C. Kondratieff

David R. Lenat's publications on Plecoptera

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Dave R. Lenat doing what he liked best, collecting aquatic insects in North Carolina, U.S.A.

David R. Lenat (right) and Ralph F. Kirchner (left) enjoying collecting in North Carolina, U.S.A.
Photographs courtesy of R. E. Zuellig.

MEMBER NEWS

DeWalt laboratory work

- Mr. Eric South is working on a PhD on the phylogeny of N. Am. Plecoptera. Transcriptomes for trunk and major branches to tribe, leaves of tree in series of single genes. Working with Perry Ridge at BYU. Other N. Am. researchers have been enlisted to collect live adults for this work.
- Evan Newman is working on a MS degree on the conservation status of stoneflies in Indiana. He is currently analyzing a 5,000 record data set to determine rarity and locations to look for rare species. Funds from Indiana Dept. of Natural Resources through Indianapolis Zoo.
- R. E. DeWalt, E. J. South, Y. Cao. Site specific changes in stonefly assemblages in Illinois. Examining human disturbance factors governing % species loss.
- R. E. DeWalt, J. L. Robinson. Pre-European Settlement and climate influenced distributions of stoneflies in the Midwest of the USA. Factors influencing assemblage composition and richness in the Midwest.
- R. E. DeWalt, Whitney Anthonysamy, Scott Grubbs, Boris Kondratieff. Distinctness of *Prostoia* (Nemouridae) species, with comparison to other eastern N. Am. taxa. Using CO1 and ITS genes. New *P. ozarkensis* is distinct, but more widespread than thought.
- R. E. DeWalt, B. C. Kondratieff. Update of the Plecoptera chapter in Merritt, Cummings, and Berg. 2008. Submission for early or middle 2018.

THE STONEFLIES (PLECOPTERA) OF NEVADA

This is a note to my plecopterologist colleagues on the publication of the Stoneflies (Plecoptera) of Nevada by Baumann, Sheldon and Bottorff. This monograph has been in press for some time and was delayed to allow the publication on the Dragonflies and Damselflies of Utah to come out in time for the DSA annual meeting that was held in Utah in June 2016. According to the Editor of the Western North American Naturalist, this monograph is scheduled to be published in May 2017. The monograph will be produced in hard copy and online so that the extensive spread sheet of collection data that is attached for stoneflies from Nevada will be available to stonefly workers as an interactive file. Information on this publication and any other stonefly papers that have appeared in the Great Basin Naturalist or the Western North American Naturalist should be directed to Janene Auger, Managing Editor, Western North American Naturalist at wnan@byu.edu or Monte L. Bean Life Science Museum, Brigham Young University, Provo, Utah 84602.

Since I gave a presentation on this paper at the May 216 NAPS many colleagues have inquired about this monograph. In fact, it is mentioned in the introduction of DeWalt et. al. “An Atlas of the Stoneflies of Ohio.” This will be a must publication for those who study stoneflies in North America because it is written in a modern format and contains an abundance of photographs, graphs, maps and distribution data that have previously not been part of geographical studies dealing with stoneflies and other (EPT): Ephemeroptera, Plecoptera and Trichoptera taxa previously.

Richard Baumann, BYU Provo, Utah, USA

ARTICLES

New records of stoneflies (Plecoptera) from Virginia, U.S.A.

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Kondratieff & Voshell (1979) and Kondratieff & Kirchner (1987) previously have reported 116 and 149 species of stoneflies from Virginia, U.S.A., respectively. Since 1987 numerous new species descriptions and species revisions have been published adding 31 species to the known stoneflies for the state (DeWalt et al. 2016). During 21 May - 20 June 2016, we (BCK, CJV) travelled to Virginia to investigate for the U.S. Fish and Wildlife Service the population status and distribution of *Acroneuria kosztarabi* Kondratieff & Kirchner, 1993 (Perlidae), *Remenus kirchneri* Kondratieff & Nelson, 1995 (Perlodidae), and *Tallaperla lobata* Stark, 1983 (Peltoperlidae). We sampled 113 locations in 27 of the 95 Virginia counties and drove a distance of 15,770 km. Adult stoneflies were collected primarily with beating sheets, although we occasionally used light traps and larval rearing as well. In total, 4,032 adult stoneflies, representing at least 87 species were collected during this study. In addition to the three target species, we collected four species which represent new Virginia state records and two undescribed species, one of these now recently described by Verdone & Kondratieff (2016). We also examined material previously deposited in the C.P. Gillette Museum of Arthropod Diversity, Colorado State University, Fort Collins, Colorado. The museum presently holds more than 26,000 vials of Plecoptera. Among these, we found one new state record, one tentative new state record, and specimens constituting a range extension for an apparently endemic Virginia *Acroneuria* species.

Three of the five new state records are members of the genus *Isoperla* Banks, 1906. *Isoperla cotta* Ricker, 1952, a species known primarily from northeastern North America, was anticipated by Kondratieff & Kirchner (1987) and reported from West Virginia by Tarter & Nelson (2006), was confirmed for Virginia. New Virginia state records for *I. cotta* include the New River in Giles County and Stony Fork in Wythe County. *Isoperla tutelo* Szczytko & Kondratieff, 2015 was originally described from Caldwell County in the foothills of the Appalachians of western North Carolina. The new Virginia state record is from Brumley Creek, Washington County in southwestern Virginia. *Isoperla zuelligi* Szczytko & Kondratieff, 2015 was originally described from Montgomery County in southcentral North Carolina. The new Virginia state records are from the South Fork Shenandoah River in Page County and the Rapidan River in Madison County, which extends the range of this species 386 km northward.

The southernmost record is from Alabama (Grubbs 2015). Szczytko & Kondratieff (2015) did not list *I. lata* Frison, 1942 from Virginia, but this species was correctly listed by Kondratieff & Kirchner (1987).

Neoperla coosa Smith & Stark, 1998 originally described from Alabama, has been recorded from eastern Tennessee (DeWalt & Heinold 2005), Indiana (DeWalt & Grubbs 2009), Ohio (DeWalt et al. 2012), New York (Myers et al. 2011), and North Carolina (Lenat et al. 2016). Our new Virginia state records are from Wolf Creek in Bland County, the Clinch River in Russell County and the Nottoway River in Sussex County.

Haploperla parkeri Kirchner & Kondratieff, 2005 was originally described from Cove Creek in Haywood County, North Carolina. The Virginia specimen was collected in the Grayson Highlands in 1983 from Big Branch in Smyth County. The Grayson Highlands area is the northernmost locality for several other southern Appalachian species including *Allocapnia fumosa* Ross, 1964, *I. reesi* Szczytko & Kondratieff, 2015, *I. stewarti* Szczytko & Kondratieff, 2015, *Leuctra mitchellensis* Hanson, 1941, *Megaleuctra williamsae* Hanson, 1941, *Strophopteryx limata* (Frison, 1942), *S. urtica*e (Ricker, 1952), *Yugus kondratieffi* Nelson, 2001, and *Zapada fumosa* Baumann & Grubbs, 2015.

Acroneuria arida (Hagen, 1861) was originally described from New York and Philadelphia and has been recorded as far south as Georgia (Stark 2004, DeWalt et al. 2016). Kondratieff & Voshell (1979) and Kondratieff & Kirchner (1987) speculated that *A. arida* could occur in Virginia based on its presence in the neighboring states of Tennessee and North Carolina. Three female *Acroneuria* from the Nottoway River in Sussex County, Virginia were examined that possess subgenital plate morphology consistent with *A. arida*. Unfortunately, these specimens lack mature ova, therefore the presence of this uncommonly collected species in Virginia is tentative and requires further study.

Acroneuria yuchi Stark & Kondratieff, 2004 was originally described from Lee County, Virginia. There are no other published records for this species. We recently re-examined specimens previously identified as either *A. evoluta* Klapálek, 1909 or *A. frisoni* Stark & Brown, 1991 from material deposited in the C. P. Gillette Museum of Arthropod Diversity. Stark & Brown (1991) synonymized *A. mela* Frison, 1942 with *A. evoluta* and described *A. frisoni* from specimens previously identified as *A. evoluta*. Previous records of *A. evoluta* from Virginia in Kondratieff & Voshell (1979) and Kondratieff & Kirchner (1987) refer to *A. frisoni*. Based on the aedeagal armature and ova, we determined that these specimens are more correctly assigned to *A. yuchi*. New Virginia state records for *A. yuchi* include Walker Creek in Giles County, Toms Creek and Craig Creek in Montgomery County and the North Fork Holston River in Smyth County. Presently, we cannot substantiate the presence of *A. frisoni* in Virginia, but believe the species may occur in the Potomac River drainage in northern Virginia because it has been reported by Pessino et al. (2014) from Licking Creek in nearby Fulton County, Pennsylvania.

The high diversity of stoneflies now reported from Virginia, at least 186 species (Table 1), is no doubt due to the wide variety of lotic habitats associated with the five physiographic provinces of the state, the Coastal Plain, Piedmont, Blue Ridge, Valley and Ridge, and the Appalachian/Cumberland Plateau (Woodward & Hoffmann 1991). As Morse et al. (1993) have pointed out regarding the southern Appalachians, “This species richness is a result of unique geological, climatological, and hydrological features of the region.”

The list that follows includes species previously reported by Kondratieff & Kirchner (1987) in addition to state records reported for the first time or from other publications. New records are indicated by # and species described since 1987 by +. Species previously reported in

other publications are indicated by superscripts, associated citations are provided in endnotes. Species that probably occur in Virginia but require further study are indicated by *. Additionally, the species of *Leuctra* may change with the ongoing studies by Scott A. Grubbs.

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Table 1. Plecoptera of Virginia.

Family Nemouridae

1. + *Amphinemura appalachia* Baumann, 1996[1]
2. *A. delosa* (Ricker, 1952)
3. *A. nigritta* (Provancher, 1876)
4. *A. wui* (Claassen, 1936)
5. *Ostrocerca albidipennis* (Walker, 1852)
6. *O. complexa* (Claassen, 1937)
7. *O. prolongata* (Claassen, 1923)
8. *O. truncata* (Claassen, 1923)
9. *Paranemoura perfecta* (Walker, 1852)
10. *Prostoia completa* (Walker, 1852)
11. *P. hallasi* Kondratieff & Kirchner, 1984
12. *P. similis* (Hagen, 1861)
13. *Shipsa rotunda* (Claassen, 1923)
14. *Soyedina carolinensis* (Claassen, 1923)
15. *S. vallicularia* (Wu, 1923)
16. + *Zapada fumosa* Baumann & Grubbs, 2015[2]

Family Taeniopterygidae

17. *Bolotoperla rossi* (Frison, 1942)
18. *Oemopteryx contorta* (Needham & Claassen, 1925)
19. *Strophopteryx appalachia* Ricker & Ross, 1975
20. *S. fasciata* (Burmeister, 1839)
21. *S. limata* (Frison, 1942)
22. *Taenionema atlanticum* Ricker & Ross, 1975
23. *Taeniopteryx burksi* Ricker & Ross, 1968
24. *T. lita* Frison, 1942
25. *T. lonicera* Ricker & Ross, 1968
26. *T. maura* (Pictet, 1841)
27. *T. metequi* Ricker & Ross, 1968
28. *T. nelsoni* Kondratieff & Kirchner, 1982
29. *T. parvula* Banks, 1918
30. *T. ugola* Ricker & Ross, 1968

Family Capniidae

31. *Allocapnia aurora* Ricker, 1952
32. *A. curiosa* Frison, 1942
33. *A. frisoni* Ross & Ricker, 1964
34. *A. fumosa* Ross, 1964
35. *A. granulata* (Claassen, 1924)
36. *A. harperi* Kirchner, 1980
37. *A. illinoensis* Frison, 1935
38. *A. loshada* Ricker, 1952
39. *A. maria* Hanson, 1942
40. *A. mystica* Frison, 1929
41. *A. nivicola* (Fitch, 1847)
42. *A. pygmaea* (Burmeister, 1839)
43. *A. recta* (Claassen, 1924)
44. *A. rickeri* Frison, 1942
45. *A. simmonsi* Kondratieff & Voshell, 1981
46. *A. stannardi* Ross, 1964
47. *A. virginiana* Frison, 1942
48. *A. vivipara* (Claassen, 1924)
49. *A. wrayi* Ross, 1964
50. *A. zola* Ricker, 1952
51. *Nemocapnia carolina* Banks, 1938
52. *Paracapnia angulata* Hanson, 1961

Family Leuctridae

53. *Leuctra alexanderi* Hanson, 1941
54. *L. carolinensis* Claassen, 1923
55. *L. duplicata* Claassen, 1923
56. *L. ferruginea* (Walker, 1852)
57. *L. grandis* Banks, 1906
58. *L. mitchellensis* Hanson, 1941
59. *L. monticola* Hanson, 1941
60. *L. rickeri* James, 1976
61. *L. sibleyi* Claassen, 1923
62. *L. tenella* Provancher, 1878
63. *L. tenuis* (Pictet, 1841)
64. *L. triloba* Claassen, 1923
65. *L. truncata* Claassen, 1923
66. L. *variabilis* Hanson, 1941
67. *Megaleuctra flinti* Baumann, 1973
68. *M. williamsae* Hanson, 1941
69. *Paraleuctra sar*a (Claassen, 1937)
70. *Zealeuctra fraxina* Ricker & Ross, 1969[3]

Family Pteronarcyidae

71. *Pteronarcys biloba* Newman, 1838
72. *P. comstocki* Smith, 1917
73. *P. dorsata* (Say, 1823)
74. *P. proteu*s Newman, 1838
75. *P. scotti* Ricker, 1952

Family Peltoperlidae

76. *Peltoperla arcuata* Needham, 1905
77. *P. tarteri* Stark & Kondratieff, 1987
78. *Tallaperla anna* (Needham & Smith, 1916)
79. *T. cornelia* (Needham & Smith, 1916)
80. *T. lobata* Stark, 1983
81. *T. maria* (Needham & Smith, 1916)

Family Perlodidae
82. *Clioperla clio* (Newman, 1839)
83. *Cultus decisus isolatus* (Banks, 1920)
84. *C. verticalis* (Banks, 1920)
85. *Diploperla duplicata* (Banks, 1920)
86. *D. kanawholensis* Kirchner & Kondratieff, 1984
87. *D. morgani* Kondratieff & Voshell, 1979
88. *D. robusta* Stark & Gaufin, 1974
89. *Helopicus subvarians* (Banks, 1920)
90. *Isogenoides hansoni* (Ricker, 1952)
91. *I. varians* (Walsh, 1862)
92. *Isoperla burksi* Frison, 1942
93. *# I. cotta* Ricker, 1952
94. *I. davisi* James, 1974[4]
95. *I. dicala* Frison, 1942
96. + *I. evanescens* Verdone & Kondratieff, 2016[5]
97. + *I. fauschi* Szczytko & Kondratieff, 2015[4]
98. *I. frisoni* Illies, 1966
99. *I. holochlora* (Klapálek, 1923)
100. + *I. kirchneri* Szczytko & Kondratieff, 2015[4]
101. *I. lata* Frison, 1942
102. *I. major* Nelson & Kondratieff, 1983
103. *I. marlynia* Needham & Claassen, 1925
104. *I. montana* (Banks, 1898)
105. *I. nelsoni* Szczytko & Kondratieff, 2015[4]
106. *I. orata* Frison, 1942
107. + *I. powhatan* Szczytko & Kondratieff, 2015[4]
108. + *I. pseudolata* Szczytko & Kondratieff, 2015[4]
109. + *I. pseudosimilis* Szczytko & Kondratieff, 2015[4]
110. + *I. reesi* Szczytko & Kondratieff, 2015[4]
111. *I. signata* (Banks, 1902)
112. *I. similis* (Hagen, 1861)
113. *I. slossonae* (Banks, 1911)
114. + *I. smithi* Szczytko & Kondratieff, 2015[4]
115. + *I. stewarti* Szczytko & Kondratieff, 2015[4]
116. *# I. tutelo* Szczytko & Kondratieff, 2015
117. + *I. yuchi* Szczytko & Kondratieff, 2015[4]
118. *# I. zuelligi* Szczytko & Kondratieff, 2015
119. *Malirekus hasta*tus (Banks, 1920)
120. *Remenus bilobatus* (Needham & Claassen, 1925)
121. + *R. kirchneri* Kondratieff & Nelson 1995[6]
122. *Yugus arinus* (Frison, 1942)
123. + *Y. kirchneri* Nelson, 2001[7]
124. + *Y. kondratieffi* Nelson, 2001[7]

Family Chloroperlidae
125. *Alloperla atlantica* Baumann, 1974
126. *A. banksi* Frison, 1942
127. *A. biserrata* Nelson & Kondratieff, 1980
128. *A. chloris* Frison, 1934
129. *A. idei* (Ricker, 1935)
130. *A. imbec*illa (Say, 1823)
131. *A. nanina* Banks, 1911
132. *A. neglecta* Ricker, 1935
133. + *A. petasata* Surdick, 2004[8]
134. + *A. stipitata* Surdick, 2004[8]
135. *A. usa* Ricker, 1952
136. *Haploperla brev*is (Banks, 1895)
137. *# H. parkeri* Kirchner & Kondratieff, 2005
138. *Rasvena terna* (Frison, 1942)[9]
139. *Suwallia marginata* (Banks, 1897)
140. + *Sweltsa holstonensis* Kondratieff & Kirchner, 1998[10]
141. *S. lateralis* (Banks, 1911)
142. *S. mediana* (Banks, 1911)
143. *S. naica* (Provancher, 1876)
144. *S. onkos* (Ricker, 1936)
145. + *S. palearata* Surdick, 2004[8]
146. *S. urticae* (Ricker, 1952)
147. + *S. voshelli* Kondratieff & Kirchner, 1991[11]

Family Perlidae
148. *Acroneuria abnormis* (Newman, 1838)
149. *A. arenosa* (Pictet, 1841)
    **A. arida* (Hagen, 1861)
150. *A. carolinensis* (Banks, 1905)
151. *A. filicis* Frison, 1942
152. *A. flinti* Stark & Gaufin, 1976
    **A. frisoni* Stark & Brown, 1991
153. *A. internata* (Walker, 1852)
154. + *A. kirchneri* Stark & Kondratieff, 2004[12]
155. + *A. kosztarabi* Kondratieff & Kirchner, 1993[13]
156. *A. lycorias* (Newman, 1839)
157. + *A. yuchi* Stark & Kondratieff, 2004[14]
158. *Agnetina annulipes* (Hagen, 1861)
159. *A. capitata* (Pictet, 1841)
160. *A. flavescens* (Walsh, 1862)
161. *Attaneuria ruralis* (Hagen, 1861)
162. *Eccoptura xanthenes* (Newman, 1838)
163. *Hansonoperla appalachia* Nelson, 1979
164. *Neoperla carlsoni* Stark & Baumann, 1978
165. *N. catharae* Stark & Baumann, 1978
166. *N. clymene* (Newman, 1839)
167. *# N. coosa* Smith & Stark, 1998
168. *N. occipitalis* (Pictet, 1841)
169. *N. stewarti* Stark & Baumann, 1978
170. *Paragnetina fumosa* (Banks, 1902)
171. *P. immarginata* (Say, 1823)
172. *P. ichusa* Stark & Szczytko, 1981
173. *P. media* (Walker, 1852)
174. + *Perlesta browni* Stark, 1989[15]
175. + *P. cranshawi* Kondratieff & Kirchner, 2006[16]
176. *P. decipiens* (Walsh, 1862)
177. + *P. durfeei* Kondratieff, Zuellig & Kirchner, 2008[17]
178. *P. frisoni* Banks, 1948
179. + *P. nelsoni* Stark, 1989[15]

180. *P. placida* (Hagen, 1861)
181. + *P. puttmanni* Kondratieff & Kirchner, 2003[18]
182. + *P. roblei* Kondratieff & Kirchner, 2003[18]
183. + *P. shawnee* Grubbs, 2005[19]
184. + *P. teaysia* Kirchner & Kondratieff, 1997[20]
185. *Perlinella drymo* (Newman, 1839)
186. *P. ephyre* (Newman, 1839)

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A mating pair. Photo courtesy of C. R. Parker

Plecoptera Species File

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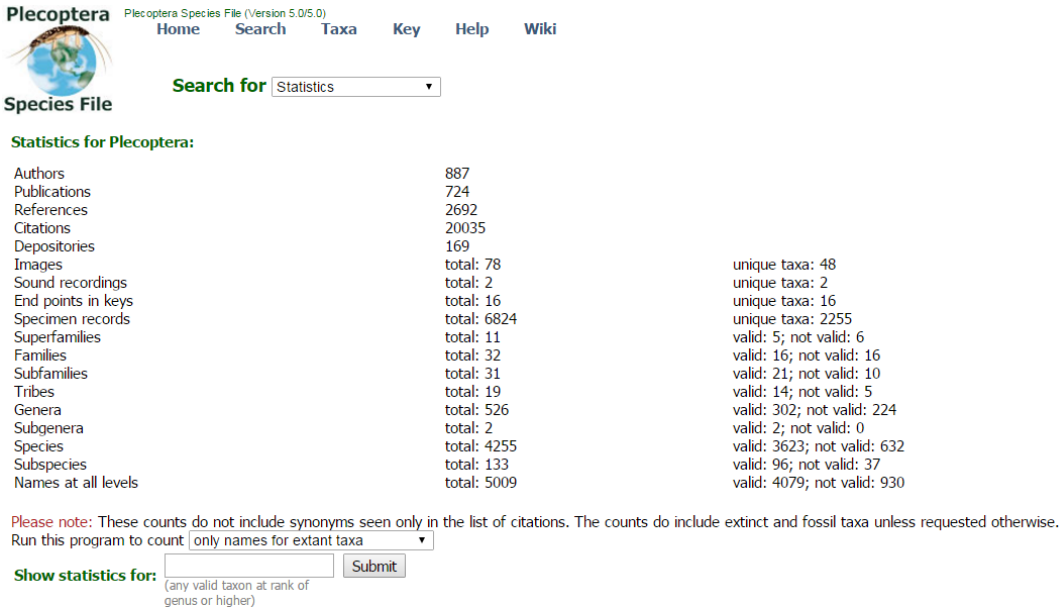
The global and >95% complete Plecoptera Species File (PSF) is the most accurate source of names and associated data for stoneflies in the world. A resource like this is never "done" since there are always obscure old, and a constant source of new, literature that come to our attention.

The database is important to use by anyone who works with stonefly names. Editors of journals will find the use of this database indispensable for checking for the potential of homonyms and for checking completeness of synonymies, literature, and type information (incomplete, but improving). Those conducting revisions should consult this source along with the primary literature. The PSF also presents Taxonomic Working Group (TDWG) distributions at three different scales. These data are translated into shaded distribution maps for species, genera, and families. Textual information is often available for country, and especially in North America, states or provinces.

Currently, a query of "Statistics" in PSF (see table) finds 3623 valid species, with another 632 synonyms. Though these statistics are for extant taxa, a query may be run that adds another 228 fossil species. These taxa are supported by 2692 references that are used in 20035 citations.


Plecoptera Species File (Version 5.0/5.0)

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Search for Statistics

Statistics for Plecoptera:

Authors	887	
Publications	724	
References	2692	
Citations	20035	
Depositories	169	
Images	total: 78	unique taxa: 48
Sound recordings	total: 2	unique taxa: 2
End points in keys	total: 16	unique taxa: 16
Specimen records	total: 6824	unique taxa: 2255
Superfamilies	total: 11	valid: 5; not valid: 6
Families	total: 32	valid: 16; not valid: 16
Subfamilies	total: 31	valid: 21; not valid: 10
Tribes	total: 19	valid: 14; not valid: 5
Genera	total: 526	valid: 302; not valid: 224
Subgenera	total: 2	valid: 2; not valid: 0
Species	total: 4255	valid: 3623; not valid: 632
Subspecies	total: 133	valid: 96; not valid: 37
Names at all levels	total: 5009	valid: 4079; not valid: 930

Please note: These counts do not include synonyms seen only in the list of citations. The counts do include extinct and fossil taxa unless requested otherwise.
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RECENT PLECOPTERA LITERATURE (CALENDAR YEAR 2016 AND EARLIER). Papers made available after 1 February 2017 will be included in the next issue. **If papers were missed, please bring these to the attention of the Managing Editor**. Drs. Bill P. Stark, J. M. Tierno de Figueroa, and Peter Zwick are thanked for reviewing and providing additions to this present list.

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***Alloperla petasata* Surdick, 2004. U.S.A., Virginia: Grayson County, Opossum Creek, 23 May 2006. Photograph by Bill P. Stark**