



PREFACE: Proceedings of the 15th International Symposium on Trichoptera

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The 15th International Symposium on Trichoptera found the world caddisfly community once again in the United States of America, 4-8 June 2015. This second US-based symposium was hosted at Rutgers University, New Brunswick in the Garden State of New Jersey. The 8th International Symposium, the last meeting in the United States, occurred 20 years before at the University of Minnesota in Minneapolis and at Lake Itasca, headwaters of the Mississippi River.

Meeting Conveners

Karl Kjer, Sheri Sheldorf, and Paul Frandsen hosted the meeting, planning many of the activities and local arrangements. Sheri Sheldorf and Carol Flint led the partners program. Contributions of many Rutgers University undergraduate students helped participants and organized resources. We especially thank Julianne McLaughlin, Jade Shevchenko, and Achmad Bakhtiar Yuni. Marzia Lisa, Stan Piotrowski, Nicolas Firbas, and Kiersten Formoso also contributed and participated in the meeting. We thank everyone for their contributions.

The meeting was hosted by Rutgers University in New Brunswick, NJ with the oral sessions occurring at the Hyatt Regency. Poster sessions and workshops were held at Rutgers, Cook Campus. Receptions and light trapping were hosted each evening by Karl Kjer and Sheri Scheldorf in Highland Park, NJ. The meeting concluded with a group dinner at the Harvest Moon Brewery and Cafe in New Brunswick.

Symposium Program

The symposium program was organized by Karl Kjer, Ralph Holzenthal, Paul Frandsen, Oliver Flint, and John Morse. The program included a total of 86 presentations. The abstracts (<https://archive.org/details/15thInternationalSymposiumOnTrichopteraAbstracts>) and symposium program (<https://archive.org/details/15thInternationalSymposiumOnTrichopteraSchedulev.21>) have been digitally archived. Oral sessions included 31 presentations (including 9 plenaries) in contributions to ecology (9), taxonomy (4), phylogenetics (4) and faunistics (5). The poster session included 55 posters in ecology (9), taxonomy (19), phylogenetics (7) and faunistics (20). Plenaries included content addressing the wide field of study on Trichoptera:

- *History of Neotropical Trichopterology* by Oliver S. Flint, Jr.
- *Current status and recent advances in Trichoptera diversity and systematics: a review of the literature from 2000* by Ralph W. Holzenthal
- *Integrative Trichoptera phylogenetics in today's "big data" environment* by Karl M. Kjer
- *Molecular phylogenetics offers insight on the ecological diversification of caddisflies* by Steffen U. Pauls, Miklos Balint, Wolfram Graf, Paul B. Frandsen, Alan R. Lemmon, Ildoki Szivak, Simon Vitecek, Johann Waringer, Karl Kjer
- *Molecular phylogeography of Palaeagapetus caddisflies* by Rirei Araiya, Tomiko Ito, Koji Tojo
- *The larval head anatomy of Rhyacophila fasciata Hagen, 1859 and its implications on mouthpart homology and the phylogeny of Trichoptera* by Frank Friedrich, Johannes Schulz, Martin Kubiak

- *The New Caledonian Trichoptera diversity--- present status of knowledge* by Kjell Arne Johanson, Alice Wells
- *Cryptic species and phylogeography of South American caddisflies* by Dani Takiya
- *The Trichoptera Literature Database and Trichoptera Library Project: advancing online collaborative resources* by Patina Mendez

The meeting included 6 workshops that allowed participants to explore new areas of interest or continue to develop expertise: *Digital Illustration* (Ralph Holzenthal), *Barcoding* (Karl Kjer), *Phylogenomics* (Paul Frandsen), *DELTA - Descriptive Language for Taxonomy* (Desi Robertson), *Microphotography and Focus Stacking* (Joe Giersch), and the *Trichoptera Literature Database “Scan-a-Thon”* (Patina Mendez). All workshops were hands-on using software for digital projects or laboratory facilities for microphotography and barcoding.



Symposium activities: (A) UV light collecting at the nightly socials (Naotoshi Kuhara-left, Anđela Ćukušić-right); (B) discussions with colleagues (Ryoichi Kuranishi-center); (C) poster session; and (D) workshops (DELTA with Desi Robertson). Photos by Goro Kimura.

Symposium Logo

The symposium logo, illustrated by Ralph Holzenthal, depicts the giant caddisfly (*Semblis phalaenoides* Linnaeus, 1758) (Phryganeidae) superimposed on the DNA double helix. It is meant to symbolize the breadth of current Trichoptera research, from the individual organism and its environment to its genome.



New Jersey Ecoregions and Biota

The meeting was held in central New Jersey, in New Brunswick and surroundings encompassing the Rutgers University campuses. The daylong field trip was to Stokes State Forest in the far northwestern corner of the state near the Delaware River. New Jersey shows great variation in ecozones, based largely on differences in soils due to major differences in geologic history. The southern half, marked by the famous “pine barrens,” is primarily sedimentary and dominated by pine and oak woodlands, while the northern half is built on a mix of metamorphic rock, with more recent episodes of glaciation influencing soil formation in the northwestern-most areas as well. The climate is designated humid subtropical (Cfa on the Köppen climate classification scheme; https://en.wikipedia.org/wiki/Climate_of_New_Jersey) with rather uniform warm humid summers across the state, but variably cold winters. Northern and inland areas have considerable snow and greater thunderstorm activity (<https://soilsmatter.wordpress.com/2017/01/15/state-soils-new-jersey/>).

Field Trips

The symposium field trip was to Stokes State Forest, in the physiographic region known as Valley and Ridge Province, located in the Appalachian Highlands, which includes a stretch of the Appalachian Trail along the Kittatinny Mountains. This hilly area (elevation ~365-500 m above sea level) is covered in deciduous mixed hardwood forest supporting a variety of trees—prominently varieties of oak, maple, and hickory—but is not virgin forest (much was logged/cleared for farming in the 18th and 19th centuries). It is interspersed with areas of white and red pine groves planted in the 1930s (<https://www.state.nj.us/dep/parksandforests/parks/stokes.html>). Vertebrate wildlife is a diverse assemblage of Northeastern forest taxa, such as whitetail deer, bobcat, coyote, squirrel, and bear. Beaver are present as well, altering the morphology of streams.

The park contains several small lakes and streams. Big Flat Brook, a tributary of the Delaware River, was the first focal point for collecting on 6 June 2015. Big Flat Brook is permanent and is stocked with fish; it is considered a prime area for fly-fishing (<http://www.njskylands.com/odfishfly>). The second site, Tilman Brook, a tributary of Flat Brook in Tilman Ravine, was a smaller stream with a high gradient along the ravine. Participants covered approximately a kilometer of stream length, with an optional hike up to Buttermilk Falls (in the adjacent Delaware Water Gap National Recreation Area). In the lower reaches, the trail traversed relic homesteads adjacent to the stream identifiable by walls created by piles of small boulders; paired large trees once marked the entrances to the properties. A group of participants went on further field trip activities, including UV light collecting at Steam Mill Campground.



Field trip to Stokes State Forest, NJ. At Big Flat Brook: (A) Ollie Flint, Ferdy de Moor & Alice Wells (left to right); (B) Fabio Quinteiro and others; and (C) searchers focused on the stream. At Tilman Brook: (D) Wolfram Mey sampling a pool habitat. Photos by Brian Smith.

Jason Robinson (JLR/jrob), of the Illinois Natural History Survey (INHS), provided locality information and a partial list of Trichoptera taxa collected during the field trips (with museum identifiers at the INHS). In the following list, M=male, F=female, L=larva, and P=pupa. These data (and others) may be viewed in the searchable INHS Insect Collection Database (<http://inhsinsectcollection.speciesfile.org/InsectCollection.aspx>).

USA NJ Sussex County, Big Flat Brook, Stokes State Forest, Steam Mill Campground at Cregger Road, 41.23894 N, -74.73585 W, 6-vi-2015, JLR 15-22: *Frenesia difficilis* (Walker, 1852) (3L) INHS 797020, (2L) INHS 797083; *Limnephilus* sp. (1L) INHS 797022; *Neophylax ayanus* Ross, 1938 (4L) INHS 797023; *Lepidostoma* sp. (3L 2P) INHS 797025; *Pycnopsyche* sp. (2L) INHS 797026; *Hydropsyche betteni* Ross, 1938 (1M) INHS 797081

USA NJ Sussex County, Stokes State Forest, Tilman Brook in Tilman Ravine at NRRA boundary, 7.1 km S of Dingmans Ferry PA, 41.15596 N, -74.8695 W, 6-vi-2015, JLR 15-23: *Molanna blenda* Sibley, 1926 (1L) INHS 797034; *Rhyacophila nigrita* Banks, 1907 (1M) INHS 797044, (1M) INHS 797088, (1F) INHS 797089; *Rhyacophila carolina* Banks, 1911 (1M) INHS 797045, (2M) INHS 797054, (1M) INHS 797090; *Agapetus pinatus* Ross, 1938 (1M) INHS 797048; *Neophylax aniqua* Ross, 1947 (5L) INHS 797049; *Dolopohilodes distincta* (Walker, 1852) (2L) INHS 797050, (3M) INHS 797053; *Diplectrone modesta* group sp. (11L) INHS 797052; *Rhyacophila fuscula* (Walker, 1852) (1L) INHS 797055; *Lype diversa* (Banks, 1914) (1F) INHS 797056; *Psilotreta labida* Ross 1944 (1P) INHS 797057; *Agapetus* sp. (1F) INHS 797058, (1F) INHS 797091; *Glossosoma* sp. (1F) INHS 797059

USA NJ Sussex County, Stokes State Forest, small unnamed seep stream 1 km NNE Walpack Center, 41.1626 N, -74.87665 W, 6-vi-2015, jrob 15-024: *Lype diversa* (1F) INHS 797027; *Rhyacophila carolina* (1M 1F) INHS 797028;

USA NJ Sussex County, small unnamed seep downslope of Gren Anderson Shelter on Appalachian Trail, 41.19728 N -74.75293 W, 6-vi-2015, jrob 15-028: *Wormaldia moesta* (Banks, 1914) (1M) INHS 797024

In Memory

In the time between the 14th International Symposium on Trichoptera in Vladivostok, Russia (2-7 July 2012) and the 15th International Symposium on Trichoptera in New Brunswick, New Jersey, U.S.A., we lost 3 colleagues who will be greatly missed.

Glenn Wiggins (1927–2013) made extensive contributions to Trichoptera taxonomy and taxonomic keys, revisionary systematics, and evolution. His contributions were most broadly known through of his books, *Larvae of the North American Caddisfly Genera (Trichoptera)* (1977, 1996) and *Caddisflies, the Underwater Architects* (2004), but was also known to many in our community through his handwritten correspondences and responses. An obituary by Patricia W. Scheffer MacCulloch is available in *Braueria* (Lunz am See, Austria) 43:4-8 (2015), http://www.zobodat.at/biografien/Wiggins_Glenn_B_BRA_42_0004-0008.pdf.

Eric McElravy (1946–2014). As a graduate student of Vince Resh at the University of California, Berkeley, Eric studied the ecology, life history, and faunistics of Trichoptera of California and Panama and attended several International Symposia on Trichoptera. He was well-known for his extraordinary creativity and skill in building lab and sampling equipment for many experiments at and beyond Berkeley. In this *Proceedings of the 15th International Symposium on Trichoptera*, Vince Resh has written an obituary to recognize Eric's contributions.

Andrew Nimmo (1938–2015) was a permanent fixture of International Symposia on Trichoptera, visible in nearly every group photograph standing in the back row recognizable with his pipe (which sometimes received its own outline in the cutout). Andy made a monumental contribution to Trichoptera research through his first volume of the *Bibliographia Trichopterorum* (1996) with progress on further volumes through the remainder of his lifetime. He was an incredibly generous collaborator, sharing extensive citations from his reference library with the *Trichoptera Literature Database* and worked closely with many members of our community. An obituary by Dave Ruitter and Bruce Hemming is available in *Braueria* (Lunz am See, Austria) 43:5-10 (2016), http://www.zobodat.at/biografien/Nimmo_Andrew_Peebles_BRA_43_0005-0010.pdf.

Proceedings

The papers that follow this preface represent the work of many colleagues, not just the authors and their teams who contributed to the work, but the many peer reviewers, and editors who communicated with reviewers and edited the papers. Ralph Holzenthal (Taxonomy), David Houghton (Ecology) and Karl Kjer (Phylogenetics and other subjects) completed the first, substantial rounds of communications and editing. With encouragement by David Ruitter, Patina Mendez and Joseph Spagna joined to organize drafts and complete editorial rounds, communicate with authors about paper status and progress, and to prepare the front materials. During this last phase, Mendez and Spagna prepared the papers with their final edits for publication and attended to details for GenBank registration and other archiving. We sincerely thank all those who have reviewed papers for these proceedings.

We thank Dave Ruitter for sending emails and gathering information to keep the proceedings moving along. Paul Frandsen assisted in finalizing papers. Julianne McLaughlin helped gather details on participants. Many thanks to those of our members who helped identify participants and populate names through Google Docs. Perhaps most inspiring has been to hear how delighted each person was when we contacted them regarding the proceedings. Many had hoped that the proceedings would still be published but were unsure if they would continue and many offered to read and edit to make it happen—we are all fortunate to have such a strong community.

The Proceedings of the 15th International Symposium on Trichoptera contains contributions in the form of 29 manuscripts from 68 authors with 42 authors attending. Most contributions to the proceedings were within taxonomy (10), followed by faunistics (8). The remainder of the papers were in ecology (5), phylogenetics (3), other articles (1), and include an obituary in memory of a colleague (1). One of the notable features of these contributions, in addition to the contributions of colleagues who have contributed to many proceedings over the years, is that several of the manuscripts that recognize the contributions of undergraduate researchers to Trichoptera scholarship in the form of authorship.

Participants

PARTICIPANTS OF THE XVth INTERNATIONAL SYMPOSIUM ON TRICHOPTERA, 4–8 JUNE, 2015, NEW JERSEY, U.S.A.

Attending the meeting were 90 participants (including accompanying persons) and 81 were coauthors of presentations or posters. Names are for the XVth Symposium participants with addresses are those that were current at the time of the Symposium.

Names in **bold** are authors or co-authors of papers included in these Proceedings

*Authors or co-authors of presentations or posters which were reported in the XIV Symposium

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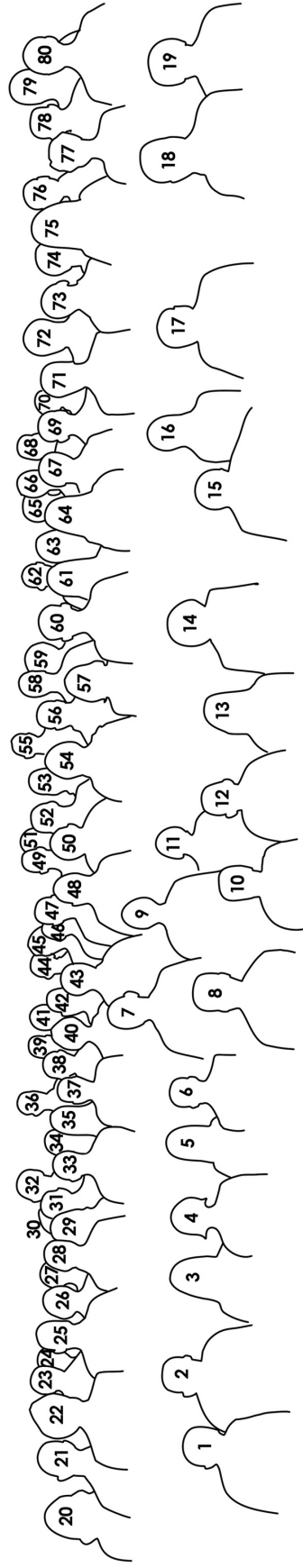
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Group photograph of participants: 1—D Thapanya; 2—R Piyadasa; 3—D Takiya; 4—D Robertson; 5—G Abrantes Jardim ; 6—V Willis; 7—S Harris; 8—S Parey; 9—P Mendez; 10—A M Pes; 11—K Kwiatkowska; 12—E Rázuri-Gonzales; 13—A Costa; 14—L Camargos; 15—W Mey; 16—R Cuk; 17—F de Moor; 18—R Wisseman; 19—N Kuhara; 20—A Santos; 21—L Dumas; 22—M Pandher; 23—M Kubiak; 24—S Pauls; 25—J Giersch; 26—F-M Gibon; 27—P Barcelos-Silva; 28—R Thomson; 29—M Springer; 30—A Čukušić; 31—F Friedrich; 32—R Holzenthal; 33—B Ríos-Touma; 34—F Hoppeler; 35—A Henriques-Oliveira; 36—D Houghton; 37—E Prendini; 38—J Bueno-Soria; 39—S Hamilton; 40—A Wells; 41—J Morse; 42—A Fusaro; 43—B Colburn; 44—K Kjer; 45—J Robinson; 46—B Smith ; 47—J Majecki; 48—D Hamilton; 49—M Floyd; 50—O Flint; 51—S Vitecek; 52—H Ibrahim; 53—J Spagna; 54—T Prommi; 55—K Johanson; 56—A Rasmussen; 57—D Weaver; 58—F Quinteiro; 59—M Kućinić; 60—P Laudec; 61—K Leymaster; 62—S Ogbogu; 63—L Lewis; 64—A Pytel; 65—K Mikami; 66—I Vučković; 68—K Tojo; 68—M Takenaka; 69—T Nozaki; 70—D Cerjanek; 71—K Tanida; 72—R Kurinishi; 73—H Nishimoto; 74—G Kimura; 75—CJ Uy; 76—T Sherk; 77—P Ekingen; 78—İ Küçükbasmaç; 79—D Rutter; 80—S Watanabe. Not pictured: P Frandsen; W Promwong; D Smirnova. Students participants from Rutgers University took the group photo and are not pictured: N Firbas; J McLaughlin; J Shevchenko; A B Yuni; K Formoso; M Lisa; S Piotrowski. Photograph is a composite.

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