CHIRONOMUS

Newsletter on Chironomidae Research

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Subfossil Chironomidae from northeastern Poland. Collage and photos by Isabelle Larocque.

CHIRONOMUS Newsletter on Chironomidae Research

The *CHIRONOMUS Newsletter on Chironomidae Research* is devoted to all aspects of chironomid research and aims to be an updated news bulletin for the Chironomidae research community. The newsletter is published yearly in October/November, is open access, and can be downloaded free from this website: http://www.ntnu.no/ojs/index.php/chironomus. Publisher is the Museum of Natural History and Archaeology at the Norwegian University of Science and Technology in Trondheim, Norway.

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Would you like to see your picture on the front page? Please send us your favourite midge photograph or drawing (*torbjorn.ekrem@ntnu.no*).

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Front page layout: Chironomid in title from photograph by Steve Marshall, Graphic design by Kolbjørn Skarpnes, NTNU Information Division.

Front page photo: Subfossil Chironomidae from northeastern Poland
Photos and collage by Isabelle Larocque

Editorial

The Importance of Illustration

We live in an undeniably and increasingly digital world. I sit here with my computer, tablet, and smartphone all at hand… each with some form of image-capture technology. My teaching and research microscopes are also outfitted with carefully chosen, high quality cameras, which I would argue are invaluable tools. These devices make taxonomic research much easier, if not more robust. None-the-less, there is still much to be said for a well-crafted illustration.

Digital imagery, while an exceptional resource, still does not completely capture the morphological complexity and minutia of insects such as the Chironomidae quite like a hand-drawn or digitally-inked illustration. Even with expensive and high-quality techniques such as "z-stacking," it is still difficult, if not impossible, to fully capture minute details that can be easily conveyed with a simple stroke of the pen. To echo Giłka (2008), drawings are perhaps the most critical component of taxonomic descriptions, and are especially crucial for dipterans.

While some insect taxonomists have been allured by the simple "click of a button" technology, particularly as compared to the often many painstaking hours with the pen (traditional or digital), there are so many details that are simply lost or not completely captured. For example, when comparing illustrations and images (e.g. Figure 1), I would argue that the digital images, while high-quality, still do not quite capture all of the details of the corresponding inked illustration. When it comes down to it, these minute intricacies may mean the difference between one species or two, or species 'A' or 'B', especially in groups that are difficult to differentiate. These situations certainly are not difficult to come by when dealing with Chironomidae.

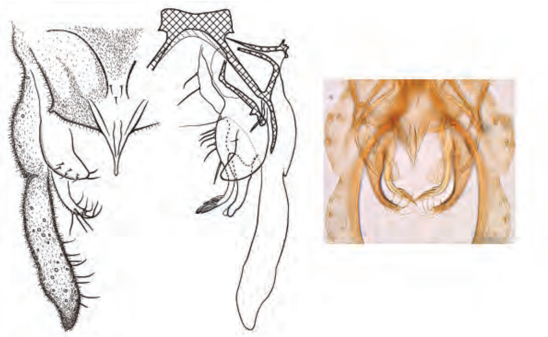

Figure 1. Comparison of digitally inked illustrations and digitally photographed images. Illustrations inked in Adobe Illustrator; photographs taken using a Leica DFC420 digital camera on a Leica DM6000 compound microscope. Figure shows hypopygium of *Micropsectra penicillata* Anderson, Stur and Ekrem, 2013.

Now, I'm definitely not advocating that we not utilize this technology. On the contrary, I think it can be used to our benefit. Images can be of great help during the illustration process, and in many cases can add great value to a manuscript. But, unless the manuscript is littered with images taken at slightly different depths or angles, the traditional illustrative techniques cannot and should not be replaced.

Another important advantage of illustration, as pointed out by Holzenthal (2008), is that the illustrator becomes intricately familiar with the specimen in question. What better way to become so familiar with the male chironomid terminalia than by sitting at the microscope, pencil in hand under the drawing tube, while making careful focusing adjustments with the other?

As careful taxonomists, we should use all techniques available to us. Just as molecular and morphological species delineation techniques complement each other, so too do digital image capture and hand-crafted illustrations. Often, they will lead to the same conclusions, but in some cases, one method will allow the observer to see features in a new light – or allow you, or other researchers, to ask further probing questions.

Alyssa Anderson

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In memory of
James E. Sublette (1928-2012)

A young James E. Sublette, 1953. Photo: courtesy of the Sublette family.

James Edward Sublette was born in Oklahoma on January 19, 1928 to Samuel Hubbard Sublette and Pearl Mae Graves Sublette and raised in Arkansas, the 3rd of 4 children. He was a descendent of Abraham Soblet, a Huguenot who came to this country in 1700 to escape religious persecution. At the age of 3, Jim came down with polio and survived with limited use of his right arm, a disability that meant that he could not serve in the armed forces during World War II and allowed him instead to attend college. Jim went to elementary school in a one-room schoolhouse in Arkansas and graduated valedictorian of his high school at the age of 15. Until he attended college at the University of Arkansas, he didn't have electricity or running water. In graduate school at the University of Oklahoma, he met his wife and lifelong scientific partner, Mary Frances Smith (1927-2007). Jim was always interested in zoology, especially fish, which led to the study of *Chironomidae*. He attained his PhD in entomology at the age of 23 and went on to be a world-renowned expert in his field, having identified, named, and described over 150 species of insects.

Jim was on the faculty of Eastern New Mexico University for most of his career, where for many years he served as Dean of the Graduate School. James and Mary were a productive team, working together tirelessly on studies of chironomid taxonomy as well as other groups. One of their definitive works (coauthored by Michael D. Hatch) was "The Fishes of New Mexico". Jim's children fondly remember dinner table conversations about *Tanytarsus* and family vacations which would center around water sources from which they collected larval specimens.

After his retirement from ENMU, Jim went on to be a faculty member at the University of Colorado in Pueblo for several additional years, after which he and Mary moved to Tucson, Arizona, where they spent a happy retirement, although Jim never actually stopped working on his taxonomic studies. Even after the death of Mary in 2007, Jim continued to work every evening on his big Zeiss microscope, practically to the very end of his life. In retirement he also took up artistic pursuits, creating biologically-inspired prints with his close friend, artist Gloria Isaak Morton.

Dr. James Edward Sublette was a renowned scientist who, together with Mary Frances, his wife of 57 years, made lasting contributions to the field of entomology. Moreover, he was a devoted husband, father, grandfather, and great-grandfather. He inspired numerous graduate students and was beloved by colleagues around the world. This brief

Jim and Mary outside their home in Tucson, 1994. Photo: courtesy of the Sublette family.

narrative of his accomplishments, however, does not capture his greatness of spirit, his insatiable curiosity about the world around him, his gentle manner, his tremendous sense of humor, his love of languages, music, poetry, travel, good food, science fiction, and, well, life.

Jim died a peaceful death on December 15, 2012, survived by four married children, Ned, Elizabeth, Mark, and Amy; eight grandchildren, Sarah, Naomi, Rose Mary, James, Reuven, Charles, Yael, and Tori; and one great-grandson, Eli.

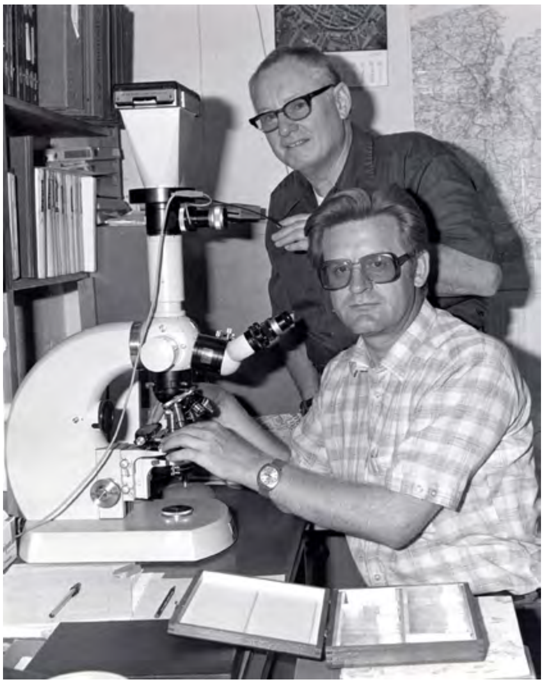
The Sublette family

Jim Sublette the chironomidologist

Jim published his first paper in the year I entered primary school (1955) and his last (in 2012) after I had retired. His works, and those co-authored by his wife Mary, have been with me throughout my career. By the time I started my PhD research in the early 70's, Jim's bibliography demonstrated how essential it was to understand the ecology of the species and systems in which the chironomids lived. It was Frieder Reiss, closer to me in age, who pointed out the importance of inclusion of the immature stages in our studies, pointing to Jim, Sam Roback and E.J. (Sepp) Fittkau from the previous generation as exemplifying the benefits of knowing the natural history. Of course, Frieder himself had come in to the field of chironomid systematics from a limnological ecological background too.

Jim's early papers ranged from what might be termed 'inventories', as in his studies of the benthos of Lake Texoma and an Ozark headwater stream, extending to catalogs of regional chironomid biotas (Alabama, California). These included descriptions of new life stages for already named species and description of new species. Jim understood the need for detailed study of nomenclature before naming new taxa, and to this end he studied the types of already described species across the USA. Not all ecologists turned taxonomists have so carefully checked not only the existing literature, but the type species. Thanks to Jim's model behaviour, North American chironomid workers had well-understood, carefully redescribed species on which to base their work.

The Sublettes did not decline the routine 'housekeeping' tasks of systematics such as the cataloging of regional biotas. Thus in 1965 Jim and Mary produced the Chironomidae chapter for *A catalog of the Diptera of America north of Mexico*, and 8 years later, contributed to the *Catalogue of the Diptera of the Oriental Region* (1973). To my mind they were unfortunate in the timing of these works, especially the North American work. Two schisms had not been reconciled at this time – the first concerned different nomenclatures that were applied on either side of the Atlantic, partially but not restricted to interpretation of Meigen's works and exacerbated by dilatory (in)action by the International Commission on Zoological Nomenclature. Henry Townes' brief flirtation with the Chironomidae was aligned with the interpretation that was eventually over-ruled - and this was followed largely by Jim and Mary in their catalog. A second issue was the reconciliation (or lack of) between the immature stages and adult-based classification. Despite Johannsen's work in the USA on the immature stages, and Jim's own strong understanding of the larvae and pupae, another gulf existed, which was really not reconciled until the multi-authored 'Holarctic keys' appeared in the 1980s. The two catalogs mentioned above were produced during this period of uncertainty concerning higher classification, and, to my mind, suffered accordingly. Never-the-less when in Ottawa with Don Oliver and Mary Dillon we brought the regional catalog into line with the newer generic concepts (published in1990); the Sublettes' species data was exceptionally thorough and accurate.



Jim Sublette and Friedrich Reiss, Portales, New Mexico, 1980. Photo: courtesy of Mary and Jim Sublette.

Taxonomically Jim's interests were broad, but with a special place for the genera *Chironomus* (often with Mary) and *Tanytarsus*, and he did not shirk from the extra-diverse *Cricotopus* or the little black orthoclads. Concerning *Chironomus* Jim and Mary worked closely with Wolfgang Wülker, Jon Martin and Malcolm Butler using a range of contemporary taxonomic tools including karyology and the then recently-developed scanning electron microscope to aid in understand this difficult, recently-radiating group. This interest extended right to the end of Jim's career with 3 of the last 5 papers he co-authored concerning the genus.

The studies of *Chironomus* exemplify Jim's eagerness to collaborate. Amongst other studies I see collaborations with W.W. (Bill) Wirth, Ole Sæther, Frieder Reiss and to a lesser extent Manabu Sasa, as important in extending the taxonomic and geographic range. The collaboration including a sabbatical in Bergen with Ole Sæther showed Jim's recognition of the narrower generic concepts applied well to the difficult Orthocladiinae that Jim had been rearing for years. His collections were immense and extraordinarily well curated as visitors to the post-retirement Sublette lab would find. Even the illness and subsequent death of Mary did not alter the scientific and personal hospitality shown to visiting chironomid systematists, as colleagues attest below. Jim surely was a mentor, friend and colleague to so many in the chironomid community.

An interest of Jim's known to many outside the midges was native fishes – and his most cited contribution to science is the book he wrote with Mary and M.D. Hatch, '*The Fishes of New Mexico*'. Less known was his interest into chironomid allergy in Japan – we met there in the late 1980s thanks to the beneficence of Manabu Sasa. I'm not sure we helped allergy sufferers but we spent happy days discussing midges, chironomidologists, Japanese customs; and his beloved south-western USA all very charitably.

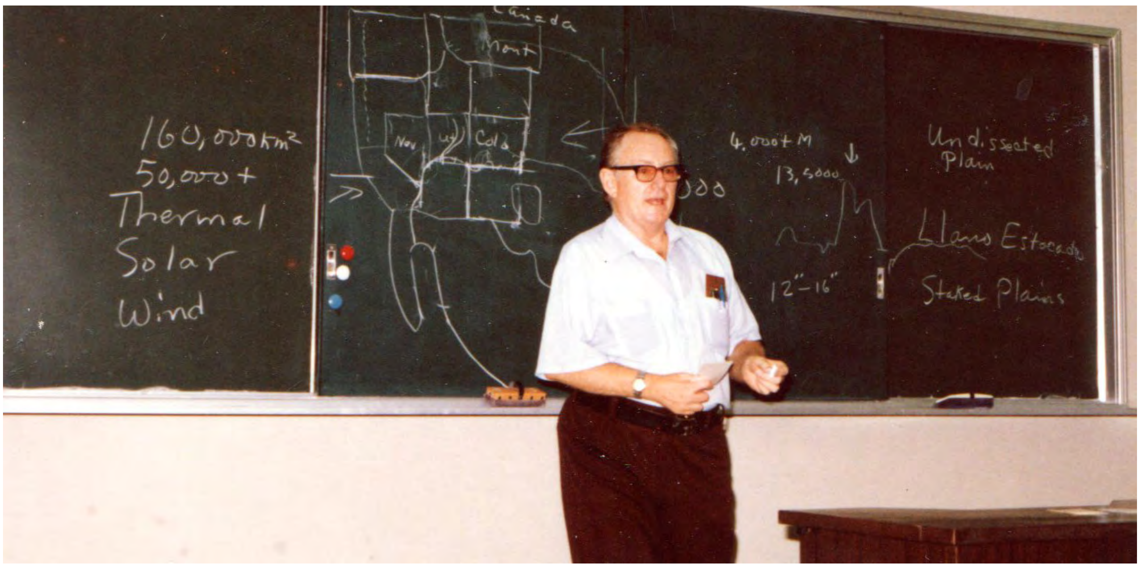
Jim prepared for his death in a very systematic manner – while at University of California, Davis, Jim sent me back several boxes of slides, both returned loans and donations of Californian midges. In 2012 he sent some 87,000 prepared slides of Chironomidae to the University of Minnesota, including many recognised, but undescribed, species. He chose here to house his collection because of his respect for Edwin Cook, the director of the University of Minnesota Insect Collection, who helped build it into one of the most important insect collections in North America. All of the slides from this donation have been scanned and digitized and are becoming available at www.insectcollection.org (requires password and login 'guest').

Peter S. Cranston, Canberra

Memories of Jim

I was greatly saddened to learn of the death of Jim Sublette, one of the kindest people I have ever met.

Perhaps some of the younger workers today do not realize the influence Jim had on North American chironomid work. During the 60's and 70's Jim went through the collections at the major museums in North America and redescribed many of the type specimens of species previously described by earlier workers. Some of these older descriptions were quite short and/or lacked useful illustrations of genitalia, etc., a problem that Jim's papers helped resolve. Jim and his wife Mary were pioneers



Jim Sublette lecturing at Eastern New Mexico University, c. 1975. Photo: courtesy of the Sublette family.

in the study of that vexing tribe, the Tanytarsini. University duties, other avenues ("The Fishes of New Mexico", etc.) and health concerns took much of their time, but many of these *Tanytarsus* species were finally described in a collaborative work with Torbjørn Ekrem in 2003. Many more species, in *Tanytarsus* and other tanytarsine genera, remain to be described; in several collections one can find specimens with labels that bear Jim and Mary's new names but these names are not currently available.

I was fortunate to first meet Jim in June of 1980, at his lab in Portales, NM. I was there to go through his collection for specimens of *Dicrotendipes* for my revision of the Nearctic members of that genus. Jim was his usual kind and generous self.

I next saw Jim and Mary at the 8th International Symposium on Chironomidae at Jacksonville, FL, in 1982 (that's me, when I still had hair on the top of the my head, standing next to Mary and Jim in the group photo).

My last visit with Jim and Mary was in 1995, at their wonderful house in Tucson, AZ. I had brought a large number of unidentified/undescribed Tanytarsini from the Southeastern US. We spent several days going over them – and enjoying some delicious meals! My wife Linda had a great time playing with some of the grandkids. Because my brother lived just a few miles down the road, I stayed with him and missed out on staying at Jim and Mary's nifty pool house!

Jim was the master of Nearctic *Chironomus*, and was always ready to help with identifications of this difficult genus – actually, Jim was ALWAYS ready to help with any problem! Jim was atypical for some of his generation, for he kept up on computer-related matters and was always easy to contact through email. He also took numerous SEMs of Chironomidae. I greatly treasure the print of the SEM he gave me of the gaping maw of a *Dicrotendipes crypticus* larva.

He will be sorely missed ...

J.H. Epler, Crawfordville, FL

In July 1961 I took a position at the University of California, Riverside, CA, USA. My contract was for a four year period, and I was to work under Dr. Lauren D. Anderson on studies of chironomid flies with the intent to control their numbers in various settings. Insecticides and biological control methods were investigated for their possible application.

Initially the taxonomy of our fly subjects did not play a major role in this project; I was informed that there were about five species involved. When, after some time, I pointed out that I had recognized at least thirty different species in the samples, I was offered the opportunity to be the "taxonomist" in our group. At that time only a handful of authoritatively identified specimens from California were available to me, so for my identifications I had to resort to what little pertinent literature was at hand. Since I was a novice at preparing and identifying specimens, it seemed wise to bring them to the attention of a more experienced authority who I hoped would be willing to evaluate my attempts at identification. That scientist turned out to be Dr. James Edward Sublette. Needless to say, I was delighted to learn from him that I was succeeding in this endeavor.

Jim Sublette & Saul Frommer, 2006. Photo: Saul Frommer.

Not long after our initial correspondence I encouraged Dr. Sublette to visit UCR, and this he did, accompanied by his wife, Mary. As some of you may know, Mary was also a close professional associate of Jim's, the two sharing the work necessary for any project Jim was involved in. We decided to meet at a restaurant in Riverside, and I will never forget that on this very first meeting with the Sublettes I was offered for study all of the material they possessed in the subfamily Orthocladiinae. Quite many taxonomists covet the material in their collections so much that it is not always obtainable for loan, yet this was not the case with the Sublettes, who were more interested in moving the science forward than in building and guarding their personal collection. Nevertheless I had to decline their offer, not only because I already had enough work at hand, but more because I felt too much like a fledgling researcher to contemplate such a task.

On one of Jim's early visits to UCR I introduced him to scanning electron microphotography. I was not using the technique myself, but felt that he would be interested in it for his research. A session with UCR's SEM technician was made, and it took no more than that initial trial to convince Jim of the technique's value. The rest is history, Jim took the ball and ran with it. At the time he was a dean in the zoology department of Eastern New Mexico University in Portales, and he managed to arrange for monthly scanning sessions at Los Alamos National Laboratory, New Mexico, where he could examine his Mücken (Jim really enjoyed using what he referred to as Milwaukee Plattdeutsch, a derivative of the Low German language). The work at Los Alamos enabled him to obtain fine illustrations for his publications; I recall in particular figures of larval heads and mouthparts.

From the time the Sublettes spent in Portales through the years they lived in retirement in various places, my wife and I would take short vacations to visit them. For me this meant visiting the Chironomid Oracle of the West. I could study slides and learn of literature that otherwise might not have come to my attention, and of course I could make and take copies. When my wife and I were involved in international folk dancing, Jim arranged for us to conduct a teaching session for interested students at his university. On another occasion he asked whether I would like to sort the university's fly collection, which was used for teaching entomology. This job brought to light an undescribed male belonging to a rare genus of Acroceridae that I could then trade for four other species to Dr. Evert I. Schlinger, a world authority on that fly family working at UCR at the time.

Over the years my wife and I came to cherish the Sublettes as part of our extended family, and this relationship lasted to the ends of their lives. Their passing has left immense holes in our hearts. They will be remembered always for their gracious sharing of knowledge and good humor. Our friendship lasted for more than 50 years and lives on in the form of memories of good times shared.

Saul I. Frommer, Murrieta, CA

The great senior among the world's chironomidologists, the witness and the participant of the early chironomid research ["...I had the pleasure of meeting Lenz in Vienna in 1959..." (from Jim's letter, July 2011)]. My chance of meeting Jim, sadly, passed, despite repeated invitations to Tucson. Jim was cheerful and gentle, always willing to encourage and to advise. He remains the perpetual inspiration.

Wojciech Giłka, Gdansk

I first made contact with Jim and Mary Sublette in 1966 while I was a NRC Post-doctoral fellow at the Entomology Research Institute (now Biosystematics Research Institute) in Ottawa, Canada. We arranged that my family and I should travel down to Urbana, Illinois, where Jim and Mary were studying the collection in the Illinois Natural History Survey, in August. From this meeting began a collaboration that continued for the next 47 years, leading to about 16 publications, often also involving Wolfgang Wülker.

Jim found funding for me to work with him for three months in Portales, N.M., when I finished my post-doc at Ottawa. As we prepared to leave Ottawa by car and travel the 3000 miles to Portales, a message came from Jim – could I detour via Prince Alfred National Park in Saskatchewan and collect specimens of *Chironomus rempelii*. So off we went (but only obtained adults) – a 3000-mile detour to our 3000-mile trip, but which enabled us to see parts of North America we would not otherwise have seen.

At this time Jim was Dean of Graduate Studies at Eastern New Mexico University and I was impressed at his ability to divide his time between administration, research and family - whichever he was doing it had his full attention. When he was in the lab he was always on the move, and always at a fast pace - due to his "high speed rear-end". I think one of the things Jim really regretted about the return of his polio, was the loss of his mobility.

While in Portales I learned much about chironomids from Jim and Mary often from a very different perspective from what I had learned from Don Oliver in Ottawa. However, it is to these three that I owe my knowledge of systematics, as all my training had been as a geneticist.

I visited Jim and Mary three more times in Portales, during which time I met other chironomidologists who came to visit Jim – Sepp Fittkau, Wolfgang Wülker, Gail Grodhaus, amongst others, but also gained introductions to many others through their contacts with Jim. Subsequently I visited in Colorado and Tucson, while we tried to distinguish the 100 or so species of *Chironomus*, particularly the *C. decorus* complex, now recorded from North America. Jim had very definite views about taxonomic nomenclature, which didn't always coincide with those of other workers. One of these was that pupae had exuviae, regardless of whether it was singular or plural. His nit-picking ensured a high standard for our publications.

When we visited the Sublettes we were always treated as family, being loaned cars, and sharing Thanksgiving and Christmas dinners with their family. It was a source of sorrow that Jim was not able to visit us in Australia so we could return the hospitality.

We continued to collaborate right up until the time of Jim's stroke – I had emailed him with a query about the day before it happened, although it was some time before I learned why I received no reply.

Jim's death is a great loss to the chironomid community, and for me the loss of a very good friend and valued colleague.

Jon Martin, Melbourne

Jim Sublette at his home in Scottsdale, Arizona, 2010. Photo: Jay Steeby.

The only time I met Jim and Mary in person was when I visited with them in Tucson for a week while working on southern California midges in the early 1990s. The purpose of our meeting was to exchange chironomid information and material, but the Sublettes were not the kind of people to limit encounters to that level, not even with someone they barely knew from just a little professional communication. It seemed the most natural to them to accommodate me in their home, let me use their outdoor pool (Arizona during the peak of summer!), chauffeur me to and from a repair shop when my car needed two days' worth of fixing, and to spend hours with me every day beyond those they could allot to scientific studies. Jim did all the kitchen work (I think this wasn't only because Mary was a bit unwell that week), and his cooking was memorably delicious (unlike that of many without any physical handicap). In the evenings, when they had time we would share pleasant stories about colleagues and places we knew, and some I didn't know. That week with Jim and Mary will always rank among the best of times I've spent in the company of colleagues.

Within the confines of chironomid science, the Sublette & Sublette team have earned our eternal reverence for their contributions to the field. Especially impressive here is their early and enduring prudence and readiness to produce resources useful not only to them, and to engage in the building of a research community in the best sense of this term.

Their legacy stands to remind us that our opportunity to walk and work this Earth among others should not be wasted on reaping what can be taken, but calls for us to join in the service of sowing, and providing for plates well beyond our own. So, here's to Jim for going so long and strong, and always with a smile for the giving, rather than giving in to fate or pain.

Martin Spies, München

We were fortunate to visit Jim and Mary at their house in Tucson at two occasions in May 2001 and February 2006. The hospitality was fantastic and we truly enjoyed our stays in their "pool house". Coming from the relatively cold and wet north, the heat and dryness of the Arizona desert was fascinating. – As was dipping in an outdoor pool that probably held more than 35°C to "cool off" in the evening.

Jim was fond of cooking and trying new food, and we greatly enjoyed preparing and eating home-cooked meals together with him, Mary and the Steeby family.

Despite his handicap, Jim was hard working and still going strong when we met. While in Tucson, we were impressed by his immense knowledge of the *Tanytarsus/Micropsectra* species we worked on and how much he remembered of each and every species, even if he had not worked on them for many years.

Jim and Mary's draft review of the Tanytarsini of the new world has been and still is a great resource for those of us studying this group of midges. Also, the Sublette collection is a fantastic resource for research on North American chironomids. We

Jim and Diego Suárez at Jim's home in 2010. Photo: Diego Añón Suárez.

were overwhelmed when we first visited Jim's lab to see all the boxes with slides and pinned specimens that filled the multiple rooms in their Tucson house. – And, maybe even more so when we were offered a long-term loan of the majority of the Tanytarsini specimens after our first visit. At our second visit we prepared several dozens of boxes of Tanytarsini slides and brought them with us on the return flight to Trondheim. They almost got stuck at the Phoenix airport, though, as an overambitious airline staff member claimed that dead chironomids on microscope slides had to constitute a security threat or illegal export. Not even the assurance from her supervisor seemed convincing, but our big box of midges finally was accepted as check-in luggage.

We think back at our visits in Tucson with joy and regret that we did not have the chance to meet with Jim the last couple of years. He really wanted to attend the 18th International Symposium on Chironomidae in Trondheim in 2011, but travel just became too difficult. We will always remember Jim as a good friend and colleague. He might not be with us anymore, but his legacy will live through his publications, collection and our good memories.

Elisabeth Stur & Torbjørn Ekrem, Trondheim

I was lucky to have the opportunity to meet Jim in 1999 after meeting of North American Benthological Society in Duluth. I planned to visit an Argentine friend in Tucson and John Epler recommended me to visit Jim. Since then, we had a pretty close friendship despite the distance, and I returned to Tucson during 2001 to work with him. It was Jim who taught me to process and identify exuviae that I collected in Bariloche. At that time I had the opportunity to meet his family with whom I shared very nice moments. Besides from working, I cooked some Argentinean dishes for them. At the same time I met and shared good times with Torbjørn and Elisabeth, who appreciate it. I returned to Tucson in 2010, when Mary his wife was no longer with us, and we were working together on the description of a new genus from alpine lakes of Patagonia. I accepted Jim´s invitation to stay with him for a couple of weeks, sharing work and talking about life and also sharing food and "mate". Besides being a thorough professional from whom I learned a lot, Jim was for me a very warm human being, affectionate, and very interested in culture, beyond science. During my working hours with him, we share many conversations about the customs of our respective countries, different kinds of food, places of the world, etc. etc. In fact during my stays at his home, he liked and enjoyed several dishes from Argentina that I cooked.

Despite the newness of our contact and the short time we shared, we maintained frequent contact by email or Skype. I always felt Jim to be a friend and I miss him. This brief reminiscence is for Jim, the Great Bear White (Gran Oso Blanco) as he called himself. Thanks for all, dear Jim.

Diego Añón Suárez, Bariloche

I was Jim Sublette's student while he taught at Colorado State University, Pueblo (formerly University of Southern Colorado) a primarily undergraduate institution. Students at CSU, Pueblo had little experience seeing research in action. Jim wove anecdotes and lessons on research into most of his lectures, so that students came to understand

Jim near the house of his brother, Shafer Lake, Indiana, 1964. Photo: Wolfgang Wülker.

the nature of research. I am so glad that I had Jim as a professor, although I never took an Entomology class from him. Instead I took Ichthyology and found him to be an engaging and fascinating lecturer, to the point that I hung on his every word. He also became my role model for combining teaching and research. However, it was not until I started teaching at a small undergraduate institution that I came to understand how unique he was in being such an accomplished researcher while maintaining a heavy teaching load. Professors at small institutions often do all of their lecture and laboratory preparation and grading without the assistance of graduate student teaching assistants. They do most of their research without fellow researchers or graduate research assistants, although Jim was very fortunate to have a collaborator in his wife, Mary. What I have come to find is that he must have done his research on top of his full time job teaching. His valuable body of work was conducted in the corners of his days, his evenings, and his weekends. His legacy stands as an inspiration to those of us who continue to study Chironomidae in the crooks and crannies of our days.

Barbara Hayford, Wayne NE

Dear Jim!

I remember your slogan "Better to be a big fish in a small pond than to be a small fish in a big pond". Indeed, you were a big fish although not in a small pond! We have known each other since 1959 and remained in contact through email until middle 2012 – a long time. You reported in your emails from "Tucson Sunday" or "Tucson Thursday", I was so happy to get these notes. Also, in your last year you described together with Diego Suárez the genus *Wuelkerella* from a cold lake in Argentina – big honour and proof of our long friendship. Through the years we had many meetings in USA, Norway and Germany. In 1964 you sponsored an unforgettable trip for family Wülker through the USA, from Indiana (see photo) west to the Pacific coast and back east to Portales, covering Niagara Falls, Yellowstone and Grand Canyon. Big impressions for me, my two sons aged 7 and 8 and their mother. Many chironomids were collected, which Mary brought on slides in many boxes!

You and dear Mary were a highlight in our life. I remember Mary said that we are like twins, which we indeed were – at least in a scientific sense. We will miss you both! You can look back on a voluminous work, which your daughter Amy described so completely. Fare well! Yours, Wolfgang.

Wolfgang Wülker, Freiburg

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In memory of Ole Anton Sæther (1936 – 2013)

Professor emeritus Ole A. Sæther died January 8 this year. His death did not come as a surprise as he had been fighting cancer for several years. He had his retirement office at the Department of Natural History, University Museum of Bergen and was working with his chironomids until shortly before his death.

Sæther was born in Kristiansand in southern Norway in 1936. He enrolled at the University of Oslo in 1955 and obtained his master degree (cand. real.) in 1963. From 1961 to 1966 he was employed, first as assistant professor, later as university lecturer at the Department of Limnology, University of Oslo. From 1966 to 1977 he worked as research scientist at the Freshwater Institute in Winnipeg, Canada. In 1977 he was appointed professor in systematic zoology at the University of Bergen, a position he held until his retirement.

Sæther specialized in aquatic Diptera, especially Chironomidae and Chaoboridae. He penned about 270 academic publications and authored or co-authored 3 subfamilies, 42 genera and nearly 400 species, mostly chironomids. Most of his publications are concerned with descriptive and analytical systematics, but several of his studies are also treating the use of chironomid communities to characterize lakes and to monitor environmental change.

Ole Sæther with Len Ferrington at the 17th International Symposium on Chironomidae in Tianjin, China, 2009. Photo: Ian Walker.

Sæther's work on comparative morphology and terminology of the larval mouthparts and the male and female genitalia in chironomids and other Nematocera is among his most important scientific contributions. His glossary of chironomid morphology terminology is now a standard text for chironomid descriptions. He was also a major contributor to the three volumes with complete diagnoses and keys to the larvae, pupae and male adults of Chironomidae of the Holarctic region; a second edition of the larvae key was printed in 2013 after his death.

Phylogenetic theory and cladistic analyses have been two of Sæther's main areas of interest through most of his career. His taxonomic experience with a morphologically highly complex taxon combined with the efforts of implementing Hennigian phylogenetic thinking in chironomid systematics, made him believe that character evolution was more complex than originally anticipated in phylogenetic theory. This belief led Sæther to advocate the idea of "underlying synapomorphies", a concept introduced by Lars Brundin as "inside parallelism". An underlying synapomorphy is regarded as the potential capacity of a character to develop into an apomorph character state, and is unlike parallel selection caused by inheritance.

Several of Sæther's recent publications concern the zoogeographical patterns found in chironomids. In addition to the well-known transantarctic Gondwanan pattern there are, among others, a northern Gondwanan or Inabrezian connection and an Afrotropical - South Asian connection often extending to East Asia and / or Australia. Through numerous studies, Sæther has showed the importance of using phylogenetic hypotheses as backbones in zoogeographical analyses.

Sæther participated on several projects and expeditions to Asia, Africa and South- and Central America. Together with master and PhD students from Norway, Ghana, China and Brazil he revised several genera of Orthocladiinae and Chironominae and described many new species. Throughout his career, Ole Sæther was always willing to help those of us who have asked for assistance and guidance in species identifications and phylogenetic analyses. He was an active participant in the chironomidologist community, and participated in all international chironomid symposia since the 4th in Ottawa in 1970.

A list of Sæther's publications from 1962 to 2006 was given by Ekrem & Andersen (2007). Publications from 2007 to 2013 are listed below.

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Ekrem, T. & Andersen, T. 2007. Professor Ole Anton Sæther 70 years: four decades of chironomid research. In: Andersen, T. (Ed.) *Contributions to the Systematics and Ecology of Aquatic Diptera – A Tribute to Ole A. Sæther.* The Caddis Press, Columbus, Ohio. Pp. 1-15.

Ole A. Sæther : List of publications 2007-2013

2007

Przhiboro, A. & Sæther, O.A. 2007. *Limnophyes* (Diptera: Chironomidae) from northwestern Russia. – *Aquatic Insects* 29: 49-58.

2008

Sæther, O.A. & Oyewo, E.A. 2008. Keys, phylogenies and biogeography of *Polypedilum* subgenus *Uresipedilum* Oyewo *et* Sæther (Diptera, Chironomidae). – *Zootaxa* 1806: 1-34.

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2009

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Sæther, O.A. 2009. *Cryptochironomus* Kieffer from Lake Winnipeg, Canada, with a review of Nearctic species (Diptera: Chironomidae). – *Zootaxa* 2208: 1-24.

Fu, Y., Sæther, O.A. & Wang, X. 2009. *Corynoneura* Winnertz from East Asia, with a systematic review of the genus (Diptera: Chironomidae: Orthocladiinae). – *Zootaxa* 2287: 1-44.

2010

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2011

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In Memory of Nikolai Ivanovich Zelentsov (1941–2012)

Nikolai Ivanovich Zelentsov.

Nikolai Ivanovich Zelentsov passed away suddenly on October 31, 2012 in the 72nd year of his life. He was a wonderful person and an outstanding scientist.

For many years, since the 1980s, we were friends with Nikolai Ivanovich. He never told us anything about his childhood, parents, or home life, always turning the corresponding questions into a joke. He was amazingly modest. His colleagues from the Institute of Biology of Inland Waters, Russian Academy of Sciences, helped us with the facts about Nikolai Ivanovich, allowing for more completely reconstructing his portrait.

N.I. Zelentsov was born on May 13, 1941 in the village of Spas (Danilovskoe raion, Yaroslavl oblast) to the family of a worker. His dad was killed in action in 1942. The hard life in a fatherless family during the postwar years left a mark on all further life of little Nikolai. From his childhood, he had to encounter the burden of long hours on the farm and bitter taste of fatherlessness. In 1948, Nikolai entered the Vakhtino secondary school, founded in Spas Village in 1918 and named after the Red Army.

The family had many children. Of all these children, Nikolai Zelentsov, who graduated in 1959, was the most diligent. Until the September of 1960, he worked on a collective farm as a machinery operator and then was in the Soviet Army to the August of 1963. Since his childhood, Nikolai Ivanovich was fond of animals and entered the Leningrad Veterinary Institute as a full-time student in 1963 immediately after his military service. Nikolai Ivanovich for the first time got acquainted with the Institute of Biology of Inland Waters, USSR Academy of Sciences, when he was sent there for his pregraduate research training. During this training, he was involved in studies of the biology of fish gill parasites.

After graduating from the Veterinary Institute in 1968, Nikolai Ivanovich was sent to work to Borok, where he came to know scientists working at the Institute of Biology of Inland Waters. Under the guidance of Alevtina Ivanovna Shilova, a candidate of biology at that time, a well-known expert in chironomids known in this country and abroad, Nikolai Ivanovich started his work as a senior laboratory assistant and then as a researcher with the Laboratory of Zoology, later renamed the Laboratory of Biology and Systematics of Aquatic Invertebrates.

From reminiscences of T.D. Zinchenko for this period of Zelentsov's life: "I met Nikolai Ivanovich in the house of Nina Yur'evna Sokolova (the scientific guide for my candidate of science dissertation and later, a reviewer for Zelentsov's dissertation). Later, being a postgraduate of Moscow State University, I had to leave Moscow for Borok during the Moscow Olympic Games. This coincided with the preparation of my candidate dissertation. At that particular time, bringing with me a big box of samples, books, and bibliographic cards and having arrived at the Institute of Biology of Inland Waters, I immediately found myself under the wing of Nikolai Ivanovich. He helped me with accommodation by giving me the keys for the apartment of a friend of his, who was away at that time, so that I would not spend my allowance on a hotel. A.I. Shilova gave her permission for Nikolai Ivanovich to work with the chironomids of the subfamily Orthocladiinae, which I sampled in the water pipeline weeds of the Uchinskii waterway. Over the whole month, we identified larvae, pupae, and imagoes and examined the perfect slides, made by Lyudmila Smirnova, a laboratory assistant to Shilova. We devotedly and enthusiastically studied the poorly identifiable species. Later, Nikolai Ivanovich confessed to me that it was the beginning of his creative life as well. Later we frequently met in Moscow at Sokolova's place; ever so often, after scientific talks and discussions of

N.I. Zelentsov with colleagues on Conference of Russian chironomidologists (second from left side in first row). Borok, Yaroslavl Region, Institute of Biology of Inland Water, Academy of Sciences of the USSR. October 1983(?).

papers on chironomids, Nikolai Ivanovich fixed something in her apartment. He was a Jack-of-all-trades and an unattainable authority for me".

In 1985, Nikolai Ivanovich defended his candidate of science dissertation at the Chair of Invertebrate Zoology with Lomonosov Moscow State University titled *Systematics and Biology of Orthocladiinae (Diptera): The Genera Psectrocladius Kieffer and Stackelbergina Shilova et Zelentzov.* His dissertation involved systematics and biology of Orthocladiinae, a poorly studied chironomid subfamily, and for most species he examined not only imagoes, but also preimaginal stages.

Zelentsov studied the chironomid fauna in various regions of Russia and adjacent countries and was one of the leaders in the classical systematics of chironomids. Shilova and Zelentsov pioneered in making the annotated lists of chironomids for aquatic bodies of three regions, namely, subarctic part of the Krasnoyarsk krai (206 species), Severnaya Dvina River system (63 species), and Upper Volga River basin (259 species). In these regions, they discovered four previously unknown species as well as six genera and 69 species earlier not encountered in Russia.

Totally, Nikolai Ivanovich described two previously unknown genera and 13 species as well as revised many earlier described species and genera in the majority of cases providing comprehensive morphological descriptions for larvae and pupae too. All the corrections introduced by Zelentsov have been regarded as justified and added to the catalogs and keys to Holarctic and Palearctic chironomids.

Nikolai Ivanovich participated in the preparation of the *Guidance Manual for Chironomid Study* and is coauthor of two monographs, *The Midge Chironomus plumosus L. (Diptera, Chironomidae)* and *The Atlas and Key to Karyotypes and Morphology of the Chironomiini Tribe Larvae.*

Numerous specialists, postgraduate students, and applicants visited Nikolai Ivanovich to be consulted or trained in the issues associated with the Orthocladiinae biology and systematics, sampling technique, and cultivation, and he always shared his unique knowledge and rich experience. However, let's face it: not all of the persons who were consulted Nikolai Ivanovich acknowledged him in their papers. One cannot but listen to his advice. First and foremost, his colleagues recall a wonderful and cheerful personality, always friendly and delicate, who loved people and was true to his friends. Gentleness and eager assistance in any situation were his redeeming features. These features of his were most pronounced in field expeditions. During his trips to Astrakhan in 1982–1984, Nikolai Ivanovich collected chironomid imagoes in the Volga Experimental Fish-Breeding Plant in ponds, floodplain water bodies, and estuarial lakes. The staff eagerly became his devoted assistants, taking part in sampling and listening to his discourses on these insects. Nikolai Ivanovich tackled any heavy work, helped in "resolving" difficult situations, gave wise and good advice. The colleagues recollect that his open radiant smile extinguished any coming conflicts and revived spirits in most desperate situations. There was no person ill-disposed towards Nikolai Ivanovich. The colleagues in the lab trusted, respected, and adored Nikolai Ivanovich, regarded him as the fairest, most reliable, and generous person in the team. His diligence was amazing as well as the reliability and quality of his papers were admirable.

Zelentsov has stockpiled priceless material on several previously unstudied regions and succeeded in processing a considerable part of it. Unfortunately, eye problems interfered with the planned generalization of the overall data (many issues remained in draft sketches).

Nikolai Ivanovich deeply loved the wildlife of his native land, Yaroslavl area, was very fond of fishing, gathering mushrooms, and berries. The talks with him were always interesting and useful. Despite that deterioration of vision hindered examination of slides, Nikolai Ivanovich continued to participate in field work, the last of which took place on the Kama River. Whenever his colleagues called him, Nikolai Ivanovich said that he felt well and always wished them good health, saying "Be careful, Tatiana Dmitrievna, Evgenii Anatol'evich, or Margarita Mikhailovna (Aleksevnina), etc.", while they replied, "Take care of yourself, of your eyes, our beloved Nikolai Ivanovich, all of us need you so much!"

Nikolai Ivanovich was an attentive family man and loving husband, father, and grandfather. He devoted his inexhaustible supply of love, faithfulness, and industry to his family.

It is an infinite sorrow to recognize that Nikolai Ivanovich is not with us now, but we will retain the bright memories about this kind and good personality and an outstanding scientist.

May the memory of our friend, colleague, and great scientist – Nikolai Ivanovich Zelentsov – be imperishable.

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Chaetocladius makarchenkovi Zelentzov, 2007

Cricotopus breviantennatum Zelentzov, 2001

Cricotopus shilovae Zelentzov, 1989

Cricotopus trilobatus Zelentzov, 1997

Limnophyes sokolovae Zelentzov, 1997

Orthocladius (s. str.) *multidentatus* Zelentzov, 1991

Propsilocerus taimyrus Zelentzov, 2000

Psectrocladius (s. str.) *delatoris* Zelentzov, 1980

Psectrocladius (s. str.) *fabricus* Zelentzov, 1980

Psectrocladius (s. str.) *sokolovae* Zelentzov et Makarchenko, 1988

Stackelbergina Shilova et Zelentzov, 1978

Stackelbergina praeclara Shilova et Zelentzov, 1978

Chironomid taxa named after N.I. Zelentsov

Diamesa zelentzovi Makarchenko, 1989

Psectrocladius (s. str.) *zelentzovi* Makarchenko, 2003

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Summary from the 12th International workshop on subfossil Chironomids, New Forest, UK

Figure 1. Participants at the workshop. Photo: Peter Langdon.

In June 2013, 40 scientists (Figure 1) met in the New Forest to attend the 12th International workshop on subfossil chironomids. This meeting, hosted by the University of Southampton, brought together researchers from Europe, North America, South America and Asia. This workshop setting fosters coherence and cooperation within the subfossil chironomid community and provides an invaluable opportunity for introducing new researchers to the field. The workshop series began in the mid-1990s, with the most recent meetings being held in Iceland (2007), Denmark (2009) and Norway (2011). The purpose of this workshop was to exchange ideas, discuss new developments in the field and to unify subfossil chironomid larval taxonomy and methods.

The meeting was organised by **Pete Langdon** (University of Southampton) and **Steve Brooks** (Natural History Museum). The Quaternary Research Association and the PAGES (Past Global Changes) project sponsored the event, providing attendance bursaries for a number of workshop delegates.

The meeting was held over three days, and was split into seven sessions designed to cover all aspects of subfossil chironomid research, with additional practical sessions on taxonomy and statistics.

Day 1

The workshop commenced with a social icebreaker pre-dinner walk, providing an opportunity to observe New Forest wetlands, heathlands and ponies. Due to the lack of sunshine, the anticipated dragonflies failed to make an appearance, much to the disappointment of Steve Brooks!

Day 2

Session one, "*Temperature inferences*", contained presentations on chironomid-inferred temperature records from around the world. **Nelleke van Asch** (Utrecht University) started this session with a talk entitled "Last Interglacial summer temperatures inferred from fossil midges", and focused on the differences in chironomid and vegetation based temperature reconstructions. Nelleke discussed the possibility that these differences may reflect responses to different seasonal temperature regimes, underlining the importance of using a multiproxy approach. The following talks in this session covered progressively younger time periods, with **Julieta Massaferro** (Consejo Nacional de Investigaciones Científicas y Técnicas) presenting the first chironomid-inferred temperature reconstruction from Patagonia, which indicated that a cool period occurred between 14.5 and 11 cal kyrs BP, encompassing both the Atlantic Cold Reversal and the Younger Dryas. Next, both **Angela Self** (Natural History Museum) and **Larisa Nazarova** (Alfred Wegener Institute) individually presented Holocene and Late Holocene climate records, respectively, from various sites in Kamchatka, Russia. These records show the influence of global teleconnections driving cooling at 5.5, 3.5, 2.7 ka, but also the local influences of forest development and volcanic ash deposition. A high-resolution multi-proxy record from Sweden, covering the last millennium, was presented by **Annika Berntsson** (Stockholm University), which showed the strong influence of precipitation. The session concluded with a talk by **Steve Brooks** (Natural History Museum), who demonstrated the close similarity between a chironomid-inferred temperature record and meteorological records despite the lake being industrially impacted and eutrophicated.

The theme of the second session of the day was "*Training sets and transfer functions*". This session began with a talk by **Stefan Engels** (University of Amsterdam) who illustrated, with a New England chironomid lake depth dataset, how training set selection, taxonomic resolution and taxa deletion can be critical in influencing model performance and reconstructions. **Alberto Arenada** (Universidad de Concepcion) presented his work on developing a chironomid-based temperature training set for Chile, and **Frazer Bird** (Open University) described preliminary results of similar work in the Bolivian and Peruvian Andes. Both studies suggest temperature is a driver of chironomid abundance and distribution in these regions, but further work is required to generate an inference model with adequate performance statistics. **Eleanor Maddison** (Durham University) spoke about her new Greenland chironomid training set, and demonstrated that it has potential for reconstructing air temperature with existing Greenland chironomid records.

The third session continued the "*Training sets and transfer functions*" theme. **Steve Juggins** (Newcastle University) presented his critical evaluation of the use of transfer functions in palaeolimnological quantitative reconstructions, which included more stringent ways in which the data should be tested to evaluate the performance of the inference model and the reliability of reconstructions by identifying the effects of confounding secondary variables. Next, **Richard Telford** (University of Bergen) spoke about his work "Identifying lakes with potential for good temperature reconstructions". In the following talk **Oliver Heiri** (University of Bern) discussed recent criticisms of environmental reconstructions and transfer functions using chironomids and concluded that cross-validation of results from other sites or against other independent proxies is an appropriate way to validate chironomid-inferred reconstructions. This session culminated in a lively discussion on the use of chironomids in reconstructing past temperatures and ways to validate reconstructions in the future.

With the talks concluded for the day, two practical sessions ran simultaneously: an informal subfossil taxonomy session and an R-tutorial, run by Richard Telford (University of Bergen) and Steve Juggins (Newcastle University). The final task for the day was to look at a range of interesting research posters, accompanied with a glass of something from the bar.

Day 3

With a move away from training sets, transfer functions and temperature reconstructions, the theme of the fourth session was titled "*Crossing environmental gradients*". The session opened with a talk by **Andrew Medeiros** (Wilfred Laurier University) which explored nutrient and productivity gradients in Arctic lakes using chironomids and geochemistry, and demonstrated responses of certain chironomid taxa to climate-driven changes in carbon and nitrogen, which lagged direct temperature responses by other chironomid taxa. Next, **Guillermo de Mendoza** (University of Barcelona) showed that temperature is the ultimate environmental driver of chironomid species distributions in the mountain lakes of the Pyrenees, although temperature may act indirectly through other environmental and physical variables. **Petr Paril** (Masaryk University) presented preliminary chironomid results from a palaeolake in the Vihorlat Mountains, the first study of its kind in Slovakia, covering the late-glacial to Holocene transition. Next, **Christopher Luszczek** (York University, Canada) presented a study of chironomid communities from south-western Hudson Bay, the southernmost treeline in the world, which showed trends towards species typical of warmer, more productive conditions over the last 30 years. To close this session **Enlou Zhang** (Chinese Academy of Sciences) spoke on his extensive work compiling a huge database of modern chironomid communities from northern China and central Mongolia.

The fifth session, "*Trophic changes and human impacts*", began with a fascinating talk by **Roberto Quinlan** (York University, Canada) on the most polluted lake in America (Onondaga Lake, New York State), describing the widespread human disturbance of the lake's watershed and related changes in the chironomid assemblages. **Wing Wai Sung** (Natural History Museum) spoke on differentiating the effects of drought, temperature and nutrient enrichment on the biota of a Danish lake using a multiproxy approach and meteorological records, and **Pete Langdon** (University of Southampton) demonstrated how time-series analysis of palaeolimnological data from a nutrient-enriched lake in China could be used to test ecological theories on the mechanisms driving alternative stable states and provide early warnings of critical ecological transitions. This was followed by a talk by **Katherine Hesketh** (University of Southampton) who is using a multiproxy approach to assess sediment and nutrient accumulation in order to establish baseline conditions in sub-catchment lakes of the River Itchen, Hampshire. **Assia Fernane** (Université Bretagne Occidentale) spoke on how chironomids are being utilised to determine past positions of coastlines in Brittany, France, by their response to salinity changes in river estuaries. This session was concluded with a talk by **Subodh Sharma** (Kathmandu University) on the challenges of sampling high altitude Himalayan lakes in Nepal and their potential for chironomid studies to investigate environmental change in this poorly studied region.

A session on "*Stable isotopes*" started with a presentation by **Kimberley Davies** (University of Southampton) who discussed the potential of chironomids as indicators of lake methane production in Arctic thermokarst lakes through the analyses of stable carbon isotopes from chironomid head capsules. **Maarten van Hardenbroeck** (University of Bern) followed with a talk on taxon-specific stable carbon isotope values in chironomid larvae and head capsules, and showed that in general profundal chironomids were typically more depleted in $\delta^{13}C$ than littoral taxa. **Ladislav Hamerlik** (Matias Belius University) concluded the session by discussing microhabitat influence on chironomid community structure and $\delta^{13}C$ signatures in the low Arctic (West Greenland).

Gaute Velle (University of Bergen) opened the final themed session, "*Biodiversity and lake restoration*", with a talk discussing biodiversity changes in European freshwaters over the last 30 years. The talk focused on the recovery of lakes and rivers post-acidification from the 1980s onwards, with preliminary results indicating a general trend of increasing biodiversity. The last presentation of the meeting was given by **Isabelle Larocque-Tobler** (The LAKES Institute) on restoration of Lake Muzzano in Switzerland, which suffered significant fish kills in 1967 and 1994 due to *Microcystis* blooms. Isabelle discussed a holistic approach to the problem.

The last day of the conference concluded with a further taxonomy session and R-tutorial, and was swiftly followed by speciality drinks for all from China, Chile and Canada. The workshop finished in style with an impromptu 'disco', with a variety of music provided by members of the gathering.

On behalf of everyone that took part, I would like to thank Pete Langdon and Steve Brooks for arranging this invaluable workshop. The location and date of the 13th international workshop on subfossil Chironomids is still to be decided upon, but may be linked to the next International Palaeolimnology Symposium to be held in China in 2015.

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Current Research

New chironomid pupal types from Norway, one with a male pharate adult: *Pseudosmittia paraspinispinata* n.sp.

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Abstract

Three new pupal types from Norway are described, one with an associated male: *Pseudosmittia parspinispinata* n.sp.

Introduction

Following the International Symposium on Chironomidae in Trondheim, VS collected some pupal exuviae for PHL in lakes and streams around Stugudalen, many hitherto unrepresented in PHL's reference collection, two pupal types of Orthocladiinae not represented in Langton (1991) or Langton and Visser (2003) and a *Micropsectra* (Chironominae, Tanytarsini) not keyed in Stur and Ekrem (2006). These new forms are here described: anyone visiting the Stugudalen area in July is alerted to the need to obtain associated adult male material of the unnamed forms. Terminology for pupae is as in Langton (1991), except that T is the abbreviation for taeniae instead of S, and terminology for adults as in Sæther 1980. (Note: In conformity with Langton (1991) the apical transverse band of a tergite, though in many cases separated from the tergite by a narrow band of unsclerotized integument, so that it can be tucked under the tergite, is not considered to be conjunctival in origin. Thus armament that may appear to be situated on conjunctive III/IV is described as the apical band of tergite III.)

Descriptions

***Cricotopus (Cricotopus)* Pe18**

A detailed description of this form is unnecessary as it keys to *C. (C.) annulator* in Langton (1991) and Langton and Visser (2003). So closely does it resemble the exuviae of *C.(C.) annulator*, that routine inspection could overlook the strong, thumb-shaped projection, often pointed at tip, on the posterior thoracic mound (Figure 1). No intermediates were present in the collections and many hundreds of *C. (C.) annulator* exuviae have been examined since and none has shown even an incipient projection on the posterior thoracic mound. It is possible that this species could be only a local form of *C. (C.) annulator*, but in the authors' opinion, it is more likely to be distinct as the character has not been recorded for any other *Cricotopus* species.

Figure 1. Two examples of the posterior thoracic mound of *Cricotopus (Cricotopus)* Pe18. (scale line = 0.1mm)

Collection sites: Vestre Rotåa river, 3.3km SE of Stugudalen (62º53'41.23''N, 11º56'23.92''E), common; a small meandering brook 4km SE of Stugudalen (62º53'39.76''N, 11º57'36.38''E). (It is noted that all *C.(C.) annulator* collected at the same time in the Trondheim area (PHL) were typical.)

***Pseudosmittia paraspinispinata* n.sp.**

The collection from a lake between Storsola and Ekonhammeren, 7.8 km E of the Nedalshytta cottage (62˚02'54.82''N,12˚14'50.95''E) contained a number of pupal exuviae (paratypes) and a pharate adult male (holotype; to be deposited in NTNU-VM: Department of Natural History, University Museum, Norwegian University of Science and Technology, N-7491, Trondheim) of a species of *Pseudosmittia* not described in Saether and Ferrington's (2011) revision of the genus.

Etymology. Greek *para-*, meaning close to, and *spinispinata*, a species described by Ferrington and Sæther (2011).

Pupal exuviae.

Total length 3.15-3.8mm (m., n=5), 2.7, 2.9mm (f., n=2). Cephalothorax and abdominal tergites pale brownish yellow.

Cephalothorax: frontal apotome rugose. Frontal setae absent. Thoracic setae difficult to make out: maps about 45µm long and longest dcs about 90µm long. Apex of antepronotum smooth.

Abdomen: Tergite I armed with small points laterally; II-VII covered with points, the anterior and posterior transverse bands joined medially by smaller points (Figure 2); VIII with only the anterior transverse band, the posterior band reduced to a few small points medio-laterally. Apical bands present on tergites II-VI, breadth about 0.18 segment width, but poorly developed on II , of 0-16, 17-46, 42-52, 16-49, and 34-48 points respectively (n=3). Sternites I-IV unarmed, V with an anterior band of minute points and a meagre posterior transverse band of similar points; VI and VII with similar armament, but progressively the points are a little larger and the bands more extensive; VIII with the anterior band only. Sternites II-VII with apical point bands of similar extent to those dorsally, of 0-5, 21-90, 83-99, 104-109, 81-104 and 0-97 points (n=3). Anal macrosetae absent. Male anal segment ending dorsally in a pair of crumpled projections, unarmed or with a very few minute points medially. Male genital sheaths about 1.4 times as long as the anal segment (Figure 3). Female anal segment rounded posteriorly, armed with a few small points medially, genital sheaths exceeding the apex of the segment by half their length.

The pupal exuviae run to couplet 12 (*P. baueri* Strenzke/ *P. danconai* (Marcuzzi)) in Saether and Ferrington's revision, but the sternal apical band IV has 17-34 points in *P. baueri* and in *P. danconai* 0-14 points, whereas in *P. paraspinispinata* there are 80 or more (83-99, n=3) (the pupa of *P. spinispinata* is unknown).

Adult male (n=1 pharate).

Wing length 1.7mm (derived from pupal wing sheath length (Langton, 2002)). Colour brown; head and thorax darker than abdomen.

Head. AR 0.96. Terminal flagellomere about 200µm long. Temporal setae 6 (0 inner verticals, 6 outer verticals). Palpomere lengths (in µm): 24, 20, 60, 72, 100.

Thorax. Antepronotal lobes narrowed medially, no lateral setae visible. Dorsocentral setae 7, acrostichals ?7, prealars 6. Scutellum with 8 setae.

Legs. Spur of front tibia 30µm long, spurs of middle tibia 20,16µm, of hind tibia 30 and 24µm with

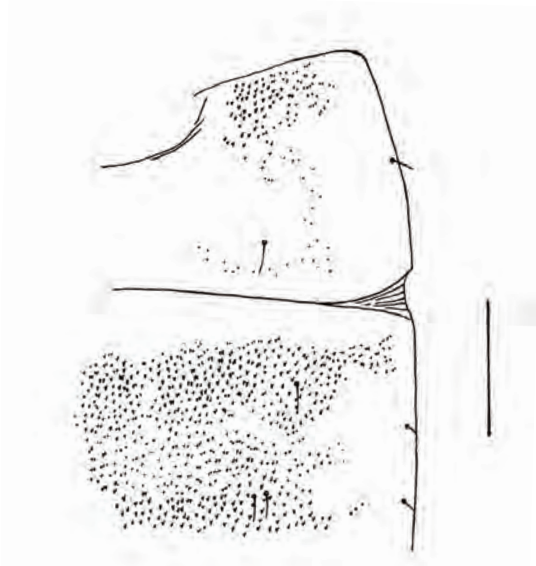

Figure 2. *Pseudosmittia paraspinispinata* n.sp. pupal exuviae, armament of tergites I and II. (scale line = 0.1mm)

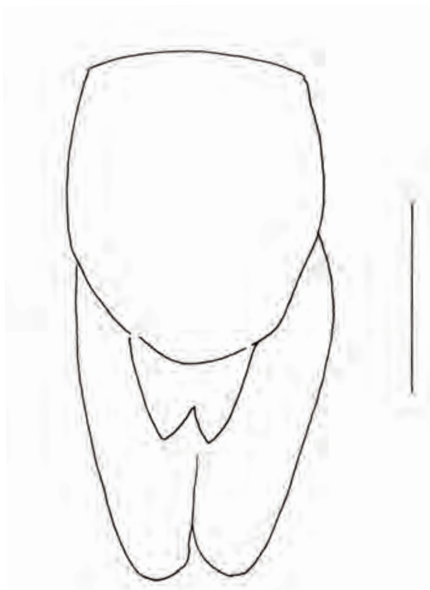

Figure 3. *Pseudosmittia paraspinispinata* n.sp. pupal exuviae, male segment IX, dorsal. (scale line = 0.1mm)

comb of about 20 setae (normal), the other tibia with three spurs 40, 30 and 20µm, the third associated with a comb of 3 setae (abnormal). Width at apex of front tibia 30µm, of mid tibia 36µm, of hind tibia 40µm. Front LR 0.25.

Hypopygium (Figure 4). Anal point absent; the raised, pubescent, rounded boss on tergite IX on which the anal point is based in *spinispinata* (Saether and Ferrington, loc.cit. Fig. 57F) is present; tergite IX with 16 setae. Virga a long strong spine, apparently composed of a number of fused spines, about 44µm long, and a row of small spines near its apex. Gonocoxite 200µm long; superior volsella emarginate, with a few small setae dorsally, reaching 0.6 gonocoxite length, smooth, thumb shaped inferior volsella and pubescent accessory lobe well developed and reaching to 0.6 and 0.8 gonocoxite length respectively. Gonostylus 80µm long; megaseta 7µm long.

The adult male of *P. paraspinispinata* runs to couplet 2 in Ferrington and Sæther (*spinispinata* n.sp and *gracilis* (Goetghebuer)) The present species has the long virga, strong accessory spines and AR of *P. spinispinata*, a species described from a single male collected in South Carolina, U.S.A. *P. paraspinispinata* differs from *P. spinispinata* in not having an anal point and having a much lower fore leg ratio: 0.25 as against 0.40-0.44 in *P. spinispinata* (any stretching of the fore leg on eclosion would only reduce the LR further).

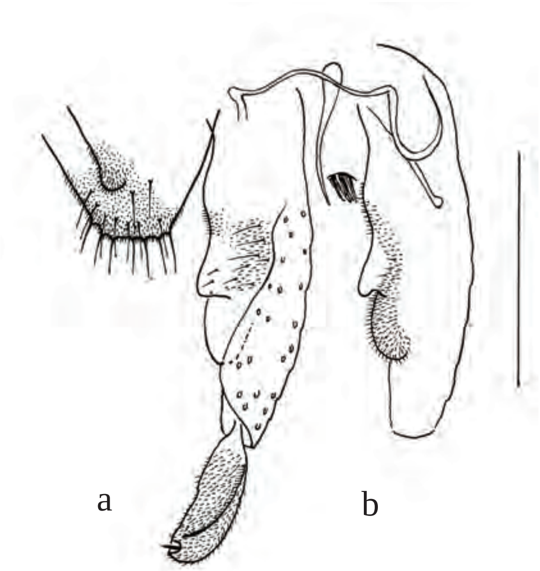

Figure 4. *Pseudosmittia paraspinispinata* n.sp. male hypopygium, a. showing dorsal volsella, b. showing ventral volsella, virga and accessory spines. (scale line = 0.1mm)

***Micropsectra* Pe9**

In the same collection in which *Pseudosmittia paraspinispinata* occurred were exuviae of a *Micropsectra* that run to *M. pallidula* (Meigen) in Stur and Ekrem's (2006) key and to *M. bidentata* (Goetghebuer) (=*M. pallidula*, teste Stur and Ekrem *loc. cit.*) in Langton (1991) and Langton and Visser's (2003) keys. However two characters indicate that they are not *M. pallidula*: 1.) the thoracic horns break off so easily that only one exuviae has an attached thoracic horn, which became detached on mounting; and 2.) the posterior spines of tergite III are confined to a patch posteriad seta D5 (Figure 5). Also the rounded cephalic tubercles and more robust teeth of the comb of segment VIII may serve to confirm the identification.

Parametric and numeric data: PeL4.9-6.0mm (m=5.4mm, n=7). FsL 70-160µm (m=117, n=6). ThL680µm; ThR 8.0 ; Th seta L 240µm (n=1). Hook row L 0.41-0.63 B II (m=0.54, n=6); hooks 140-160 (m=150, n=6). LT V-VIII 0-3, 0-4, 2-4, 2-5; LT IX 34-59 (m=46.6, n=7). CbB 40-60µm (m=52µm, n=7), Cb marginal teeth 3-7 (m=5, n=7), short, hardly longer than broad at base (Figure 6). ALR 0.95-1.2 (m=1.08, n=7). Cephalic tubercles rounded mounds. Posterior thoracic mound shallow. PSB II well developed.

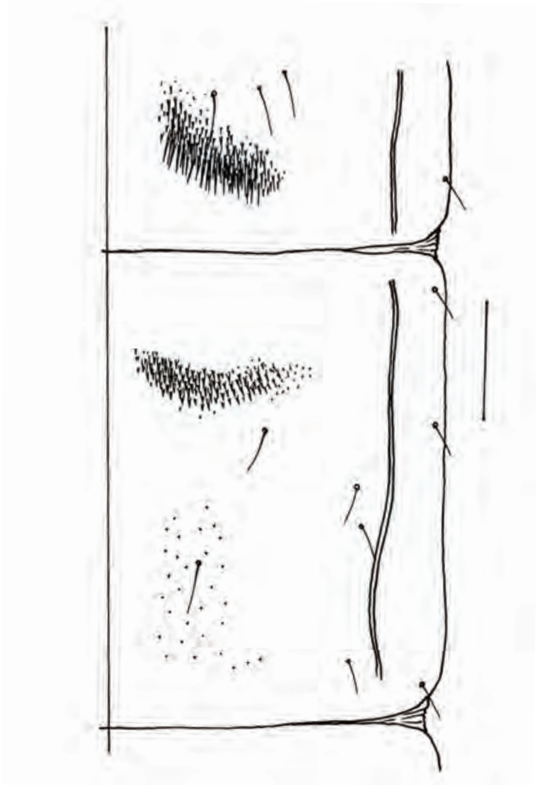

Figure 5. *Micropsectra* Pe9 armament of tergites III and IV. (scale line = 0.1mm)

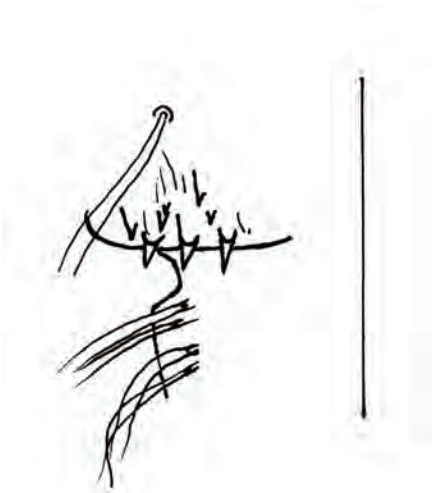

Figure 6. *Micropsectra* Pe9 comb of segment VIII. (scale line = 0.1mm)

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Hibernal Emergence of Chironomidae in Crimea (Ukraine)

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Abstract

Twenty-seven species of Chironomidae were detected emerging in the Crimea peninsula during the period from December 2010 to March 2013. Twenty-three are Orthocladiinae and 4 are Chironominae (one Chironomini and three Tanytarsini species). Nine species are recorded for the first time in Crimea. At the genus-level the hibernal emergence in Crimea shows resemblance to the patterns reported for streams in Kansas.

Introduction

Hibernal emergence of Chironomidae in the southern part of Ukraine is nearly unstudied (Baranov 2011a). The only research published on hibernal emergence of Chironomidae was done on a single spring-brook in the Kharkiv city (Sarzhinka tract), where 15 winter-emerging species were recorded (Baranov 2011b). Chironomids from Crimea were also almost unstudied until recently, but new records increased the number of Crimean Chironomidae species to 135 (Baranov 2013).

Because of the climate of the peninsula, with annual average temperatures at the Southern coast ranging from 10.8-13.9 C, and average temperature in January of about 0°C (Pozhachenuk 2009), some of the Crimean aquatic insects possess interesting patterns of emergence in winter (Prokopov 2010). For example, early spring species of Plecoptera occasionally emerge during winter after short periods of warm air temperatures (e.g., *Capnia nigra* (Pictet, 1833) or *Leuctra crimeana* Zhiltzova, 1967). Prokopov (2010) suggested that some species are capable of emerging earlier in winter if air temperatures are higher than average and occur before the spring floods. However, there is no comprehensive data on Chironomidae phenology during winter months across a variety of habitats for Crimea. In this paper we report species, substrate conditions and river zones where species have been collected in winter.

Material and methods

Adults were collected mainly with sweep net. Pupal exuviae were collected with a hand net and drift nets. In total, 17 samples were collected from 12 sites (e.g. Figs 1A, B). In addition, some larvae and pupal exuviae were kindly provided by Mr. Grigoriy Prokopov.

Specimens were preserved in 70% ethanol and then slide-mounted in Euparal using the technique described by Pinder and Langton (2007). Morphological terminology follows Sæther (1980). Specimens were identified using MBS-1 dissecting microscope and American Optics Microstar Series 10A biological microscope. Slide preparations were made according to the method described by Langton and Pinder (2007). All material has been deposited in the collection of the Department of General and Applied Entomology of I. I. Schmalhausen Institute of Zoology, NAS. Species were determined using keys of Langton and Pinder (2007), Giłka (2011), Makarchenko and Makarchenko (2006a, b) and Sæther (1990).

Results

Twenty-seven species of Chironomidae were detected emerging in the Crimea during the period from November 2012 to March 2013 (Table 1). Twenty-three are Orthocladiinae and four are Chironominae (one Chironomini and three Tanytarsini species). The following species are recorded for the first time in Ukraine: *Chaetocladius insolitus* Caspers, 1987, *Eukiefferiella ilkleyensis* (Edwards, 1929), *Limnophyes pentaplastus* (Kieffer, 1921), *Limnophyes spinigus* Sæther, 1990, *Orthocladius glabripennis* (Goetghebeuer, 1921), *Thienemanniella clavicornis* (Kieffer, 1911), *Thienemanniella vittata* (Edwards, 1924) and *Micropsectra apposita* (Walker, 1856).

Table 1. Chironomidae species collected during winter months in the Crimea peninsula. Air temperature on day of collection given as range over 24 hours. Abbreviations used in table: Substrate types, s = sand; m = mud; gr = gravel. River zones, ep-rtr = epyrithral; hyp = hyporythral; rtr = rythral; kren = krenal; mtr = metarythral.

Species	**Air temp, C° (range)**	**Substrate type**	**River zone**
Orthocladiinae			
Acricotopus lucens	6	s-m	mtr
Brillia bifida	-5 – 6	s-m; gr-m	mtr
Bryophaenocladius akiensis	6	s-m	mtr
Bryophaenocladius sp.2	6	s-m	mtr
Chaetocladius insolitus	-5 – 9	s-m; gr-m	kren; mtr
Corynoneura lacustris	6	s-m	mtr
Eukiefferiella claripennis	9	gr-m	kren
Eukiefferiella ilkleyensis	6	s-m	mtr
Heterotrissocladius subpilosus	14	s-m	mtr
Limnophyes minimus	6 – 15	gr-m	mtr; ep-rtr
Limnophyes pentaplastus	9	gr-m	kren
Limnophyes spinigus	5 – 6	gr-m; s-m	mtr
Metriocnemus eurynotus	6 – 15	s-m; gr-m	kren; mtr
Orthocladius sp. 1	5	s-m	mtr
Orthocladius glabripennis	14	s-m	mtr
Orthocladius s.str. sp. 2	6	s-m	mtr
Paracladius conversus	5 – 6	gr-m; s-m	mtr
Parametriocnemus stylatus	6	s-m	mtr
Paraphaenocladius impensus contractus	15	gr-m	mtr
Parorthocladius korneyevi	5 – 9	gr-m; s-m	kren; mtr
Pseudorthocladius sp.1	14	s-m	mtr
Thienemaniella clavicornis	6	s-m	mtr
Thienemaniella vittata	5	s-m	mtr
Chironominae			
Chironomini			
Dicrotendipes nervosus	6	s-m	mtr
Tanytarsini			
Cladotanytarsus atridorsum	14	s-m	mtr
Micropsectra apposita	6 – 12	Gr	kren; ep-rtr
Micropsectra atrofasciata	5 –15	s-m; gr;gr-m	kren; ep-rtr; mtr; hyp-rtr

Species accounts

Acricotopus lucens (Zetterstedt, 1850)

Material: 1♂, Ukraine, Crimea, Bachchisarajskij district near Novopavlivka, Alma River, N44°49.86’ E33°58.41’, 19.iii.2011, Prokopov, G.

Common Holarctic species. Widespread in Ukraine, recorded for the first time from the Crimea peninsula (Ashe & O’Connor 2012, Baranov 2011b). Ubiquitous species with no special references in literature to hibernal emergence. However, Lindegaard (1995) listed *A. lucens* as possible inhabitant of European springs, and spring species often possess hibernal activity of adults.

Brillia bifida (Kieffer, 1909)

Material: 2♂, 1♀, Ukraine, Crimea, Simferopol, Salgir River, near Tavrida National University, N44°56.41’ E34°8.21’, 20.ii.2011, Prokopov, G.; 5♂, 2♀, Ukraine, Crimea, Simferopol, Salgir River, near Tavrida National University, N44°56.41’ E34°8.21’ , 18.i.2013, Baranov, V.; 3♂, Ukraine, Crimea, Simferopolskij district, Western Bulganak River, near Pozharske village, N44°55.92’ E33°52.22’, 20.i.2013, Baranov, V.

Widespread Palearctic species, previously not re-

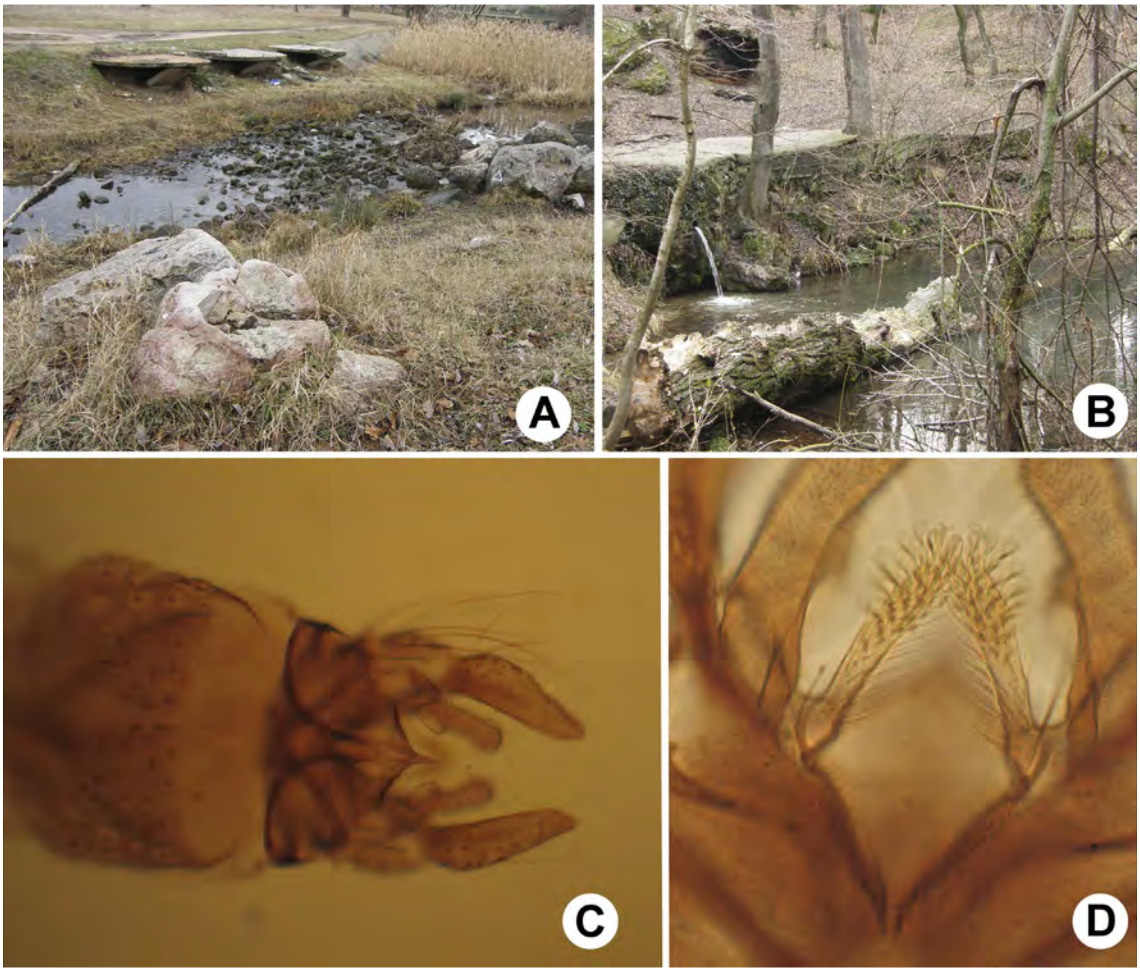

Figure 1. A, B: Sampling localities. A, Salgir river, Simferopil city, 18.01.2013; B, Plachushaja skala tract, Pozharskoe village, 21.01.2013. C, D: *Micropsectra apposita;* C, hypopigium; D, median volsella.

corded from Ukraine (Ashe and O'Connor, 2012, Baranov 2011b). No records of hibernal emergence of this species have been found.

Bryophaenocladius akiensis (Sasa, Shimomura & Matsuo, 1991)

Material: 2♂, Ukraine, Crimea, Bachchisarajskij district, Alma River, near Novopavlivka, N 44°49.86' E 33°58.41', 19.iii.2011, Prokopov, G.

Eastern Palearctic species, recorded from Japan, the Russian Far East and, probably, Madeira. In Ukraine it was recorded in 2010 and 2011 in the mountainous areas of Crimea (Ashe & O'Connor 2012; Baranov 2013 Makarchenko and Makarchenko (2006a, b). In Ukraine this species is characteristically associated with small, cold springs and rivers, occurring in the winter or spring (Baranov 2011c).

Bryophaenocladius sp.2

Material: 1♂, 2♀ Ukraine, Crimea, Bachchisarajskij district, Alma River, near Novopavlivka, N44°49.86' E33°58.41', 19.03.2011, Prokopov, G.

Two females and one male of undetermined *Bryophaenocladius*, collected from dead previous-year vegetation along the river bank.

Chaetocladius insolitus Caspers, 1987

Material: 15♂, 2♀, Ukraine, Crimea, Bachchisarajskij district, Alma River, near Novopavlivka village, N44°49.86' E33°58.41', 19.i.2013, Baranov, V.; 3♂, 5♀, pupa, pupal exuviae, Ukraine, Crimea, Simferopol, Salgir river, near Taurida National University, Simferopol, N44°56.41' E34°8.21', 21.ii.2012; 19.i.2013, Baranov, V.; 10♂ Ukraine, Crimea, Simferopolskij district, Western Bulganak River, near Pozharske village, N44°55.92' E33°52.22', 20.i.2013, Baranov, V.

This is a rare species of west Palearctic non-biting midge (Diptera, Chironomidae), with very strange and distinct male hypopygium (Figs 2A, B), with tergite IX bearing a lamelliform structure, derived from a structure similar to anal tergite bands, and covering the anal point base (Caspers 1987). The

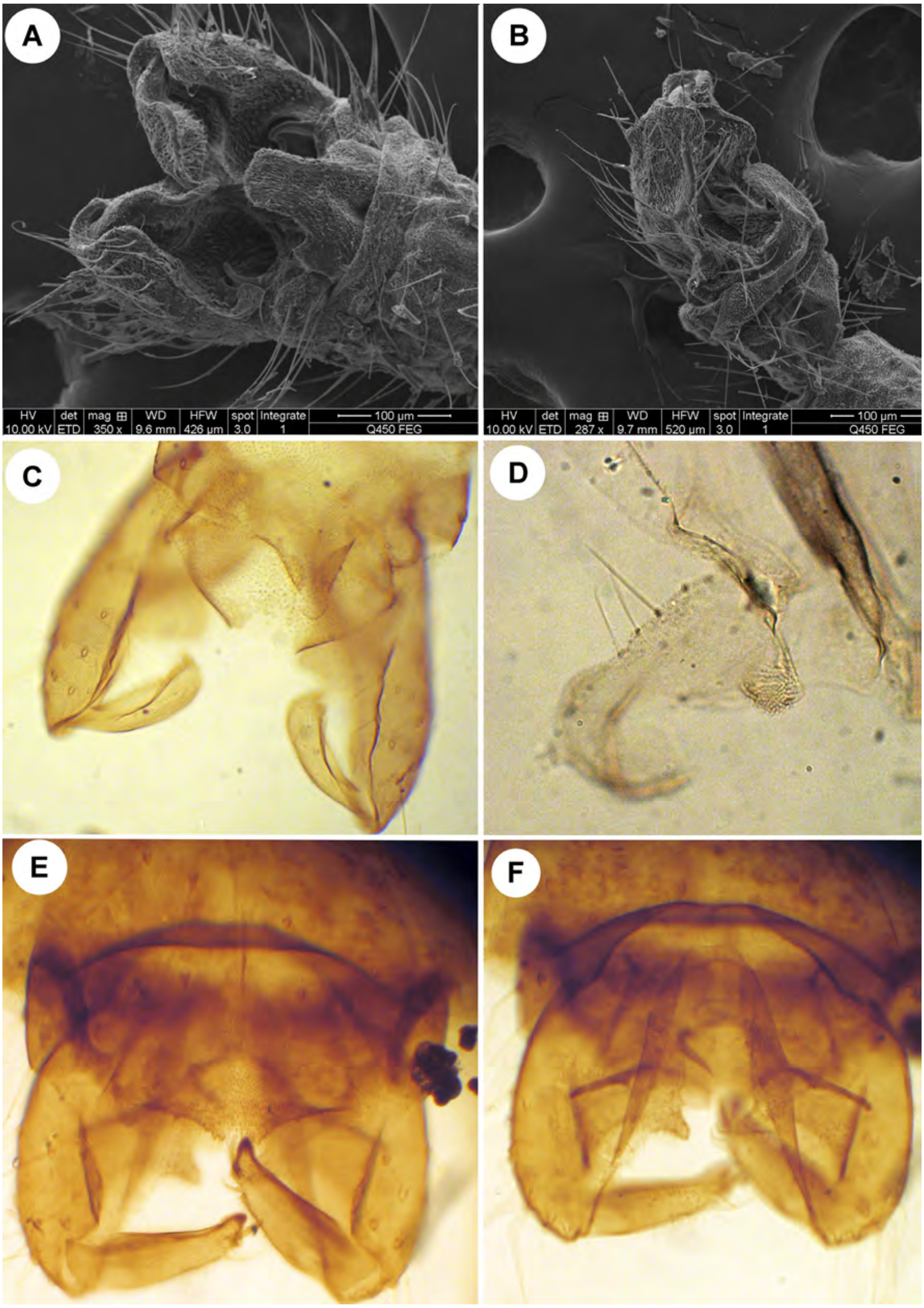

Figure 2. A, B: Scanning electron micrograph of *Chaetocladius insolitus* male hypopygium. C, D: *Paraphenocladius impensus contractus*; C, male hypopygium; D, squama. E, F: *Limnophyes spinigus* hypopygium; E, details of tergite 9; F, details of virga.

species was described from a small stream, near Lunz biological station, Austria, and was previously recorded also from Germany (Bavaria), Ireland and Switzerland (Ashe & O'Connor 2012). However, the record from Switzerland is based on an unknown source, cited in Fauna Europe ver. 2004 (Sæther and Spies 2004, Martin Spies and Patrick Ashe pers. comm.) and is therefore doubtful. Caspers (1987) stated that the autecology of *C. insolitus* is unknown. Michiels (1999) has found *C. insolitus* in the Salzach, a mainly alpine river in Southern Bavaria, running primarily in natural conditions. We have found large populations of this species in the subalpine zones of Alma and Salgir rivers, and in the lowland part of the Bulganak River basin. All records of *C. insolitus* in Crimea are during winter months, when swarms were detected on days with the air temperature from 6° to 9°C. Pupal exuviae were found in rivers with water temperature from 5° up to 9° and pH from 7.0 to 7.8.

Corynoneura lacustris Edwards, 1924

Material: 2♂, Ukraine, Crimea, Bachchisarajskij district, Alma River, Partyzans'ke reservoir, N44°49.25' E34°2.98', 26.iii.2011, Prokopov, G.

Widespread Holarctic species, in Ukraine is known only from the Crimea (Ashe & O'Connor 2012; Baranov 2011c). Species is common in the winter at the Alma River, at the sites with sandy substrates.

Eukiefferiella claripennis (Lundbeck, 1898)

Material: 1♂, Ukraine, Crimea, Simferopil city, Salgir River, near Tavrida National University, N44°56.41' E34°8.21', 18.iii.2013, Baranov, V.

Species distributed throughout the Holarctic, Oriental regions and Oceania (Hawaiian islands), widespread in Ukrainian Carpathians (Ashe & O'Connor 2012; Baranov 2011b). The present record is the first for Crimea. Several specimens where caught only in the winter.

Eukiefferiella ilkleyensis (Edwards, 1929)

Material: 1♂, Ukraine, Crimea, Simferopolskij district, Western Bulganak River, near Pozharske village, N44°56.41' E34°8.21', 20.i.2013, Baranov, V.

Species is widespread in the Holarctic Region. The present record is the first in Ukraine (Ashe & O'Connor 2012; Baranov 2011). Drake (1982) documented emergence in February in southern England.

Limnophyes minimus (Meigen, 1818)

Material: 3♂, Ukraine, Crimea, Simferopil city, Salgir River, near Tavrida National University, N44°56.41' E34°8.21', 18.i.2013, Baranov, V; 11♂, Ukraine, Crimea, Bachchisrajskij district, Kacha River, near Sinapnoe village, N44°56.41' E34°8.21', 19.i.2013, Baranov, V.

This is a common, subcosmopolitan species that is widespread in Ukraine (Ashe & O'Connor 2012; Baranov 2011b).

Limnophyes pentaplastus (Kieffer, 1921)

Material: 1♂ Ukraine, Crimea, Simferopil city, Salgir River, near Tavrida National University, N44°56.41' E34°8.21', 18.i.2013, Baranov, V.

Limnophyes spinigus Sæther, 1990

Material: 1♂ Ukraine, Crimea, Simferopil city, Salgir River, Gagarin Park, N 44°56.41' E 34°8.21', 29.XII.2010, Baranov, V.; 1♂ Ukraine, Crimea, Simferopolskij district, Western Bulganak River, near Pozharske village, N44°55.92' E33°52.22', 20.i.2013, Baranov, V.

Species is recorded from Ukraine for the first time (Baranov 2011a). Crimean specimens differs from the specimens described by Sæther (1990), by lower number of scallpellate scutelars (2), however, the shape of gonostylus, conspicuously long virga and megasetae, and general appearance of the hypopigium closely resembles *L. sphingius* (Figs 2E, F).

Metriocnemus eurynotus (Holmgren, 1833)

Material: 3♂, Ukraine, Crimea, Simferopil city, near Tavrida National University, N44°56.41' E34°8.21', 18.i.2013, Baranov, V.; 4♂, Ukraine, Crimea, Simferopil city, Salgir River, Botanical Garden, N 4°56.41' E34°8.21', 21.i.2013, Baranov, V.; 2♂, Ukraine, Crimea, Bachchisarajskij district, Alma River, near Novopavlivka, N44°49.86' E33°58.41', 19.iii.2011, Prokopov, G.

Species was previously recorded from Crimea (Baranov 2011c).

Orthocladius sp.1

Material: 1 pupal exuviae, Ukraine, Crimea, Bachchisarajskij district, Alma River, near Novopavlivka, N44°49.86' E33°58.41', 19.i.2013, Baranov, V.

Orthocladius glabripennis (Goetghebeuer, 1921)

Material: 1♂, Ukraine, Crimea, Bachchisarajskij district Alma River, Partiznske Reservoir, N44°49.86’ E33°58.41’, 19.iii.2013, Prokopov, G.

This species is recorded for the first time from Ukraine (Baranov 2011a)

Paracladius conversus (Walker, 1856)

Material: 1♂ (pharate adult) Ukraine, Crimea, Bachchisarajskij district Alma River, near Novopavlivka, 19.i.2013, N44°49.86’ E33°58.41’, Baranov, V.; 3♂, Ukraine, Crimea, Western Bulganak River, near Pozharske village, N44°55.92’ E33°52.22’, 20.i.2013, Baranov, V.

Widespread Holarctic species, common in Ukraine (Ashe and O’Connor 2012).

Parametriocnemus stylatus (Kieffer, 1924)

Material: 2♂, Ukraine, Crimea, Simferopolskij district, Western Bulganak River, near Pozharske village, N44°55.92’ E33°52.22’, 20.i.2013, Baranov, V.

Widespread in the Holarctic Region, and common in Ukraine (Ashe and O’Connor 2012).

Paraphaenocladius impensus contractus Sæther & Wang, 1995

Material: 2♂, Ukraine, Crimea, Simferopil city, Salgir River, Botanical Garden, N44°56.41’ E34°8.21’, 21.i.2013, Baranov, V.

This subspecies of *P. impensus* was previously recorded only from the China, Japan, Turkey, Austria and Algeria, Romania (?) and Germany (Ashe and O’Connor 2012), and was considered as Southeren Palaearctic and Oriental subspecies. Subspecies is clearly differs from the *P. impensus impensus* in having squama with 3-6 setae, AR 0,44-0,69 (about 0,67 for our specimen), LR_1 – 0,70-0,74; LR_2 – 0,48-0,54; LR_3-0,67-0,71 (Sæther & Wang 1995). Details of the hypopygium in Figs 2C, D.

Parorthocladius korneyevi Baranov, 2011

Material: 24♂, Ukraine, Crimea, Simferopil city, Salgir River, Gagarin Park, N44°57.75’ E34°5.51’,29.XII.2010, Baranov, V.; 3♂, Ukraine, Crimea, Simferopolskij district, Western Bulganak River, near Pozharske village, N 44°55.92’ E 33°52.22’, 20.i.2013, Baranov, V.

This species is endemic to the Crimea peninsula, where it is recorded only for these two rivers (Baranov 2011c).

Thienemanniella clavicornis (Kieffer, 1911)

Material: 3♂ Ukraine, Crimea, Simferopolskij district, Western Bulganak River, near Pozharske village, N44°55.92’ E33°52.22’, 20.i.2013, Baranov, V.

Although widespread in the Palearctic and Oriental regions, this species is recorded for the first time from Ukraine (Ashe & O’Connor 2012, Baranov 2011b).

Thienemanniella vittata (Edwards, 1924)

Material: 5♂, Ukraine, Crimea, Bachchisarajskij district, Alma River, near Novopavlivka, N44°49.86’ E33°58.41’, 19.i.2013, Baranov, V.

Widespread European species. This species is recorded for the first time from Ukraine (Ashe & O’Connor 2012, Baranov 2011b).

Chironominae: Chironomini

Dicrotendipes nervosus (Staeger, 1839)

Material: 5♂, Ukraine, Crimea, Bachchisarajskij district, Alma River, near Novopavlivka, N44°49.86’ E33°58.41’, 19.iii.2011, Prokopov, G.

Widespread in the Holarctic Region and common in Ukraine and Crimea (Baranov 2011b).

Chironominae: Tanytarsini

Cladotanytarsus atridorsum Kieffer, 1924

Material: 10♂, Ukraine, Crimea, Bachchisarajskij district, Alma River, Partiznske Reservoir, N 44°49.25’ E 34°2.98’, 19.iii.2013, Prokopov, G.

Widespread in western Palaearctic and Oriental regions, and common in Ukraine and Crimea (Baranov 2011b, Giłka 2011).

Micropsectra apposita (Walker, 1856)

Material: 45♂, 10♀, 21 pupal exuviae, Ukraine, Crimea, Simferopolskij district, Plachushaja skala tract, N44°56.07’ E33°50.73’, 20.i.2013, Baranov, V.; 20♂, Ukraine, Crimea, Bachchisrajskij district Kacha River, near Sinapnoe village, N44°40.2’ E34°0.41’, 19.i.2013, Baranov, V.

Western European species, recorded for the first time from Ukraine (Giłka 2011, Baranov 2011b). Details of the hypopygium in Figs 1C, D.

Micropsectra atrofasciata (Kieffer, 1911)

Material: numerous specimens of all stages, at all collection sites mentioned above.

Widespread in the Palaearctic Region (may possibly be the most abundant species of Tanytarsini in Europe, (W. Giłka, pers. comm. 2012, Baranov 2011b).

Discussion

At the genus-level the hibernal emergence in the Crimea shows resemblance to the patterns reported for streams in Kansas (Ferrington 2000; 2007; Anderson *et al*. 2011) with composition consisting of primarily Orthocladiinae, and to lesser extent Tanytarsini. Several of the orthoclad genera reported both here and for Kansas are known to have species that emerge in winter or have phenologies that include late winter emergence through spring season. These genera also include species that are common to smaller stream habitats, often with alternating pools-riffle habitats, and some in areas with very extensive groundwater inputs. Collections of adults, although rare, tend to be more productive after periods when air temperatures have exceeded 0°C. continuously for several days preceding sample collection in the Crimea, as was also reported for species emerging in winter in Kansas (Ferrington 2000).

Emergence of Tanytarsini in Crimea is primarily dominated by two species of *Micropsectra*, which also is the pattern in Kansas. Here we also report one collection of *Cladotanytarsus atridorsum*. This genus was not encountered during winter in Kansas, but two species of *Paratanytarsus* and three species of *Tanytarsus* emerged from ground water dominated or intermittent stretches of stream (Anderson *et al*. 2011). We did not make extensive collections at sites with similar hydrologic characteristics in Ukraine, but future efforts will be directed to streams with similar hydrologies to determine if the winter patterns are similar at the generic level.

Only one species of Chironomini, *Dicrotendipes nervosus*, has been encountered emerging during winter in Crimea, and only on one date. However, this species is widespread in Ukraine and Crimea, and appears to be multivoltine, with emergences through spring, summer and fall periods. By contrast, five species of Chironomini have been recorded during winter months, including *Dicrotendipes fumidus* (Johannsen, 1905), which likely is bivoltine in Kansas (Ferrington unpublished data). The other species of Chironomini reported in winter in Kansas, however, also appear to be common, widespread and multivoltine with emergence spread through spring summer and fall seasons. In both Crimea and Kansas it appears that life histories of Chironomini are not adapted for substantial emergences at lower water and air temperatures.

The patterns of collections of genera as a function of air and water temperatures also show some general similarity in Crimea and Kansas. In both regions, species of *Chaetocladius* can emerge at air temperatures below freezing. Orthocladiinae genera are more commonly encountered as adults at cooler air temperatures in winter than Chironomini. Water temperatures were not continuously quantified as part of this study, but future efforts to document environmental conditions prevailing during winter emergences will attempt to include repeated water temperature determinations before and at time of collection.

Acknowledgments

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A contribution towards a revision of West Palaearctic *Procladius* Skuse (Diptera: Chironomidae)

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Introduction

The genus *Procladius* is in great need of revision. Such an exercise would be fraught with many uncertainties. Those species characterized by having marked wings may have the markings extremely faint and perhaps even absent. The spur of the gonostylus is variable in length and shape, in the pharate adult rotated more vertically and compressed, so that association with pupal structure is not simple. It appears that the spur is extended hydraulically on eclosion, perhaps to a variable degree. The one character that appears to remain constant is the phallapodeme toothed at apex or not, but that just separates the subgenus *Holotanypus* into two groups. Even the type species of s.g. *Holotanypus*, *P. (H.) culiciformis* (Linnaeus) is not keyed in Langton & Pinder (2007), though recorded for Britain, because the authors were unable to find a clear separation from *P. (H.) choreus* (Meigen). We here provide a key to the pupal exuviae of subgenus *Holotanypus* that are now known to us as a step towards a generic revision[1]. Terminology as in Langton (1991).

Peliminary key to known pupal exuviae of *Procladius* (*Holotanypus*)

Named taxa are the taxa so named in Langton (1984), Langton (1991) and Langton and Visser (2003) except for *P. (H.) tatrensis* Gowin, the specimens of which used for this key are conspicuously distinct and originate from the Tatra mountains. The names previously used by Langton have been used in many publications and unless shown to be invalid through revision are best retained for use in comparative biodiversity studies.

[1] Neither of the authors has this in mind: the challenge is thrown out to any other Chironomidae researcher with the time and perseverance to complete the project.

1. Thoracic horn skittle or vase-like, with oval plastron plate 2

– Thoracic horn not as above, plastron plate absent 12

2(1). Plastron plate much narrower in diameter than the maximum breadth of the horn (PpB:ThB = 0.24 – 0.33); anal lobes tapering to a point, serrated externally .... *Procladius* (*H.*) near *vesus* Roback (Fig. 1)

– Plastron plate wider in diameter (PpB : ThB > 0.33); anal lobes rounded and serrated externally, inner margin straight and unarmed 3

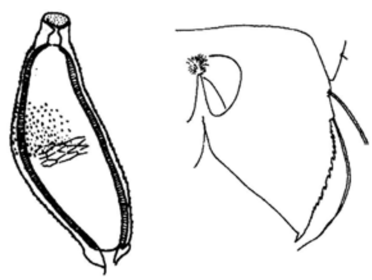

Figure 1. *Procladius* (*H.*) *vesus* thoracic horn and anal lobe.

3(2). Plastron plate nearly as wide or wider than the horn (> 200 µm; PpB : ThB 0.77 – 1.24), joined to the respiratory atrium by a very short neck (<0.2 length of Pp) often difficult to distinguish 4

– Plastron plate narrower than the horn, joined to the respiratory atrium by a longer neck 5

4(3). Horn atrium with a deep, narrow invagination of its distal margin; plastron plate neck even narrower than that of the next species .... *Procladius* (*H.*) 'sp. (from Norway)' Fittkau & Murray 1986 (Fig. 2)[2]

[2] A number of associated specimens of this form were collected in the Stugudalen area of Norway by Vít Syrovátka: lake in gap between Storsola and Ekorrhammaren, 7.8 km east of the cottage Nedalshytta.

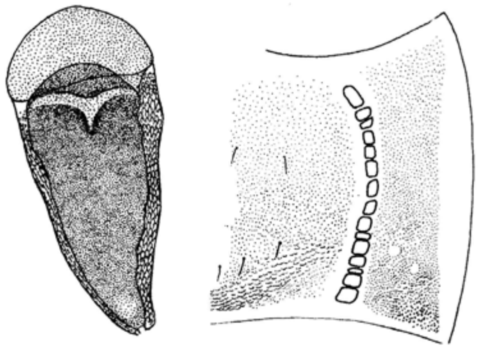

Figure 2. *Procladius* (*H.*) sp. '(from Norway)' thoracic horn, armament of tergite and paratergite IV.

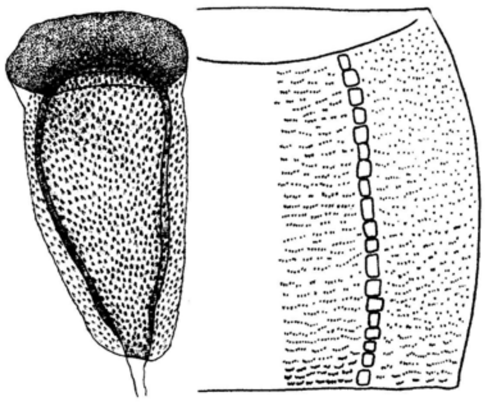

Figure 3. *Procladius* (*H.*) *tatrensis* Gowin; thoracic horn, armament of tergite and paratergite IV.

– Horn atrium usually with distal margin entire, never as above. Plastron plate attached to the horn atrium by a very short neck, often only visible at the sides .... *Procladius* (*H.*) *tatrensis* Gowin (Fig. 3)[3]

5(4). Armament of tergite IV of small points; in central part and mainly posteriorly arranged in transverse rows; plastron plate mostly narrower than 101 µm 6

– Tergite IV, especially posterolaterally, with strong, dense, irregularly arranged points in which the circular bare patches around the dorsal setae show up very clearly; plastron plate mostly wider than 101 µm .... *Procladius* (*H.*) *simplicistylus* Freeman (Fig. 4), (*Procladius* (*H.*) Pe1 Langton, 1991)[4]

6(5). Ratio PpB:ThB > 0,67 7

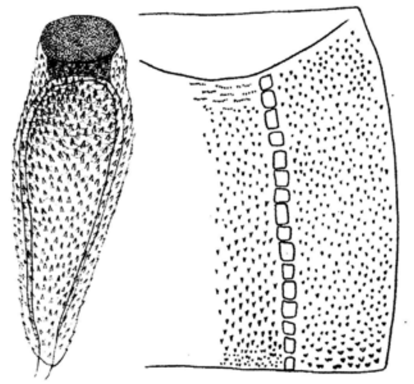

Figure 4. *Procladius* (*H.*) *simplicistylus*: thoracic horn, armament of tergite and paratergite IV.

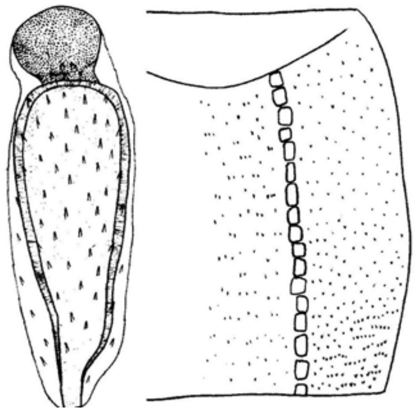

Figure 5. *Procladius* (*H.*) Pe4 Langton; thoracic horn, armament of tergite and paratergite IV.

– Ratio PpB:ThB < 0,67 (thoracic horn coarsely toothed) 9

7(6). Thoracic horn robust, covered with strong, sharply pointed teeth; points on tergite IV generally larger than those on tergite VIII 8

– Thoracic horn nearly smooth and very fragile, often damaged or missing; abdominal segments colourless, shagreen very fine; points on tergite IV arranged irregularly, on paratergites arranged in rows only posteriorly; points on tergite IV smaller than on tergite VIII .... *Procladius* (*H.*) Pe 4 Langton 1991(Fig. 5)

8(7). Armament of paratergites and tergites II-VII posteriorly of scale shagreen .... *Procladius* (*H.*) *islandicus* (Goetghebuer) (Fig. 6)[5]

[3] Subalpine and alpine lakes in the Tatra Mountains in Slovakia and Poland.
[4] Specimens from a dystrophic lake in the Tatra Mountains, but widely distributed in the West Palaearctic.

[5] Associated material from Lake Myvatn, Iceland, leg. Jón Olafsson (Fig. 6).

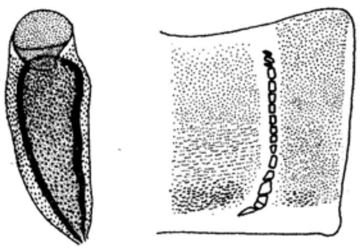

Figure 6. *Procladius* (*H.*) *islandicus*. Thoracic horn, armament of tergite and paratergite IV.

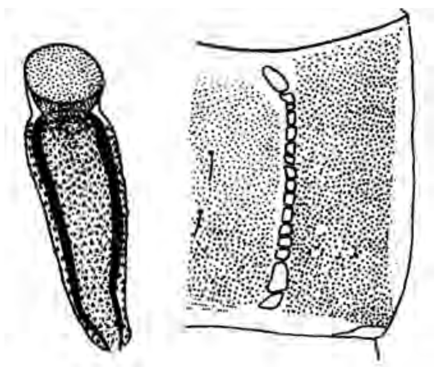

Figure 7. *Procladius* (*H.*) *fimbriatus*. Thoracic horn, tergite and paratergite IV.

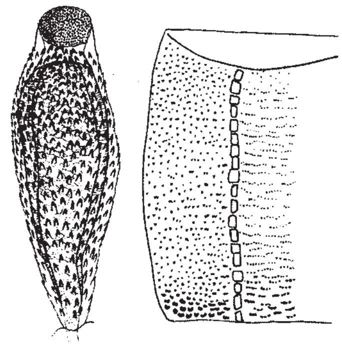

Figure 8. *Procladius* (*H.*) Pe5; thoracic horn, armament of tergite and paratergite IV.

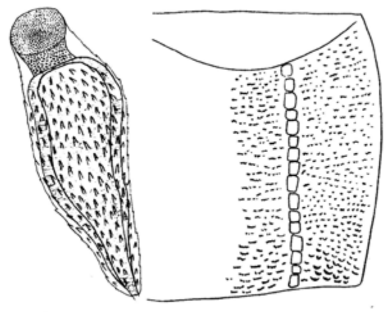

Figure 9. *Procladius* (*H.*) *choreus* (Meigen); thoracic horn, armament of tergite and paratergite IV.

– Armament of paratergites and tergites of discrete points .... *Procladius* (*H.*) *fimbriatus* Wülker 1959 (Fig. 7)[6]

9(6). Thoracic horn usually narrower than 129 µm; points on thoracic horn tapered and without pigmented tip; points on tergite IV the same size as those on VIII 10

– Thoracic horn usually wider than 129 µm (average = 150 µm); points on thoracic horn with rounded and pigmented tip; abdominal segments brown; points on tergite IV larger than on VIII .... *Procladius* (*H.*) Pe5 (Fig. 8)[7]

10(9). Tergites II – VII with points arranged in obvious, short transverse rows, posteriorly in the segments II – IV curved producing a "fish-scale" effect; transverse rows present on paratergites II – V too, but fish-scale shagreen is restricted to posterior corners; ThL:ThB = 3.26; exuviae brownish .... *Procladius* (*H.*) *choreus* (Meigen) (Fig. 9)

– Armament of tergites II – VII of transverse rows but without "fish-scale" effect; paratergites with transverse rows at best posteriorly, anterior and middle part covered with irregularly arranged points, occasionally grouped in pairs; ThL : ThB ≤ 3.26; abdominal segments with distinct brown anterior edging (*Procladius* (*H.*) Pe3 Langton, 1991) 11

11(10). Respiratory atrium transversely reticulate internally (best seen focused on the far inner surface at a magnification of x300) .... *Procladius* (*H.*) *signatus* (Zetterstedt) (Fig. 10a)

– Respiratory atrium with at most vague indication of reticulation internally, usually without any such structure .... *Procladius* (*H.*) *sagittalis* (Kieffer) (Fig. 10b, c)[8]

12(1). Thoracic horn gradually expanded for about two thirds its length, thereafter narrowed evenly to a pointed apex; respiratory atrium rounded apically, without plastron plate; segments III – VI laterally fringed with taeniae; six lateral taeniae on segment VII, five on segment VIII .... *Procladius* (*H.*) ‚Type A' Fittkau & Murray 1986 (Fig. 11)

– Thoracic horn *Tanypus* like, swollen D shaped with apical tubercle .... *Procladius* (*H.*) *crassinervis* (Zetterstedt) (Fig. 12)[9]

[6] Originally described from Finland by W. Wülker, associated material of this species was collected in 1993 from Lake Korta, MM474994, 150m asl., Norway by P. Langton.

[7] Material from three small ponds in northern Slovakia

[8] The above separation is tentative, but has associated material to justify it.

[9] This would appear to be the *Procladius (H.) pectinatus* (Kieffer) of middle European workers, but we refrain from formally synonymising the species pending a revision of the genus.

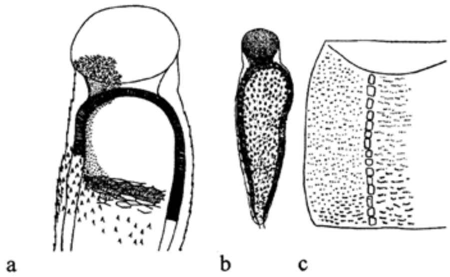

Figure 10. a, *Procladius* (*H.*) *signatus* thoracic horn; b-c, *Procladius* (*H.*) *sagittalis*, b, thoracic horn, c, armament of tergite and paratergite IV.

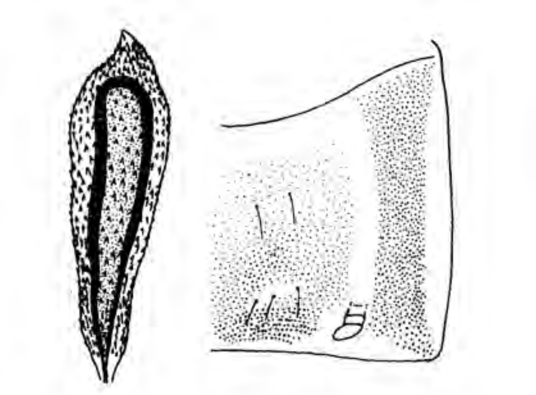

Figure 11. *Procladius* (*H.*) 'Type A' Fittkau & Murray, thoracic horn, armament of tergite and paratergite IV.

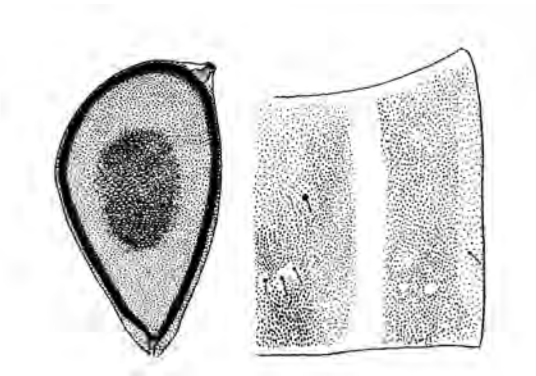

Figure 12. *Procladius* (*H.*) *crassinervis*, thoracic horn, armament of tergite and paratergite IV.

Acknowledgement

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Alyssa M. Anderson new co-editor for the Chironomus Newsletter

Torbjørn Ekrem & Peter H. Langton

co-editors Chironomus Newsletter on Chironomidae Research

It is a great pleasure for us to welcome Dr. Alyssa M. Anderson as a member of the editorial board for the Chironomus Newsletter on Chironomidae Research. Alyssa received her PhD at the University of Minnesota studying winter-emerging Chironomidae in Minnesota trout streams and moved to South Dakota to join the faculty at Northern State University in Aberdeen in 2013. She is experienced in ecology, traditional taxonomy and molecular systematics and will be a great to have on board in the further development of the newsletter. If you would like to know more about Alyssa and her research interest, take a look at this YouTube video produced by NSU: http://www.youtube.com/watch?v=y6hajKrNwa8

Photo: Torbjørn Ekrem

The 8th International Congress of Dipterology is held in Potsdam, Germany, 10-14 August, 2014. The program for the conferences is already quite developed and will contain numerous symposia on various topics. Of particular interest to the chironomid community might be: Advances in Neotropical dipterology, Applied dipterology, Behavioural ecology, Biodiversity surveys, Fossil Diptera, Diptera biogeography and Molecular identification of Diptera. Early bird registration deadline is February 1, 2014. See the congress website (www.icd8.org) for more information.

19th International Symposium on Chironomidae

The next symposium on Chironomidae is to be held in České Budějovice, in the Czech Republic, August 17-22, 2014. Information on the conference venue and how to get there is available on the symposium website: http://web.blatna.cuni.cz/chironomidae/. The program is very preliminary at the moment, but a suggested schedule is available on the website.

Registration is announced to open in January 2014.

Remember to register your publications in the online bibliography on Chironomidae literature!

The Online Bibliography of the Chironomidae has existed for about one and a half year, but does so far not have many users actively registering their own publications. See Martin Spies' short communication on page 56 for statistics on recorded publications. The bibliography will only be as good as we make it ourselves, so please visit http://literature.vm.ntnu.no/ check if your publications are registered and add what is missing.

New book: Chironomidae of the Holarctic Region. Keys and diagnoses - Larvae

A completely revised version of the classic key to Holarctic Chironomidae larvae was recently published by Scandinavian Entomology Ltd in volume 66 of the series Insects Systematics and Evolution Supplements (ISBN: 978-91-637-4668-0). The book is edited by Trond Andersen, Peter S. Cranston and John H. Epler. For a review of the book, please see Oliver Heiri's impressions on page 58. For more information on how to purchase, please see http://scanentom.se/ or contact:

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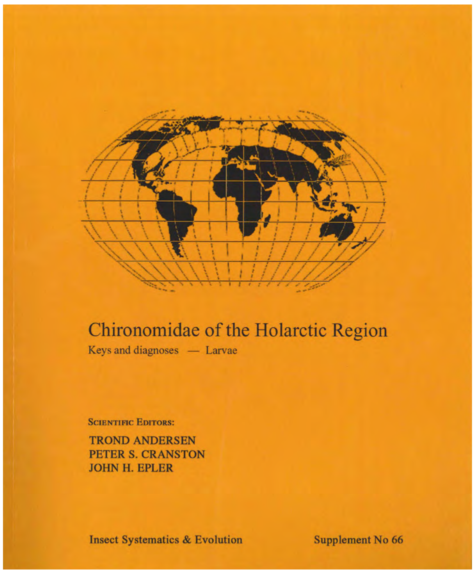

A simple method for slide-mounting chironomid hypopygia in lateral view (and for similar preparations)

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Introduction

From the very beginnings of my work in chironomid taxonomy, I have always found it highly informative, frequently even indispensable, to examine and document structures of three-dimensional complexity, such as the adult male hypopygium, from more than just one angle. For example, in the convoluted case of *Parachironomus monochromus* (van der Wulp) and *P. tenuicaudatus* (Malloch), sorting specimens and resolving the conflicts among various usages of these names were aided greatly by studying the hypopygia in lateral view (Spies 2000, e.g. figs. 1-4; for further examples, see Spies et al. 1994).

I adopted this method as a student, following what I had seen in collection specimens (Prof. Fittkau and Dr. Reiss used such slides regularly) and in some publications (e.g., Townes 1945, fig. 186A,B; Lehmann 1970). In the literature, however, such models seemed relatively rare, considering how useful I found the approach to be.

One reason for this rarity certainly is that it is much more difficult to keep a hypopygium or abdomen in position on one of its sides until the fluid mounting medium has hardened than it is to lay it down on its wider and flatter venter. A recently discovered easy way to facilitate such preparations is described below.

Material and method

The chironomid used in the present example is an adult male of an undescribed, novel member of the 'Harnischia complex' of Chironomini genera (listed as *Parachironomus* sp. 1 „Iijoki“ in Paasivirta 2012); specimen data: FINLAND, Nuuksio National Park, Antiaanpuro (a forest stream); June 2006, Malaise trap, leg. Lauri Paasivirta; kindly donated to ZSM by the collector. Body length prior to slide-mounting was c. 5 mm; the dimensions of the hypopygium (anterior to posterior / left to right / dorsal to ventral) are approx. 400 / 200 / 150 µm.

Prior to slide-mounting, the specimen's abdomen, or an appropriate rear part of it (in the present case, carefully macerated segments VIII-IX; see Fig. 1), is passed through the series of fluid baths required for the mounting medium to be used. In our example the series led up to concentrated alcohol, and finally to Euparal Essence. Using this commercially available specific solvent and thinning agent avoids the troublesome dispersion of the Euparal drop on the slide that often occurs when a specimen is placed in Euparal directly from alcohol. Whenever working with any substances that evaporate quickly and can be harmful when inhaled - e.g. with concentrated or dilute alcohol or Euparal - be sure to open the containers holding such materials only as briefly as necessary, and keep your workplace sufficiently ventilated.

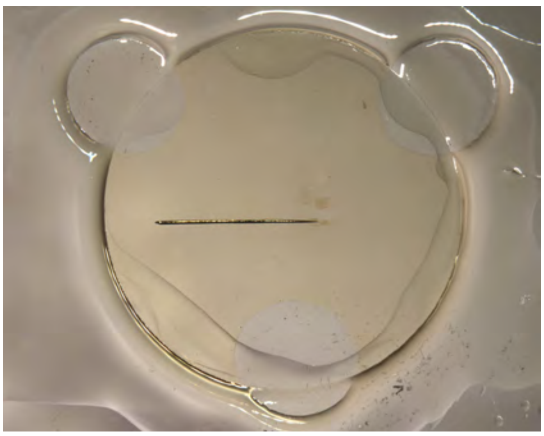

Figure 1. Chironomid adult male abdominal segments VIII-IX mounted in stable lateral view by inserting an entomological minuten pin. Cover slip diameter c. 10 mm; pin length 4.7 mm, max. pin diameter (near left end) c. 100 µm. Photo: Marion Kotrba & Martin Spies (ZSM).

An entomological minuten pin of a size appropriate for the respective object is selected, and passed through the final stages of the fluid series (in the present case I used a recycled fragment of a size 005 pin that is about 5 mm long and 0.1 mm across except at its tapering tip; see Fig. 1). The pin may be inserted in the object at any soaking stage from dilute alcohol to Euparal Essence, whereas inserting it inside a drop of viscous mountant on the slide is messier and incurs greater risk of the object being distorted. If forceps are used during the insertion these must be non-magnetic, to avoid problems due to the adhesion between pin and forceps.

To minimize rotating or distorting forces being exerted on the object when the cover slip is added, it is advisable to place the latter on supports that are high enough for the object but not too high (see discussion below). In the present example, three commercially available vinyl props of 250 µm thickness were used (visible in Fig. 1).

Figure 1 was photographed under a stereoscope (Leica M205 C). Figure 2 is a software composite (using Helicon Focus, version 5.3) of three exposures made under a compound microscope (Zeiss Axioskop 2 plus) in phase-contrast mode. During figure editing (Adobe Photoshop CS4), some specks were removed and background areas smoothened.

Figure 2. Enlarged view of object in Fig. 1. Image software-integrated from three exposures, then edited for clarity (see text). Photo: Marion Kotrba & Martin Spies (ZSM).

Discussion

So far I have used the minuten-anchor method described above for lateral views of hypopygia only, but it is expected to work equally well for mounting other objects that tend to tip over if they are not held in place. Conceivable applications are, e.g., lateral views of dorso-ventrally flattened or curved larval head capsules (possibly best with a few anterior body segments still attached, so that the pin does not enter the head capsule), dorsal views of larval posterior body segments, etc.

Thick mounts, in which the cover slip is relatively far above the glass slide normally used as the base, can limit the selection of microscope objectives through which the object may be examined with sufficient depth of field. A possible remedy is to substitute for the slide by employing another cover slip as the base of the mount (I use commercially available rectangular ones that are 60 mm long and 24 mm wide). Embedding an object between two cover slips allows it to be examined at higher magnifications from two sides. For more on this method, including an aluminum 'slide' with central cut-out that reduces risk of breakage during viewing and storage, see Schlee (1966, p. 190 and fig. 2).

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Comments on some species in tribe Chironomini

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During the work of identifying Chironomini collected at various localities in the Netherlands, I made some observations in species interpretation that I think are useful to share with the readers of the Chironomus Newsletter on Chironomidae Research. I hope that in particular ecologists and other users of larval identification keys will find the below comments helpful.

Reinterpretation of some species in *Chironomus*

Chironomus macani

I obtained males and females from single-reared larvae. Peter Langton identified them as *Chironomus* (*Chaetolabis*) *macani* Freeman, 1948 and confirmed that the male imagines are conspecific with the holotype of *Chironomus* (*Chaetolabis*) *macani*, held in the Natural History Museum in London, but not with those of Prof. Wolfgang Wülker presently kept in the Zoologische Staatssammlung, München. The Wülker's specimens thus do not belong to the true *C. macani* and should be renamed (Langton & Vallenduuk 2013). The larvae of both species are morphologically very similar but can be differentiated.

Chironomus dorsalis

Chironomus (*Lobochironomus*) *longipes* Staeger, 1839 was listed as a junior synonym of *Chironomus* (*Lobochironomus*) *dorsalis* Meigen, 1818 by Spies & Sæther (2004). However, the name *Chironomus* (*Chironomus*) *dorsalis* Meigen, 1818 has also been used (e.g. Strenzke 1959). *Chironomus dorsalis* Meigen *sensu* Strenzke is a misidentification and synonymous with *C. alpestris* Goetghebuer, 1934 (Sæther & Spies 2013).

I reared single larvae of *C. dorsalis* Meigen and *C. alpestris* Goetghebuer. It appears that the imago of *C. longipes* described by Shilova (1980) as *Einfeldia* does not match with *C. dorsalis* Meigen in Strenzke (1959: 23, fig. 12) and Langton & Pinder (2007, Vol. 1: 163; Vol. 2: Fig. 203B). The larvae of both types differ in morphology. Judging from the drawings by Shilova (1980, fig. 10), there are two characters in *C. longipes sensu* Shilova that differ from *C. dorsalis* Meigen. In *C. longipes sensu* Shilova, the lateral mental tooth 4 is shallower than tooth 5 similar to *C. alpestris* (see Webb & Scholl, 1985: 365 as *dorsalis*). The pecten epipharyngis seems to have equally sized teeth. In *C. dorsalis* Meigen the lateral mental tooth 4 is somewhat longer than 5 (gradually declining lateral teeth 1-5), as in Vallenduuk & Langton (2010: Fig. 18-21). The pecten epipharyngis has narrower and shorter interstitial teeth (Fig. 1).

As a result, there appear to be these 3 species:

Chironomus (*Chironomus*) *alpestris* Goetghebuer, 1934.
Chironomus (*Lobochironomus*) *dorsalis* Meigen, 1818.
Chironomus (*Lobochironomus*) *longipes* Staeger, 1839 *sensu* Shilova (1980) as *Einfeldia* has to be examined to determine which species the specimens belong. These probably are **not** *C. dorsalis* **nor** *C. longipes* and should be renamed.

Notes to species interpretations in identification literature:

Chironomus dorsalis Meigen in Webb & Scholl (1985), Langton & Pinder (2007), Vallenduuk & Moller Pillot (2002 and later) and Moller Pillot (2009a: 41) must be *C. alpestris* Goetghebuer.

Chironomus longipes Staeger in Vallenduuk et al. (1997) and Vallenduuk & Moller Pillot (2002 and later) must be *C. dorsalis* Meigen.

Chironomus longipes Staeger *sensu* Shilova (1980) in Vallenduuk & Langton (2010: Table 2) is not synonymous with *C. dorsalis* Meigen.

Chironomus longipes Staeger, 1839 in Moller Pillot (2009a: 45) probably is *C. dorsalis* Meigen.

The reported changes in species interpretation require information in former publications to be treated carefully. The autecological information (e.g. in Moller Pillot 2009a) appears to be correct, but has to be updated.

The pecten epipharyngis in larvae of the subgenera *Lobochironomus* and *Chaetolabis*.

On finding interstitial teeth of the pecten epipharyngis in the species belonging to both subgenera, I believed that this character would be unique for them (Fig. 1). I later found that some specimens of other species in *Chironomus* also can have these interstitial teeth (Fig. 2). Jon Martin made similar observations (pers. comm.). When comparing different species it appears that the structure of the teeth varies. The teeth in *Lobochironomus* and *Chaetolabis* appear to differ from other species, but in a way that is very difficult to explain properly in keys. Therefore, this character is better not to be used as a character for distinguishing *Lobochironomus* and *Chaetolabis*.

Single reared larvae "versus" cytology and DNA

For identification and/or description of a species its stages, karyotype (cytology) or DNA sequences can be used. In my opinion each method has its positive and negative aspects and it is not the aim of these remarks to discuss which method is the best. In my point of view, all three methods bring us insight into the autecology of a species. With this knowledge, the "character" of the water, its biological quality, can be determined. When these data are available, environmental changes over a certain period can be determined.

Over the past years I have reared many species from single larvae. As shown for *Chironomus macani*, this process can be very valuable because it results in associated material of all life stages.

After rearing a larva, cytological analysis is not possible any more and DNA sequences can be found using a part of the imago. Mass-rearings can produce material also for cytology, but associations are unreliable since there can be multiple species of the same genus at anyone locality. However, by using standardized DNA sequences (e.g. DNA barcodes), both life stage and karyotype association is possible.

My aim is to create a publicly available collection of associated life stages from all species in Chironomini. Who wants to join this work? With the help of more workers it might be possible to build up a large reference collection (a utopian thinking?).
Please contact me if you are interested!

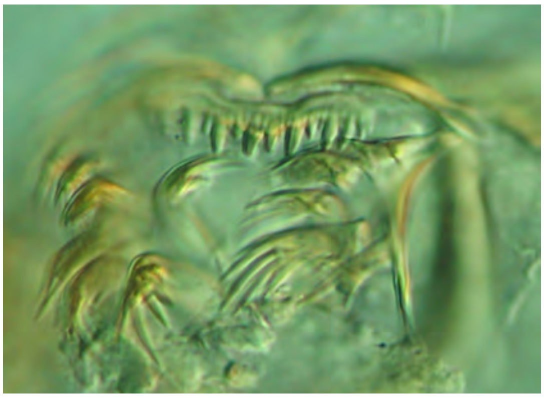

Figure 1. *Chironomus* (*Lobochironomus*) *dorsalis*, pecten epipharyngis.

Figure 2. *Chironomus* (*Chironomus*) *holomelas*, pecten epipharyngis.

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Regeneration of old slide specimens mounted in Hoyer's medium

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All slide specimens of the Sasa collection are mounted in Hoyer's solution, which due to crystallization is considered to be an unsuitable medium for long term preservation (Pinder 1989). The oldest slide specimens of the Sasa collection were mounted in 1979 (34 years ago). However, crystallized slides are so far not very frequent. Recently, I successfully regenerated a Holotype specimen in a crystallized mount (Figure 1). Here I describe the method used.

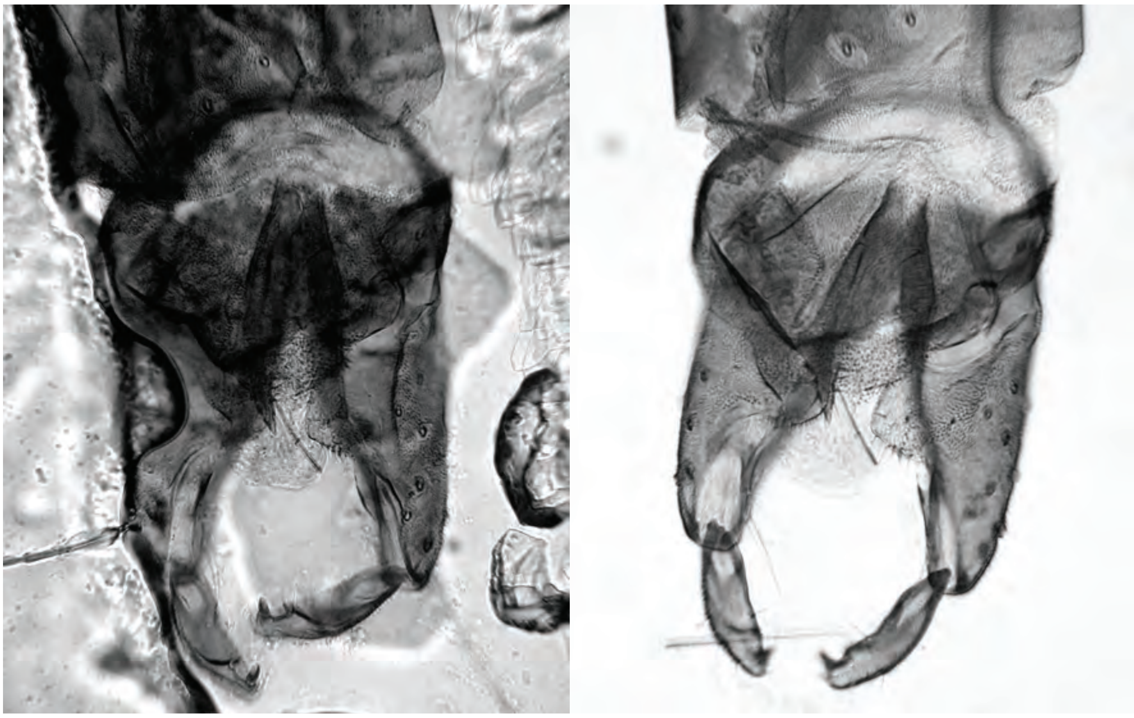

Figure 1. Holotype of *Rheocricotopus (Paracricotopus) tamabrevis* Sasa, 1983, transferred to *Paracricotopus tamabrevis* (Sasa, 1983) by Niitsuma (1990). Holotype NSMT-I-Dip-4558. Left before regeneration, right after regeneration.

Methods

Hoyer's solution is water-soluble even if it is crystallized, so crystallized slide mounts can be dissolved in water.

1) Pour tepid water (about 40°C) into a glass (or 200ml beaker) in which a microscope slide is placed standing so **that the water covers the mount but not the label**. Replace the water with new tepid water, after several hours. After repeating this several times, the medium dissolves and the cover slip is released. At the same time the specimen parts come loose and sink to the bottom.

2) Collect the body parts using a fine pipette, and place them in 70% alcohol in a petri dish. Examine dish and glass using a binocular to ensure that all parts are retrieved.

3) Wipe up the microscope slide and cover slip with clean gauze.

4) Carefully mount the specimen using a medium suitable for permanent slides.

Reference

Pinder L.C.V. 1989. Introduction. In Wiederholm, T. (Ed.) *Chironomidae of the Holarctic region, Keys and diagnoses. Part 3. Adult males*. Entomologica scandinavica Supplement 34: 5-9.

First record of *Diamesa thomasi* Serra-Tosio, 1970, from Croatia

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Plitvice National Park is situated in the mountainous karst area of Croatia. When conducting studies of the chironomid fauna of the park, we found that *Diamesa thomasi* Serra-Tosio, 1970 were abundant in the stream Bjela rijeka. The streams Bijela rijeka and Crna rijeka form the Matica River, which is the main surface-water supplier of the lakes in the park. This is the first record of *D. thomasi* in Croatia. The river's source, the Bijela rijeka spring, is located at an altitude of 719 m a.s.l. at 44°50'05" N and 15°33'43" E. The Bijela rijeka spring is a rheocrene that dries out only during extremely dry years (Marušić & Ćuruvija 1991). Spring water emerges from substrate composed mainly of cobbles and sand with a few interspersed moss-covered boulders. Because of these characteristics, it is considered a psammorheocrene type of spring (Gerecke et al. 1998). The tree canopy is open during spring, and there is much aquatic vegetation and accumulated allochthonous organic material during autumn and winter.

A pyramid-type emergence trap was operated at six locations from February 2007 to February 2008. *Diamesa thomasi* was recorded at three of them. In total, we have collected 94 adult specimens of *D. thomasi* from these traps. Maximum number of specimens collected at one time is 48. All specimens were found in winter / spring samples with the emergence period ranging from November until May.

Serra-Tosio (1970) considered *D. thomasi* as a member the *dampfi* group with *Diamesa dampfi* (Kieffer, 1924) as sister species and *Diamesa permacra* (Walker, 1856) as their closest relative. These midges are characterized by the combination of a typical *Diamesa* wing and a flattened, but not completely cordiform fourth tarsi (Fig. 1A). We used Sanger-sequencing on frequently used DNA markers, including mitochondrial cytochrome *c* oxidase subunits I and II (COI, COII) (e.g. Ekrem et al., 2010) to quickly check for relationships between *D. thomasi* and 55 other Diamesinae species (Willassen unpublished data). Three specimens were prepared for DNA analysis according to the procedure described by Ekrem et al. (2010) and vouchers are kept in the collections of Bergen University Museum. Unfortunately, the standard DNA barcoding primers (Folmer et al. 1994) did not yield clean sequences with unambiguous base calls for COI. However, the COII segment places *D. thomasi* as sister to *D. permacra* in the dataset. Unfortunately, the dataset currently lacks sequences from *D. dampfi*.

Morphologically, the male genitalia of *D. thomasi* (Figs. 1C-D) correspond with the description by Serra-Tosio (1970, figs. 8, 9). Serra-Tosio (1970) also included a figure of the female genitalia in lateral view and Willassen and Serra-Tosio (1988, figs. 3.4, 3.6) showed that the hypothetical sister species, *D. dampfi* (Kieffer, 1924) differs from *D. thomasi* by possessing a long and digitiform gonocoxite IX. In ventral view (Figs. 1E-F) the female genitalia of *D. thomasi* appear more similar to *D. permacra* (see Willassen 1982, fig.10.2).

This study is important in that it expands the known distribution of *D. thomasi*. Since its first discovery in the French Pyrenées (Serra-Tosio 1970), and with additional findings in the region by Moubayed-Breil (2007), the distribution of *D. thomasi* is presently known to range from the Caucasus Mountains, the Tatra Mountains and Carpathians (Kownacki and Kownacka 1974; Kownacki 1988), to the Dinaric Mountains in Croatia. *Diamesa thomasi* has also been recorded from the Thuringian Forest in Germany (Bellstedt 1992).

Acknowledgements

We are most grateful to Dr. Louise Lindblom and the University of Bergen sequencing facility at HiB for help with producing DNA sequences. Thanks to Martin Spies for the reference to the record from Germany. Viktor Baranov's work with University of Bergen Chironomidae collection was supported by an Ernst Mayer travel grant (Harvard Museum of Comparative zoology).

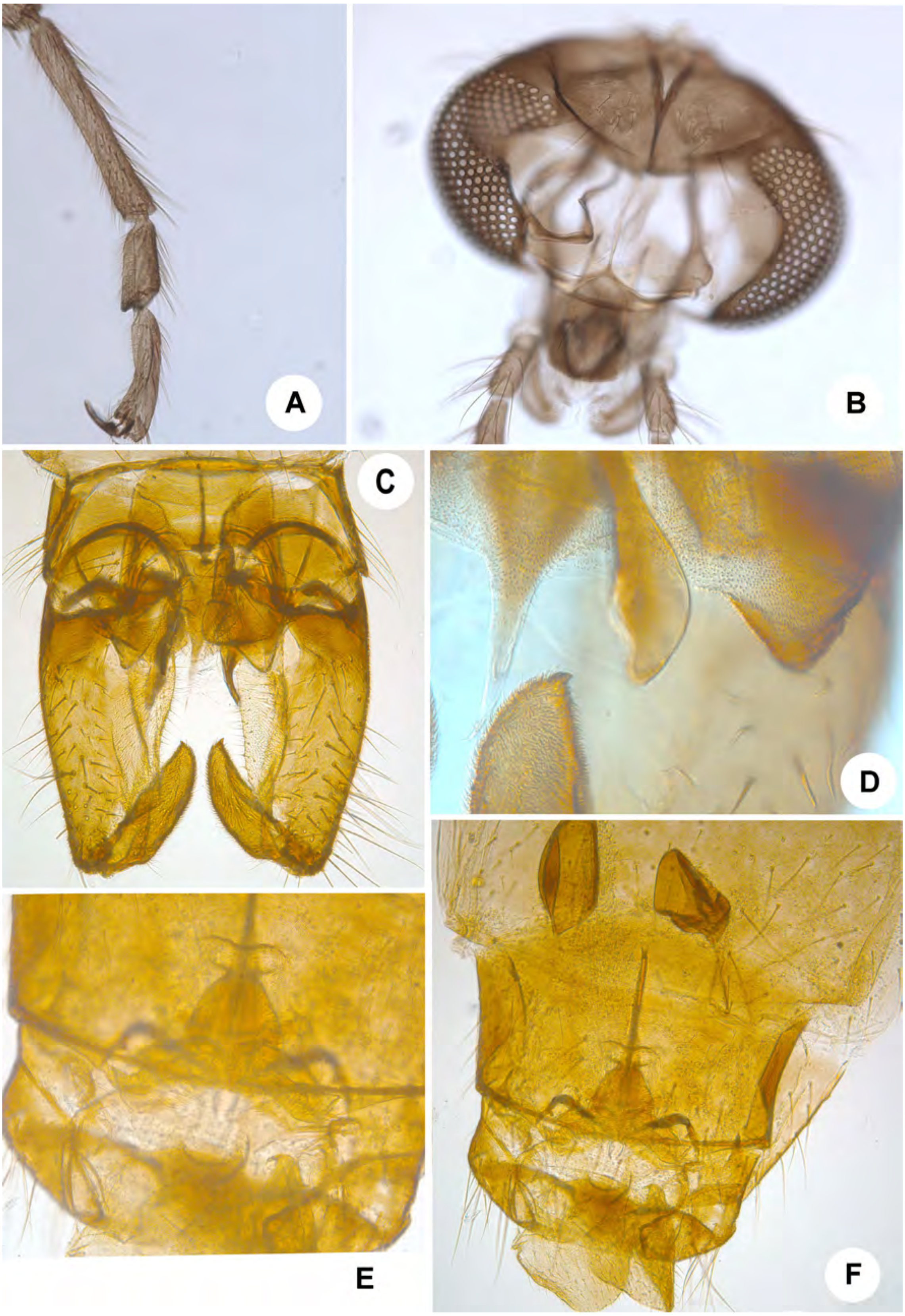

Figure 1. *Diamesa thomasi* Serra-Tosio, 1970 from Croatia. A. leg with typical shape of tarsus four; B. male head; C. male genitalia; D. details of male genitalia; E. female genitalia in ventral view; F. female genitalia with seminal capsules.

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A survey of publications with chironomid content represented in bibliographic databases on the web

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Introduction

A year and a half have passed since the opening on the world wide web of the "Bibliography of the Chironomidae" (http://literature.vm.ntnu.no/Chironomidae/), and three years since Odwin Hoffrichter sadly had to stop the invaluable service to our community that has resulted in his enormous contributions to the CHIRONOMUS newsletter from No. 9 (1995) through No. 23 (2010).

On this occasion, here is a look – of general interest and relevance, I would hope – at how our special literature database has performed, on its own and compared to some standard tools commonly used in searches for scientific publications.

Sources and procedures

Three online databases were searched between the 9th and 12th of December 2013. Each basic search operation covered a single calendar year only; sum totals calculated for longer periods were checked by searching with corresponding year ranges, where the entry fields and search functions allowed this. Many data for 2013 have yet to be entered in the databases; thus, this year can be considered only as far as general trends.

The "Bibliography of the Chironomidae" (abbreviated ChirB below) was searched by entering the respective figure in the "Year" field. As quite many individual entries in that field include more than one year figure, e.g. '1971 ("1970")', '1972/73', '1974–1975', affected yearly totals were reduced accordingly.

The "Web of Knowledge℠" (WoK; Thomson Reuters; http://thomsonreuters.com/web-of-knowledge/) was searched using "All Databases" and the search conditions 'Topic=(chironom*) AND Title=(chironom*)'. The WoK available to me via subscription by the Bavarian State Library (Munich) includes six databases: BIOSIS Citation Index℠ (1926–present), BIOSIS Previews® (1926–present), Current Contents Connect® (1998–present), Journal Citation Reports®, MEDLINE® (1950–present), and Web of Science® (1995–present).

The Zoological Record (ZR; Thomson Reuters) was searched via ZSM subscription to the OvidSP platform (Wolters Kluwer; http://ovidsp.tx.ovid.com/sp-3.10.0b/ovidweb.cgi), performing a "Multi-Field Search" with chironom* as the search term in "All Fields". This database reports 1978 as its official starting date; it includes some earlier publications too, but not enough for quantitative comparisons.

Results

Figure 1 shows the annual numbers found in each database for the period from 1970 to 2012, and an average from ChirB (535 titles per year) over the 40-year period 1970–2009.

For 1978–2012, the sum total in ChirB was 18,658 titles, whereas ZR and WoK returned 8,176 and 5,198 hits, respectively.

Considering works published from 2010 to the present, the titles in ChirB totalled 424 only, whereas ZR and WoK yielded 838 and 677 hits, respectively.

Discussion

For every year from 1970 to 2009, searches in the ChirB found many more titles than in the ZR and WoK databases. Considerable differences between the specialist tool and the general ones were to be expected, but the very low proportions returned by both of the latter – often under 50% of ChirB values, in a number of years even less than a third – are surprising. In any case, it looks clear that searching for chironomid references in the ZR or WoK cannot substitute for consulting the ChirB.

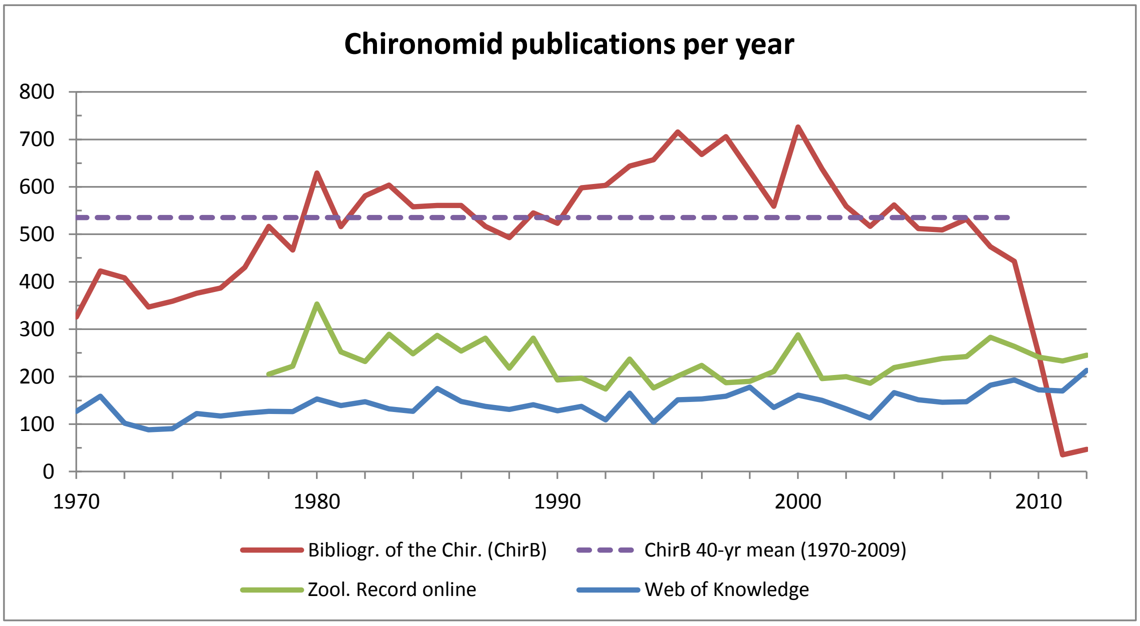

Figure 1. Annual numbers of publications with chironomid content found in three online bibliographic databases in December 2013.

The annual numbers registered by ZR and WoK vary relatively little throughout the period examined. In contrast, our bibliography indicates a strong and steady increase of the publication output from the 1970s through the 1990s, but shows a considerable reduction at the beginning of the 21st century, and then a drastic drop after 2010. While the latter obviously coincides with the loss of Odwin's services, the earlier decrease after the year 2000 is unexplained at this time.

One would expect that each and everyone conducting or following Chironomidae research immediately combines the observations in the preceding two paragraphs and draws the obvious, inevitable and serious conclusion. If we do not find a feasible way to maintain and update the "Bibliography of the Chironomidae", anyone seeking to relate his studies to similar ones in the literature in a soundly scientific way will suffer dearly from the loss of the single most useful source of such references we have had available.

It is neither appropriate nor promising to hope for another colleague like Odwin Hoffrichter to come along and solve this problem for everyone else. However, there is a very simple and effective solution that is not impeded by any real obstacle or argument. **Whenever any work with chironomid content that you have (co)authored has been published, just take a few minutes to enter the title in our freely accessible online database.**

Actually, this little activity should be an integral part of publishing (making your findings known to a wider audience), thus is in your best interest as an author. The only evident factor standing in the way so far, and causing the catastrophic crash of the values marked by the red line in Figure 1, is laziness. The latter is a strong human feature – and I, too, have experience with it. However, you'll agree that it does not make a good enough reason, especially not for keeping you from making small contributions to a community that you wish to keep drawing large benefits from.

The Larvae of Chironomidae of the Holarctic Region – Keys and diagnoses

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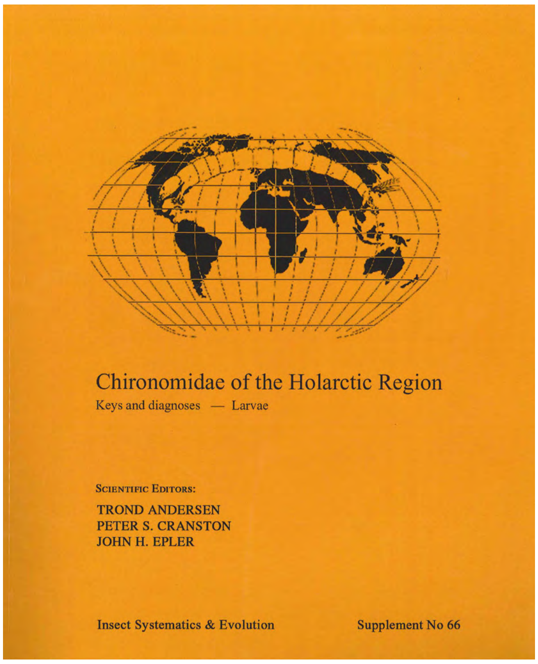

The Wiederholm 1983 key to the larvae of the Holarctic Chironomidae was by far the most used book during my PhD and my post-doctoral years. It shaped my understanding of chironomid classification and identification, and provided the basis for most of my work as a chironomid ecologist and palaeoecologist. It is, therefore, with high expectations (will there be new taxa?) and some dread (will I have to rethink my classification?) that I opened the copy of the revised "*Chironomidae of the Holarctic region. Key and diagnoses - Larvae*" that was kindly provided to me by Lennart Cederholm at Scandinavian Entomology Ltd. At first glance, the book, edited by Trond Andersen, Pete Cranston, and John Epler, does not look much different than the original edited by Torgny Wiederholm. It has the same cover, color, and is similarly massive, although the format has changed - the book has now become several centimeters broader. My first impression was one of slight disappointment. Many of the figures are obviously identical as in the 1983 version, but not as well reproduced. In many sections the text also remains more or less the same, especially in the larval descriptions for the different genera. The chapters are presented in a similar order, starting with an introduction and a section describing the morphology of the larvae, followed by a key to the different subfamilies. These initial chapters are followed by sections dealing with the different subfamilies: Buchonomyiinae, Podonominae, Tanypodinae, Telmatogetoninae, Diamesinae, Prodiamesinae, Orthocladiinae, and Chironominae. The book also includes a foreword and an index of the discussed Holarctic chironomid taxa.

However, a closer look at the different sections reveals a number of significant changes. All of the chapters have been updated. For example, the introduction now includes a short part on identification based on genetic analyses. The second chapter, originally consisting of a key to the subfamilies only, now includes a detailed description of the morphology of chironomid larvae. However, the most relevant improvement is that the sections on the different subfamilies now contain a larger number of generic descriptions and illustrations. For example, the chapter on Orthocladiinae now includes descriptions of *Aagaardia*, *Allocladius*, *Apometriocnemus*, *Chasmatonotus*, *Compterosmittia*, *Eretmoptera*, *Neobrillia*, *Phytotelmatocladius*, *Platysmittia*, *Semiocladius*, *Stictocladius*, *Tavastia*, *Tempisquitoneura*, *Trichochilus*, *Unniella*, and *Vivacricotopus*, all genera without larval diagnosis in the 1983 version of the key. The chapter on Tanypodinae has been revised and now includes 42 generic diagnoses, compared with 36 in the original version of the book. Several nomenclatural actions are proposed for the Tanypodinae and two figures are included which provide detailed illustrations of the cephalic setation for 18 genera of this subfamily. The order the genera are discussed in the text has also been modified. The authors now first describe the non-Pentaneurini genera, followed by the Pentaneurini and a special section on the *Thienemannimyia*-group. This revised structure will certainly help beginners to separate the main larval groups within the Tanypodinae and to realize that different larval structures will have to be examined to identify them. The structure of the section on Chironominae has also been revised. The chapter now first deals with the larvae of the Chironomini (including *Pseudochironomus* and *Manoa*), followed by the Tanytarsini. Again, it can be expected that this structure will facilitate the identification of Chironominae larvae for all those not yet familiar with the different genera within this subfamily. Several new genera are discussed (e.g. *Kribiodorum, Xestochironomus*). Also, the sections for some genera have been expanded significantly. For example, the description of *Polypedilum* now includes a description of eight different subgenera within the genus and the description of *Micropsectra* includes notes on the phylogeny of this taxon. Similar changes and improvements are apparent in the other chapters that were already available in the 1983 version of the key (e.g. Prodiamesinae, Diamesinae), although the modifications in some of them (e.g. Telmatogetoninae, Podonominae) are really very minor.

At first glance not that dissimilar to the 1983 "Chironomidae of the Holarctic Region" larval key, the new book edited by Andersen and coworkers must nevertheless be considered a milestone for chironomid research. Thirty years after the publication of the original it again includes up-to-date diagnoses for the larvae of Holarctic chironomid genera in a single book, and provides detailed keys that will allow the identification of most fourth instar larvae, but also of many younger stages and fossil head capsules. The experienced chironomidologist will profit from the added information and the clear overview over Holarctic chironomid larvae compiled in the book. However, most of us have assembled our own little library of chironomid keys and publications and will know exactly which one to consult when dealing with certain chironomid subfamilies, genera or species collected from different parts of the Northern Hemisphere. It will be the novices and less experienced chironomid systematists, ecologists and palaeoecologists in training that will most significantly benefit from the new book. They will find an introduction to the collection, preparation and identification of all chironomid genera presently known for the Holarctic in a single reference manual, together with detailed descriptions and ecological notes on the discussed taxa. Since the book now includes more taxa from the southern Nearctic and eastern Palaearctic it is also more widely applicable than the 1983 version of the key.

The original "Chironomidae of the Holarctic Region" larval key edited by Wiederholm provided the basis for three decades of progress in the field of chironomid systematics and ecology, and allowed the expansion and growth of new subfields such as chironomid palaeoecology. The revised key edited by Andersen, Cranston and Epler will hopefully provide a similar stimulus for the field. The typesetting and printing of the revised book is of lower quality than the original, and I found a relatively large number of typographical and printing errors. However, the editors at *Insect Systematics & Evolution* have informed me that the book has now been corrected and reprinted, so hopefully many of these errors will have been removed. It is difficult to imagine the amount of work that must have gone into producing this revision - hopefully the authors and editors will be compensated by the satisfaction of seeing it widely used by students and experienced colleagues alike. I will certainly recommend the book to my own students and to colleagues working with fossil chironomid larvae, especially since it is available at what must be considered a very reasonable price for such an extensive compilation. I have already started using it in my own research, and have sent my own, old copy of the original 1983 version of the guide to its well-deserved retirement on the top shelf of my bookcase.

For information on how to purchase a copy of the book, please see announcements on page 46.