FLY TIMES

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Welcome to the latest issue of *Fly Times*! I thank everyone for sending in such interesting articles – I hope you all enjoy reading it as much as I enjoyed putting it together! Please let me encourage all of you to consider contributing articles that may be of interest to the Diptera community for the next *Fly Times*. We all greatly appreciate your contributions! *Fly Times* offers a great forum to report on your research activities and to make requests for taxa being studied, as well as to report interesting observations about flies, to discuss new and improved methods, to advertise opportunities for dipterists (one of which – a biggie – is the first article!), and to report on or announce meetings relevant to the community. This is also a great place to report on your interesting (and hopefully fruitful) collecting activities! Really anything fly-related is considered. I also want to thank Chris Borkent for putting together the list of Diptera citations since the last Fly Times – good job!

The electronic version of the *Fly Times* continues to be hosted on the North American Dipterists Society website at http://www.nadsdiptera.org/News/FlyTimes/Flyhome.htm. The Diptera community would greatly appreciate your independent contributions to this newsletter. For this issue, I want to again thank all the contributors for sending me so many great articles! That said, we need even more reports on trips, collections, methods, updates, etc., with all the associated digital images you wish to provide. Feel free to share your opinions or provide ideas on how to improve the newsletter.

The *Directory of North American Dipterists* is constantly being updated and is currently available at the above website. Please check your current entry and send all corrections to Jim O'Hara. There is a form for this on the last page of the newsletter.

Issue No. 50 of the *Fly Times* will appear next April. If possible, please send your contributions by email to the editor at stephen.gaimari@cdfa.ca.gov. All contributors for the next *Fly Times* should aim for 10 April 2013 – don't worry – I'll send a reminder! And articles after 10 April are OK too!

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NEWS

CALIFORNIA ACADEMY OF SCIENCES

POSITION DESCRIPTION
Assistant / Associate Curator - Diptera

Position Title:	Schlinger Curator of Dipterology
Prepared Date:	March 2012
Prepared By:	Charles Griswold, Chair, Entomology
FLSA Status:	Exempt
Please apply directly to:	The California Academy of Sciences' SnapHire e-recruitment platform (http://calacademy.snaphire.com/), accessing Assistant/Associate Curator - Diptera (9710)

Applications should include

1. *A cover letter briefly summarizing their interest*
2. *A CV, with a list of publications*
3. *A statement of their research interests and philosophy (not more than* 1 *page)*
4. *A statement of their collection and curatiorial interests and philosophy (not more than* 1 *page)*
5. *Names of three references*

Position Summary

California Academy of Sciences seeks a systematic entomologist at the assistant or associate curator level to conduct an integrative, collections-based research program focused on Diptera (flies). The candidate is expected to develop an internationally recognized research program utilizing modern methods, which may include molecular systematics, genomics and bioinformatics, in pursuing collections-based systematic research on Diptera, with relevance to phylogenetics, genetics, evolution, morphology, behavior, biogeography, biodiversity, ecology, conservation biology or related fields. Frequent publication of highly regarded papers in competitive, peer-reviewed journals, curation of collections in specialty area, service to the scientific community in leadership capacities, acquisition of external funding, engagement in outreach activities, and mentorship of students are expected.

ESSENTIAL DUTIES & RESPONSIBILITIES:

A. RESEARCH:

- Conducts research integrating diverse forms of data, including from scientific collections, to answer questions related to the diversity of Life, including its origins, evolutionary mechanisms, patterns and processes, and its future.
- Plans and executes original research resulting in peer-reviewed scientific publications.
- Plans, directs, and participates in scientific expeditions designed to advance knowledge, facilitate specimen collection, and conserve biodiversity.
- Successfully seeks extramural funding and grants to support research activity.

B. COLLECTIONS:

- Is responsible for the strategic growth and improvement of scientific collections.
- Is dedicated to maintaining and developing biodiversity data associated with scientific collections.
- Encourages use of the collections by scholars engaged in research; requests new material from external sources through donations, exchanges, and purchases; determines desirable additions to fill existing gaps and/or build existing strengths.
- Is responsible for professional judgments involving de-accession and disposal of collection material.

C. TRAINING:

- Actively trains and mentors the next generation of scientists through supervision of postdoctoral fellows, graduate students and undergraduates.
- Dedicated to training scientists originating from developing nations and increasing participation of historically underrepresented groups in systematics and evolutionary biology.
- Engages in education activities for Academy staff, including docents.

D. PUBLIC ENGAGEMENT:

- Participates in a spectrum of activities that engage diverse audiences in the excitement and process of scientific discovery, and conveys the importance of this work to the larger world.
- Activities may include: participation in the development of exhibitions; presentation of popular lectures and presentations; citizen science programs; mentoring youth, adult, and family audiences; participation in education and outreach programs of the Academy; and other forms of popularization and dissemination of science.
- Is responsible for review and scientific accuracy of exhibit scripts and technical documentation.

E. FUNDRAISING AND MARKETING:

- Participates in fundraising and communication with donors through the Academy's Development team and their donor cultivation programs.
- Works closely with Academy marketing staff to leverage scientific discoveries into popular media and to elevate the visibility and impact of the Academy's Research activities.

F. ADMINISTRATION:

- May serve as a member of Academy-wide or Research Division committees.
- May serve as a Department Chair with primary responsibility for coordinating research and collection activities.
- As Chair, oversees setting departmental goals, budget development, monitoring of budgetary activity.
- As Chair, is responsible for communicating goals and other matters to department staff, and for communicating departmental matters to Dean of Research.
- As Chair, is a member of the Research Executive Committee and the Academy Leadership Team.

G. MISCELLANEOUS SERVICE:

- Establishes professional contacts with other institutions and scientists, and builds appropriate partnerships and collaborations.
- Participates in the activities of and/or provides advice to local, national, and international scientific societies and academic institutions.
- Serves as reviewer of scientific manuscripts and grant proposals and may serve on review

panels for grant proposals or for review of the activities of other institutions.
- May serve on search committees within and beyond the Academy.
- May provide specimen identifications in discipline of inquiry or in areas of personal expertise.
- May provide professional advice to governmental and public service organizations such as U.S. Customs, Drug Enforcement Agencies, Poison Centers, State Department of Fish & Game, City Planning Departments, etc.

QUALIFICATIONS

To perform this job successfully, an individual must be able to perform each essential duty satisfactorily. Superlative performance in other areas cannot compensate for lack of excellence in matters related to duties and responsibilities in Research (i.e., A above), such as scientific productivity and ability to attract external funding. The requirements listed above are representative of the knowledge, skill, and/or ability required. Criteria for appointment include experience and training, publication record, demonstrable record of external funding, effective communication skills to professional and lay audiences, a demonstrable and sustained record of academic and professional achievement and a proven ability to perform in all of the requisite areas of involvement listed above.

EDUCATION and/or EXPERIENCE:
- Ph.D. in scientific area represented in Research and Collections Division.
- Postdoctoral Research experience strongly desired.
- Proven track record of publication of original research.
- Demonstrable record of competitive external funding.
- Demonstrable record of being an articulate and effective spokesperson for the relevance and importance of the individual's scientific work.

KNOWLEDGE, SKILLS & ABILITIES:
- Demonstrated high level of performance in research and public engagement.

LANGUAGE SKILLS:
- Proven verbal and written communication skills that can be delivered to audiences of differing levels of knowledge and experience.
- Ability to write scientific papers, popular articles, and produce routine reports.
- Ability to speak effectively before groups or individuals with different backgrounds and levels of knowledge.

PHYSICAL DEMANDS & WORK ENVIRONMENT:

The physical demands and work environment described here are representative of those that must be met by an employee to successfully perform the essential functions of this job. Reasonable accommodations may be made to enable individuals with disabilities to perform the essential functions. While performing the duties of this job, the employee is frequently required to stand, sit, walk, and reach with hands and arms, and talk or hear. Must be able to lift 50 Ibs. Must be able to perform repetitive motions 50% of the time. Must be able to walk for lengthy periods in steep terrain; have ability to work at elevations above 2000m.

APPOINTMENT:

Full-time, regular position, 10-month annual basis. The California Academy of Sciences is an Equal Opportunity Employer and welcomes applications from individuals who will contribute to its diversity.

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Zurquí All Diptera Biodiversity Inventory (ZADBI)

Brian Brown[1] and Art Borkent[2]

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American Museum of Natural History, and Instituto Nacional de Biodiversidad;
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As many of you already know, this past June we received final approval for a large biodiversity study of cloudforest Diptera in Costa Rica, in cooperation with the Instituto Nacional de Biodiversidad (INBio). Here we provide an overview of our project, the people involved and our general plan over the next three years (the duration of the NSF grant). Part of the following was taken from our proposal and so, for some, will include obvious background information. We thought, however, including some background would yet be of interest.

Introduction

Life on our planet is in trouble. Every major ecosystem is in decline and there is strong evidence that we are entering a sixth massive extinction event. In spite of the huge ramifications of such great change, we have surprisingly poor knowledge of most biodiversity on our planet. Strong emphasis on vertebrates allows us to estimate that 25% of all mammal species, 13% of all bird species and 41% of all amphibian species are under threat of imminent extinction (IUCN 2010). Yet we are aware that most life on our world is composed of smaller organisms and our knowledge of them, particularly insects, is exceedingly poor. We know that many insect species are not yet named but cannot agree whether there are 3 million or 30 million undescribed species. We do know that much of that biodiversity is present in the rapidly disappearing tropics. It is therefore more than remarkable that there has not yet been a complete description of the species level diversity for any of the megadiverse groups of insects anywhere in the mainland tropics of our planet. Our project aims to not only provide the first such interpretation but also to set a benchmark for what are sorely needed future studies of a similar nature. We need to know which and how many species are out there before more rational decisions can be made on what needs to be saved.

Our cherished Diptera includes about 160,000 described species, comprising about 10% of all known life on our planet. In spite of their ubiquitous presence and importance in every terrestrial and freshwater ecosystem on our planet, there are many basic features of this group for which we have no or little information. By extension, this means we have little understanding of the community structure, trophic structuring, or any of a host of other ecological features of this huge array of species.

Our experience with Diptera indicates that there are enormous numbers of undescribed species in the Neotropical Region, and to undertake the study of all species for a broad area would be impossible, both logistically and financially. Our project is more modest, and therefore attainable. We plan to begin rectifying this huge gap in our understanding by examining the diversity of all Diptera at the species level for a single tropical site in Costa Rica.

We are uniquely poised to undertake this ambitious project because we now have a major tool that was previously lacking. One of the main reasons that we have never been able to interpret tropical Diptera at the species level has been because the means of identifying such Diptera even at the genus level was lacking (Brown 2005). However, the Manual of Central American Diptera (MCAD) has now been published (Brown et al. 2009, 2010) and we realize the tremendous potential these volumes have, allowing identification to the generic level and with a synopsis providing information about the included species: their richness in Central America, distribution, habitats, natural history, latest keys, plus discussion of common or distinctive species in the region.

Another exceptional advantage we possess is that authors of the family level chapters of the MCAD are enthusiastic about extending their expertise to the next level. This extraordinary level of cooperation by the dipterological community makes the success of our project nearly certain. Our understanding is that there have been no opportunities in recent times in which a whole community of taxonomists is willing to interpret an entire megadiverse group of insects and especially so in the tropics. We are privileged to have such an opportunity now. The combination of the MCAD and the continuing support of its authors give us unprecedented momentum and scientific support. It provides the perfect springboard from which to launch our current project and take our Central American studies to the next logical step - an interpretation of the species.

Our project

Our primary goal is to conduct the first modern, thorough investigation of the systematics of the entire Order Diptera in a continental (non-island) tropical location. The group is so large, so diverse, and so poorly understood taxonomically at the species level, however, that we are initially restricting our study to a single 123 by 182 m site (Fig. 1). Our sampling will be carefully limited, to prevent collecting of excessive specimens that will never be studied. Furthermore, the specimens will be fully prepared, eliminating any curatorial barriers to identification. It is the common bane of insect taxonomists to receive large amounts of poorly curated specimens to identify. The reality is that much of it is never studied. In contrast, the combination of limited location, restricted collecting, and full preparation of material is unique to our study and each of these aspects is discussed more fully below. Additionally, for some focal taxa, we are conducting limited collecting at two other sites in Costa Rica at the same elevation. This additional collecting will provide data to allow comparison among sites, giving us a preliminary assessment of species turnover over two spatial scales (40 km distant and 180 km distant, respectively).

ATBI and ADBI

Our project is a modified All Taxon Biodiversity Inventory (ATBI), which we refer to as an ADBI: All Diptera Biodiversity Inventory. The goal of an ATBI is to catalog all life forms at a site. In the original ATBI (Janzen & Hallwachs 1994), the intention was not only to assemble a list of names, but also to interpret the types of interactions among species, their roles in ecosystem function, and their importance to human well-being. The result of such an ATBI would be a detailed catalog, with a listing of each species by its proper name, a photograph, a brief description, an explanation of its lifestyle, and its place in the community. In the largest sense, this effort would include all species in a large area like a national park- in Janzen & Hallwachs's case, Guanacaste National Park (120,000 hectares) in northwestern Costa Rica.

Fig. 1. Map of Zurquí with study site shown.

ATBIs are important because they provide a benchmark for future changes, both natural and anthropogenic (global warming, air pollution, acid rain, increased pesticide use); they provide a "known universe" for comparison with other sites of interest; they provide an inventory of organisms whose lifestyles, even if only imperfectly known, can be the basis of abundant further ecological work (Janzen 1997). The problem with all ATBIs, even limited ones, are fourfold: 1) they are grandiose projects that are extremely expensive, 2) the taxonomic infrastructure to support them is too limited, often stretching the resources of the entire community of taxonomists), 3) the taxonomic work of identifying the known species and describing the many newly discovered species is prohibitively time consuming, and 4) typically, easily curated taxa and those of larger species are emphasized, leaving the smaller, more difficult and often the bulk of the species uninterpreted. In order to overcome these obstacles, our project preserves many of the ambitious elements of an ATBI, but is focused on Diptera from a small, definable area.

Scientific products

Our comprehensive and unique inventory of Diptera will answer questions about local to global species richness, as well as diversification among groups of Diptera. Based on the sophisticated knowledge of our expert taxonomic collaborators, we will also characterize and describe the ecological roles and

guilds represented by the taxa at our primary site. Both print and web results will be produced. In addition, our sampling protocols allow us to address questions related to inventory methods, which will help guide future efforts. These questions include: - how effective are various methods of collecting for the entire 123 x 182 m area? - how does species diversity of selected groups of Diptera change year to year? - how does species diversity of selected groups of Diptera compare to near and far sites at the same elevation within Costa Rica? For some groups, broader comparisons are possible (i.e., with all of Central America and even the whole world).

Fig. 2. Map of Costa Rica showing position of the three study sites, INBio and San Jose.

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Additionally, just as the MCAD project stimulated a high level of genus- and species-level research and description, as authors made names available for many previously unknown genera (e.g., Borkent 2008; Kung & Brown 2005; Mathis 2008; Norrbom 2006; Wheeler & Mlynarek 2008), our project will likely stimulate the description of many previously unnamed species and encourage the further interpretation of this tropical fauna.

Sampling locations & sampling plan

Our main sampling location is a mid-elevation (1600 m) site in Costa Rica, called Zurquí de Moravia, located at 10.047313°N, 84.008457°W (Figs. 1, 2; hereafter Zurquí). This site consists of a pair of forested ravines, one with a permanent stream and the other with intermittent water flow and some pasture (Figs. 4, 5).

We picked our site for several reasons:

- LOCATION: it is a small, circumscribed tongue of forest outside of, but continuous with, the much larger Braulio Carrillo National Park (BCNP). Together with BCNP, it is part of the water catchment system for San José, and thus an area of important ecosystem-service value;

- ALTITUDE: at 1600 m, it is in the middle elevation zone, which Janzen (1973) and Janzen et al. (1976) found to be the most species-rich in their studies, including for Diptera.

- KNOWN HOTSPOT: it is an exciting site where previous collections have uncovered many new taxa in the groups that have been studied (e.g., Brown 1993a, 1994, 1996, 1997, 2001, 2002; Gauld, 1991, 1997; Godoy & Webb 1994; Pollet 2005), and will thus yield a high number of previously unknown species.

- HABITAT DIVERSITY: the site has a significant number of different habitats, including mature cloud forest, small adjacent, abandoned pastures, and an ever-flowing stream; there is a rich topography, with many microhabitats, a high plant diversity, abundant rotting wood, bromeliads and other phytotelmata, and leaf-cutter and army ant colonies (hosts of many commensal and parasitic Diptera species).

- LOGISTICS: Our site is privately owned by Jorge Arturo Lizano (Fig. 3), who has supported research there for decades. He has cabins at the site and we are renting one of these as a place for our parataxonomists to stay for 3 days/ month (for additional collecting), as a place to store our equipment, and for visiting scientists to use.

Within the Zurquí site, we will collect only in the 123 m x 182 m area bounded by the box in Fig. 1. This area encompasses a main forested ravine, with a single side branch. Small trails allow access to the forest interior, as well as other habitats, such as riparian areas, old pasture, and forest edge (Figs. 4, 5).

Our secondary sites are in Tapantí National Park and Las Alturas. Located 40 and 180 km distant from Zurquí (Fig. 2), respectively, both are cloud forests at the same elevation as Zurquí (1600 m), and have nearby streams comparable to that of our main site. Their Diptera faunas are even more poorly-known, however, and could include many further new species.

Fig. 3. Left to right, Art Borkent, Jorge Arturo Lizano (owner of Zurquí), Brian Brown. after dinner.

Fig. 4. Permanent stream at Zurquí, with emergence trap in place.

Fig. 5. Edge of forest on east edge of Zurquí study site (just west of the rented cabin).

At first glance our sampling may seem highly restricted, but it is intended to successfully inventory a finite area and not be diluted by material from ever-widening collecting localities (i.e., all of BCNP). In our area we expect to collect many hundreds of thousands of specimens and certainly over two thousand species, and to adequately sample, prepare, and study this material will be a tremendous task. For some families, study of Zurquí material will be all that will be possible because of the number of specimens and species. For a number of families with fewer specimens and species, however, we will also compare the diversity at Zurquí with Tapantí and Las Alturas. We know so little about the turnover of

Neotropical Diptera that, even with restricted sampling and using only focal taxa, we will be documenting for the first time how faunas differ across large distances.

Our sampling plan is two-tiered, as follows:

Tier 1. Inventory of all species of Diptera collected at Zurquí, using a wide variety of traps such as Malaise traps, light traps, pan traps, emergence traps (both aquatic and terrestrial), and bait traps, as well as hand collecting over the space of one year. Our two Malaise traps (one on the forest edge, one by the permanent stream, both with alcohol) are being run continuously. Additional trapping will take place for three days each month when two of the parataxonomists (Wendy and Marco) will be staying at Zurquí as well as an occasional day (particularly those which are sunny!) when most of the parataxonomists will be collecting.

We will continue sampling at Zurquí during the second and possibly even the third year of our study for select families with smaller numbers of species and for species or genera with particularly interesting life histories. All participants are encouraged to search for and record life history information for flies. Some types of collecting lend themselves to this type of data gathering, such as rearing and hand collecting, and will be augmented by photographs and notes that can be used on web pages. For instance, we will rear Diptera from galls (aided by Dr. Paul Hanson from the University of Costa Rica) that will be photographed on their host plants in the field; similarly, we will photograph the hosts of parasitoid Diptera, such as fireflies (Coleoptera: Lampyridae) attacked by parasitic phorids. We will record perch positions of predatory asilid flies and the locations of mating swarms of any Diptera we encounter. Vouchered biting records for mosquitoes, black flies, and biting midges will be collected.

Tier 2. Comparative study at Tapantí and Las Alturas will involve sampling each site with a single wet Malaise trap for one year. We expect only to use these samples for well-studied focal taxa.

Project Schedule

Year 1: Collecting for both Tiers to take place. Our intention is to do virtually all of the needed collecting in the first year, so that technicians can thereafter concentrate on preparing and distributing material in a timely manner. This one-year collecting period also makes our inventory a tighter snapshot in time, representing the fauna at this site for October, 2012- October, 2013, and making it a clearer baseline for future change.

Year 2: Continued specimen preparation and distribution to experts, identification to be completed for most groups. Continued Malaise trap and specialized sampling for select groups.

Year 3: Finish all specimen preparation and identification. Analysis of data and preparation of manuscripts and completion of web pages, with photos of all genera and many species.

Our Team and Beginning the Inventory

We are delighted to have the full support of the Instituto Nacional de Biodiversidad (INBio) in undertaking this project. Manual Zumbado (Coordinator of Biosciences) and Carlos Viquez (Inventory) are helping to coordinate the work with the goals and materials at INBio.

In addition, we are very fortunate in having six others working full time on this project (Fig. 6). Anna Holden is our project manager. She has a background in both biological inventories and science outreach, and will be based at the Los Angeles County Museum. Her job is to facilitate ZADBI strategic

Fig. 6. The ZADBI team: Back row, left to right: Manual Zumbado, Brian Brown, Art Borkent. Front row, left to right: Elena Ulate, Wendy Porras, Anna Holden, Carolina Avila, Annia Picado, Marco Moraga.

planning, dataflow, the movement of supplies and specimens to and from Costa Rica, gather data from specimens identified by the taxonomists, develop research projects with the Universidad de Costa Rica, and help to interpret our results for the public through our upcoming ZADBI website and other forms of educational outreach.

We have five parataxonomists working at INBio: Wendy Porras, Annia Picado, Marco Moraga, Elena Ulate and Carolina Avila. The field work is being overseen by Wendy and Elena is managing the lab. Everyone will be involved in sorting and preparing material but Marco will also be working in the field and Annia will generally be making slides. Carolina will be sorting and preparing pinned material.

All parataxonomists are working in a single large room at INBio that is provided with a fume hood and all the tools necessary to complete their work (Fig. 10).

Brian, Art and Anna visited INBio Sept. 7-16, 2012 to begin the groundwork of the project. We spent time meeting with Manuel and Carlos to ensure that our project coordinates well with INBio (especially data basing), meeting with the parataxonomists (some for the first time) talked about our goals, worked on the sampling and preparation protocols and initiated the preparation of the first material we collected at Zurquí (Figs. 7-12). We had a full and wonderful day to familiarize everyone with the collection site

Fig. 7. Going over the sorting protocols to ensure that fragile groups remain in good condition.

Fig. 8. Marco Moraga and Carolina Avila sorting Diptera to family.

Fig. 9. Brian Brown showing Carolina Avila the finer points of identification.

at Zurquí (Figs. 13-19) and made a number of good discoveries (including a sciarid with very peculiar wing venation). Most of our parataxonomists are already highly skilled, being able to make good preparations, including sophisticated slide mounting and, as a group, they can already identify all Diptera to at least the family level. They are a gifted and enthused team and we are very fortunately to be able to have their help with this project!

Fig. 10. Elena Ulate and Annia Picado in the lab.

Fig. 11. Annia Picado preparing microscope slides.

Our Collaborators

Of course, none of this project would be possible without the cooperation and support of a worldwide network of taxonomic experts. We have 42 primary collaborators, as listed below, and a number more who have been invited by some of these collaborators to help them with a given family. It isn't certain, by any means, that all of the families below are present at our sites. So far (in the first few weeks of sampling) we have recorded 44 families (noted in bold below).

Tipulidae	Jon Gelhaus
Blephariceridae	Greg Courtney
Bibionidae	Dalton Amorim
Mycetophilidae	Peter Kerr
Ditomyiidae	Peter Kerr
Keroplatidae	Peter Kerr
Diadocidiidae	Peter Kerr
Lygistorrhinidae	Peter Kerr
Sciaridae	Heikki Hippa
Cecidomyiidae	Mathias Jaschhof
Chironomidae	John Epler
Ceratopogonidae	Art Borkent
Simuliidae	Peter Adler
Dixidae	Art Borkent
Corethrellidae	Art Borkent
Culicidae	Tom Zavortink
Scatopsidae	Dalton Amorim
Psychodidae	Greg Curler
Anisopodidae	Dalton Amorim
Stratiomyidae	Norm Woodley
Asilidae	Eric Fisher
Xylophagidae	Norm Woodley
Athericidae	Norm Woodley
Rhagionidae	Norm Woodley
Tabanidae	John Burger
Vermileonidae	Norm Woodley
Pantophthalmidae	Norm Woodley
Xylomyidae	Norm Woodley
Acroceridae	Norm Woodley
Bombyliidae	Carlos Lamas
Mydidae	Norm Woodley
Scenopinidae	Norm Woodley
Therevidae	Steve Gaimari
Dolichopodidae	Marc Pollet

Empididae	Jeff Cumming / Brad Sinclair
Phoridae	Brian Brown
Syrphidae	Chris Thompson/Manuel Zumbado
Platypezidae	Brian Brown
Pipunculidae	Jeff Skevington
Agromyzidae	Stephanie Boucher
Milichiidae	John Swann
Chloropidae	Terry Wheeler
Sphaeroceridae	Steve Marshall
Drosophilidae	David Grimaldi
Tephritidae	Al Norrbom
Micropezidae	Steve Marshall
Neriidae	Alessandre Colavite
Pseudopomyzidae	John Swann
Tanypezidae	Owen Lonsdale
Psilidae	John Swann
Conopidae	Jeff Skevington
Lonchaeidae	Cheslavo Korytkowski
Ulidiidae	Valery Korneyev
Platystomatidae	Valery Korneyev
Pyrgotidae	Valery Korneyev
Ctenostylidae	Valery Korneyev
Richardiidae	Valery Korneyev
Piophilidae	Al Norrbom
Lauxaniidae	Steve Gaimari
Chamaemyiidae	Steve Gaimari
Sciomyzidae	John Swann
Ropalomeridae	Sergio Ibáñez-Bernal
Sepsidae	Vera Silva
Clusiidae	Owen Lonsdale
Odiniidae	Steve Gaimari
Anthomyzidae	Kevin Barber
Aulacigastridae	Alessandra Rung
Periscelididae	Alessandra Rung
Asteiidae	John Swann
Carnidae	Terry Wheeler
Heleomyzidae	Norm Woodley
Chyromyidae	Terry Wheeler
Curtonotidae	John Swann
Canacidae	Wayne Mathis
Diastatidae	Wayne Mathis

Ephydridae	Wayne Mathis
Inbiomyiidae	Brian Brown
Muscidae	Jade Savage
Tachinidae	Monty Wood/ Manuel Zumbado
Hippoboscidae	Carl Dick
Streblidae	Carl Dick
Nycteribiidae	Carl Dick
Scathophagidae	Verner Michelsen
Anthomyiidae	Verner Michelsen
Fanniidae	Jade Savage
Calliphoridae	Terry Whitworth
Sarcophagidae	Thomas Pape
Rhinophoridae	Thomas Pape
Oestridae	Thomas Pape

Specimen preparation

Of critical importance is the proper and full preparation of specimens for our collaborators. We have contacted everyone and received their input as to how they would like their families curated. There is a surprising diversity of protocols for the various groups. Some need to be slide-mounted (Canada Balsam for some, Euparol for others; different layout of dissected parts for different groups), pinned (directly, pointed, some on minuteens), and a few prefer their specimens in alcohol. The parataxonomists (who are remarkably skilled) have been instructed in the various protocols and methods and are doing a great job.

Fig. 12. Art Borkent and Brian Brown sorting Diptera in the lab.

We plan on sending a limited sample of specimens to various collaborators within the next month or two to receive their direct input on the quality of the curation. We are attempting to provide "perfect" specimens to everyone, knowing ourselves how this is so often a severe bottleneck in identification.

Although Tier-1 sampling involves an inventory of all species from Zurquí, we do not intend to prepare all the specimens from this, or any other traps. Indeed, to do so would be an extravagant waste of time and physical resources. Even a single Malaise trap catches many thousands of specimens per month. For rarer taxa, every specimen will be prepared. However, for abundant taxa, our sorters will select morphotypes for further preparation and send them to the relevant expert, indicating that more specimens are available if it is necessary to see them. Feedback from the experts will guide further sorting and any modifications to the specimen preparation process.

In addition, in some groups only one sex can be identified. For instance, in phorid flies, we can identify only males, parasitic females, and brachypterous females. For chironomids, only males can be reliably identified to species. Our goal is to inventory, not revise, the fauna, so we will not spend time trying to

associate the sexes in families where the taxonomy is based on one sex or the other. The remaining material will be left for later study, and stored permanently at either INBio or LACM.

Fig. 13. Brian Brown and Anna Holden setting up a dry Malaise trap at Zurquí.

Fig. 14. Wendy Porras, Marco Moraga and Art Borkent setting up a light trap at Zurquí.

Specimen identification plan

Genus-level identification in most groups will be straightforward, using the Manual of Central American Diptera (Brown et al. 2009, 2010) and our collaborators' expertise. Some specimens will be identifiable to named species; others will be designated as morphospecies by the experts, i.e., "Megaselia ZUR-12." Collaborators will be encouraged to write keys to their species (named and unnamed), so that future users of this material can recognize them. Each of the species will be vouchered by specimens deposited in INBIO and databased by our staff. The specimen records will be databased in the ATTA system at INBio and served directly to GBIF. Their information will thus be available to a wide range of users.

Our species concepts are based on morphology. We realize that some such species are complexes of cryptic species, and that we are possibly underestimating the total diversity with this approach. The teasing out of such cryptic relationships, however, are best left to species-level revisionary work on a large scale, considering material across the entire geographic range of occurrence.

Large scale use of molecular techniques to resolve cryptic species is beyond the scope and funding availability for our project, but we are collecting and initially preserving all specimens in 95% alcohol

for collaborators to use in ongoing or future studies. Obviously some prepared material will no longer be amenable to molecular work (e.g. slide mounted specimens).

Data analysis plan

Identification of all species from the single Malaise trap is the minimum level of engagement for our project but actually all collaborators have indicated their desire to study all members of their families collected at Zurquí (Tier 1). This inventory alone will give an unprecedented insight into the fauna of this locality, especially for small species.

A primary objective of our project is to provide an inventory of Diptera at Zurquí, and most of our effort will be directed towards this ambitious goal. Our data collection methods, however, will allow some other analyses to be made. Tier 1 data will be comprehensively collected for each group of Diptera found at Zurquí. Each species collected from trap samples will be recorded. Collaborators will be directed to fill in a data sheet, in Excel format. These data will then be used to construct species accumulation curves to investigate which taxa are approaching full inventory, and which are still undercollected by our methods.

Fig. 15. Permanent stream at Zurquí, sweeping by Annia Picado and Marco Moraga.

Further sampling at Zurquí will allow us to extend our knowledge for selected taxa, to learn how many more species a second year of trapping would provide, to study more accurately the effects of seasonality, and to assess the degree of species turnover. Such sampling will also make possible comparisons with the few similar sampling efforts in other parts of the world. For instance, Owen (1991) found that it took two years of Malaise trapping with a single trap to collect all of the common syrphid flies in her English garden. We expect that a tropical site will not be so quickly inventoried, and will have data to directly compare with Owen's.

Various sampling methods used at Zurquí will allow us to study complementary collecting techniques, such as whether one or two methods together can collect a significant fraction of the fauna with less effort. Remarkably few investigations have been made that compare sampling methods for any groups of Diptera, especially in species-rich areas like the New World tropics (except for medically important Diptera, for which there are many such studies). Our results and comparisons will contrast with studies from other areas (such as Disney et al. 1982 for England; Kitching et al. 2004 for Australasia) and inform future tropical inventory efforts, including our own at other sites.

Tier 2 data will be gathered from the Malaise traps operated at Tapantí and Las Alturas. They will be reported in the same format as for Tier 1, and will be compared with results from Zurquí. We will gather

basic data, such as the overlap of species among the three sites, a listing of species found only at single sites, and species accumulation curves. We will calculate basic diversity measures (Shannon index, Simpson's index, Fisher's alpha, and evenness) for both the total fauna as well as subsets and test for significant differences using ANOVA. These data will begin to show, for the first time, the magnitude of difference among Malaise traps at three different localities for an array of Diptera taxa.

Fig. 16. Marco Moraga and Art Borkent setting up a frog-call trap to trap Corethrellidae.

Based on well-sampled groups like tabanids and culicids, which are almost all described at the species level, we will be able to extrapolate our inventory data to the entire fauna for the New World tropics or even broader areas. For instance, if the entire Diptera fauna of Zurquí is 2,000 species, and well-sampled families are represented by 5% of their known New World species at Zurquí, then we can postulate that there are at least 40,000 New World Diptera. Furthermore, discovery of high diversity in some groups at Zurquí, greater than the named fauna of Costa Rica, Central America and perhaps even broader areas, give insight concerning undescribed faunas. Such numbers identify taxa of particular concern for further research ("who knew there were so many psychodids?"), and give insights into the diversification of the Diptera. They also capture public interest, and perhaps engender concern for the magnitude of tropical biodiversity and its loss. In our opinion, any attention on Diptera, besides that given to the negative effects of a few pest species, is worthwhile and valuable.

Fig. 17. The rented cabin at Zurquí.

Dissemination of results

Aside from publishing a variety of papers from this project, we are also constructing a website which will provide a platform to share results with our colleagues as well as the general public.

Our web site will have information for both the general public and researchers. Methods and background of the project will be included, as well as new discoveries. We will present a photograph of each fly family, along with its common and scientific name. Clicking on a given family will lead to a photograph of the researcher working on that group, a brief description of that person's interests, and a synopsis of the family and its habits. A list of genera will be provided and each will lead to a further link, with a photograph of at least one species of the genus and discussion of its features. A list of species and morphospecies will be given, as research unfolds, and we will include as much info on each of these as possible (including life history information). As such, individuals interested in biodiversity in general and specifically in Diptera can see what our study has revealed about the flies we are studying.

Diptera Blitz

We are planning a coordinated effort by ourselves and many of our collaborators by holding a Diptera Blitz at Zurquí. Our grant includes funds to support travel by some of our American colleagues (as restricted by NSF) and we are hoping that others may be able to pay for their own flights (some support in Costa Rica will be available). Although we are thinking about May, 2013 as a good date to gather, we need to do some more exploring in this regard.

Fig. 18. Marco Moraga experiencing the consequence of a full day of collecting at Zurquí.

Fig. 19. Brian Brown photographing an interesting Tipulidae trapped on a baked potato and spotted by Marco Moraga during dinner! Only true Dipterists would show such enthusiasm over a fly in their meal.

Student competition

We also plan to host two week trips for a selection of American graduate students during our three year project, to introduce them to the methods and challenges of a major biodiversity survey and to encourage further research on Diptera. Further details will be forthcoming.

Closing thoughts

This proposed research was enthusiastically received by reviewers, but difficulties with some budget items made it a challenge to receive NSF funding. We now have the funding to proceed and thanks to

our strong network of collaborators we will do the previously unthinkable – a full Diptera species inventory of a tropical site! As the samples and specimens pour in, you will hear more from us about the discoveries we and our team make.

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New Smithsonian Institution NMNH dipterist

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I am very excited to announce that I have accepted the position of Research Entomologist / Curator at the National Museum of Natural History in Washington, DC and that I will join the USNM Diptera unit in early November. I will continue my phylogenetic, taxonomic, and biodiversity research on Apioceridae, Asilidae, and Mydidae and look forward to getting to know the extensive robber fly collection of more than 400 drawers as well as other parts of the Diptera collection.

My curatorial responsibilities will include all families of Asiloidea at this stage with additions in the future. In previous years, these families were divided between Chris Thompson and Norm Woodley. If you would like to study material of Asiloidea from the USNM or to find out what species we have, please send inquiries by e-mail to me. Note that the entire USNM collection of Bombyliidae is on a long-term enhancement loan to the Bernice P. Bishop Museum in Honolulu, HI, and is under the care of Neal Evenhuis (neale@bishopmuseum.org).

If you are a curator of a collection from which I have borrowed material, please be assured that the specimens are with me now at the USNM and are taken care of. I will continue to study material from these loans and will do my best to return this material when done.

I am looking forward to working for many years in the USNM Diptera collection, conducting research based on this vast collection, expanding the collection through my own field work, as well as to curating parts of it and making data about the specimens accessible online. I am sure I will greet many readers of *FlyTimes* at one stage or another at the USNM and I am very much looking forward to having you utilize the collection for your research.

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Dipterist Postdoc in Brazil

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Greetings fellow dipterists! I just wanted to send an update out... I've got a postdoc fellowship at INPA under the supervision of Dr. José Albertino Rafael and I'm currently working on a Syrphidae picture key for the Brazilian central amazon and I'm also writing up a few revisions (groups from *Ocyptamus* sensu lato).

During my work here I was casually trying to obtain a frontal view of the hypandrium and phallus of *Chalcosyrphus (Neplas) bidens* (fig., left) and ended up with an angry gentleman staring back at me (fig., middle). You got to love these composite images... People told me that it actually might be Jamie Heyneman from the Mythbusters TV series (fig., right). You can be the judge...

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Big Collection Move in the West

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In an effort to make both collections better, Brian Brown of the Los Angeles County Museum of Natural History and James Pitts of the Utah State University have agreed on a large exchange of specimens. The entire USU Diptera collection, amassed largely by Wilford Hansen, will be sent to the LACM in exchange for the LACM general Hymenoptera collection (non-bees and non-ants). The total number of specimens is unknown, but assumed to be approximately equal at about 600 drawers of material on each side. The USU Diptera collection is mostly Neotropical, and rich in undescribed species. Its greatest strength is the Stratiomyidae, which makes up about 83 drawers of the total. This exchange will give the LACM a large Diptera collection, with the strats joining phorids, blephariceridsand psychodids as major strengths. Most of the material will be exchanged by the end of the year, with the strats coming later.

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Dipterological Poems II

Gordon Ramel

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Mycetophilidae

How straight of limb they stand, how tall and strong,
their armour clean and polished as if new,
an humble people these, and ancient too,
part of the world to which we all belong.
Born to the Earth, nutured within the soil,
they shun dry towns, but love our moors and woods
where they can dine on well recycled goods;
and to the gods of green and damp they’re loyal.
As adults they use only what is free,
a flower’s wine, a dewdrop from a leaf,
their lives are bright and clear, though sadly brief;
they do no harm at all that I can see.
Who called them gnats? These warriors of light,
to me each one’s a brave and noble knight.

Tabanidae

Horse flies are never loved, I know,
except by entomologists
and poets who have minds that go
where-ever some strange truth exists.

Their beauty though, is plain to see
it's in their eyes, as well as mine,
and minds that knowledge has set free
appreciate a good design.

They're found on every continent,
from tropic hot to tundra cold
the whole world's their environment,
they're big, and buzzy, bright and bold.

Their larvae feed within the soil,
the adult males love nectar most,
and pollination is their toil
from mountain peak to sandy coast.

The problem lies, so we must think
not in the way their men folk live
but in their females taste in drink;
and in the nasty bite they give.

Her knife like jaws will slash my skin
and let my precious blood run free,
so she can quickly take it in;
and use it procreatively.

How little of my blood she needs,
if only she were on her own
I might ignore her as she feeds
but horseflies never live alone.

Where there is one there's many more
and with their iterative breeding
I know it won't be long before
she's back again for further feeding.

And sadly too, her bite brings pain
I cannot see it as a gift;
she will not bite my leg again,
for my response was hard and swift.

I know she has no choice, I see
she is the beauty and the beast,
but death is all she gets from me,
when tempted to make me her feast.

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Review of:
Borkent, A. 2012. The pupae of Culicomorpha—
morphology and a new phylogenetic tree. *Zootaxa* 3396: 1-98.

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Art Borkent has been a busy dipterist in recent years. His activities have included, among other things, publication of an award-winning monograph on Frog-biting Midges (Corethrellidae) (Borkent 2008) and serving as co-editor and major contributor for the *Manual of Central American Diptera* (Brown *et al*. 2008, 2011). With the recent publication in *Zootaxa* of a detailed review of culicomorph pupae, Borkent fills another major gap in our knowledge of lower Diptera. His most recent monograph provides much-needed information and insights on pupal structure and homologies across a diverse and important group of flies. Among the most valuable contributions of the paper is a glossary for homologous structures across all culicomorph taxa, including a common chaetotaxy. This information, which is summarized succinctly in two detailed tables, provides a clear and comprehensive comparison of structures and chaetotaxy across all culicomorphs and the Ptychopteridae, the presumed sister-group of Culicomorpha. Other important contributions are a key to pupae of all culicomorph families and detailed descriptions of the pupae of these families and the Ptychopteridae.

Borkent's phylogenetic analysis includes 92 characters, among them features of the egg (1), larva (21), pupa (33) and adult (37). Each character is discussed in detail, followed by sections on misinterpreted- and conflicting synapomorphies. Results of the analysis provide a novel hypothesis with Chironomidae the sister-group to a clade comprising the remaining culicomorph families. Although support for the latter is relatively weak (bootstrap of 40 and Bremer support of 1), the clade is defined partly by a pupal character that appears to be unique. This clade in turn forms two well-defined monophyletic groups, the Culicoidea and Simulioidea. The first of these contains the historically recognized clade of Dixidae (Corethrellidae (Chaoboridae + Culicidae)) whereas the Simulioidea comprises a novel arrangement with Ceratopogonidae as sister-group to Thaumaleidae + Simuliidae. Both major lineages are supported by multiple synapomorphies, with strong bootstrap- and Bremer-support (e.g., values of 96 and 5, respectively, for Culicoidea, and 99 and 8, respectively, for Simulioidea).

The monograph also places known fossils and presumed date of origin on the phylogenetic framework, and includes an insightful discussion of bionomic divergence, emphasizing adult feeding behavior (e.g., evolution of haematophagy on vertebrates) and larval habitat. The text is richly illustrated with 30 plates, 27 of which show multiple detailed drawings or light micrographs of pupal structures. With this publication Borkent has once again produced a comprehensive and compelling study that establishes a solid foundation for future investigations.

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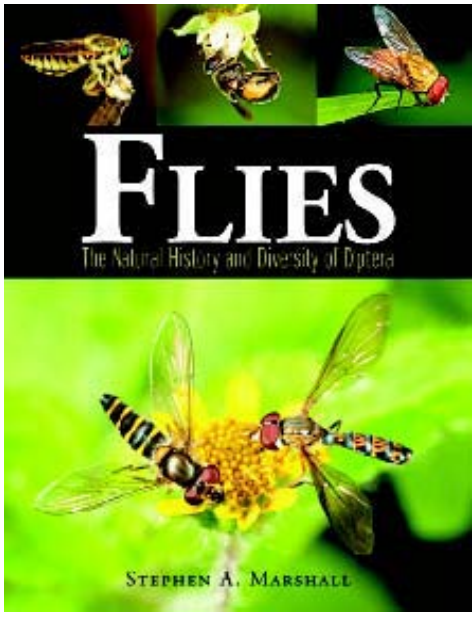

Announcing the Pulbication of:
FLIES: The Natural History and Diversity of Diptera
by Stephen A. Marshall

Meticulously researched and illustrated with more than 2000 color photographs taken by the author, ***Flies*** is a landmark reference book that will be indispensable to any naturalist, biologist or entomologist. Most photographs in this encyclopedic reference were taken in the field and show the insects in their natural environment. All of the world fly families are covered and the book contains species such as the common house fly, the elusive African stalk eyed flies and giant robber flies of North Vietnam, the strikingly beautiful Andean flower flies and giant hedgehog flies, to the deadly tsetse flies and malaria mosquitoes. This 616 page work from Firefly Books, 8 1/2 by 11, with gloassary, bibliography, pictorial key to families, and over 2000 color photographs!

Flies is broken up into three parts: Life Histories, Habits and Habitats of Flies; Diversity; and Identifying and Studying Flies. The 20 pages of profusely illustrated keys linked to the unprecedented photographic coverage of the world's fly families and subfamilies enable the reader to identify most flies quickly and accurately, and to readily access information about each family as well as hundreds of distinctive genera and species.

Flies includes:

Part 1: Life Histories, Habits and Habitats of Flies
Chapter 1 – Life Histories of Flies
Chapter 2 – Flies, Plants and Fungi
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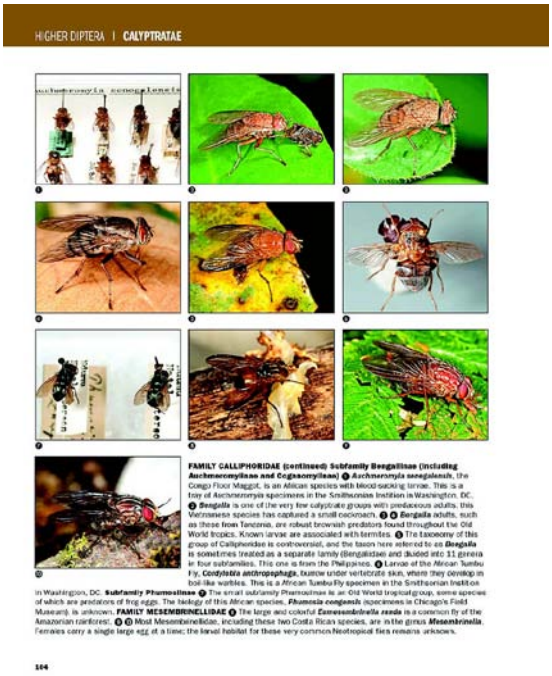
Chapter 4 – Flies and Invertebrates

Part 2: Diversity
Chapter 5 – Origins and Distribution of the Diptera
Chapter 6 – The Lower Diptera
Chapter 7 – The Lower Brachycera and Empidoidea
Chapter 8 – The Higher Brachycera or Cyclorrhapha

Part 3: Identifying and Studying Flies
Chapter 9 – Collecting, Preserving and Rearing Flies
Chapter 10 – Identifying Fly Families



HIGHER DIPTERA | CALYPTRATAE

FAMILY CALLIPHORIDAE (continued) Subfamily Bengalinae (including Auchenomyiinae and Coginosomyiinae) ❶ *Auchenomyia senegalensis*, the Congo Floor Maggot, is an African species with blood-sucking larvae. This is a tray of *Auchenomyia* specimens in the Smithsonian Institution in Washington, DC. ❷ **Bengalia** is one of the very few calyptrate groups with predaceous adults. This Vietnamese species has captured a small cockroach. ❸ ❹ **Bengalia** adults, such as these from Tanzania, are robust brownish predators found throughout the Old World tropics. Known larvae are associated with termites. ❺ The taxonomy of this group of Calliphoridae is controversial, and the taxon here referred to as **Bengalia** is sometimes treated as a separate family (Bengalidae) and divided into 11 genera in four subfamilies. This one is from the Philippines. ❻ Larvae of the African Tumbu Fly, *Cordylobia anthropophaga*, burrow under vertebrate skin, where they develop in boil-like warbles. This is a African Tumbu-fly specimen in the Smithsonian Institution in Washington, DC. **Subfamily Phumosiinae** ❼ The small subfamily Phumosiinae is an Old World tropical group, some species of which are predators of frog eggs. The biology of this African species, *Phumosia congensis* (specimens in Chicago's Field Museum), is unknown. **FAMILY MESEMBRINELLIDAE** ❽ The large and colorful *Eumesembrinella randa* is a common fly of the Amazonian rainforest. ❾ ❿ Most Mesembrinellidae, including these two Costa Rican species, are in the genus **Mesembrinella**. Females carry a single large egg at a time; the larval habitat for these very common Neotropical flies remains unknown.

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CHAPTER 3

Flies and Vertebrates

Blood Feeding, Disease, Myiasis, Dead Bodies and Forensic Dipterology

MANY FLIES HAVE AN INTIMATE ASSOCIATION with mankind and other vertebrates, imbibing their blood, consuming their tissues or developing in their remains. Females of some groups of lower Diptera and lower Brachycera acquire protein for egg production by biting vertebrates, a habit best known in the mosquitoes (Culicidae), black flies (Simuliidae), punkies (Ceratopogonidae), horse flies (Tabanidae) and sand flies (Psychodidae) but also found in the frog midges (Corethrellidae), some snipe flies (Rhagionidae) and a few athericid flies (Athericidae). Only a few lineages of higher Brachycera (Cyclorrhapha) have blood-feeding adults, but in these groups (including the entire Hippoboscoidea and several genera of Muscidae), both sexes bite. In some Muscidae, Piophilidae and Calliphoridae the larvae do the blood feeding, usually attacking nestling birds, although some African calliphorid maggots imbibe mammal blood (including that of humans).

Blood-feeding flies are important disease carriers, but diseases of humans and animals are also carried by non-biting species. Eyes and other moist membranes attract flies, such as some Chloropidae and Drosophilidae, that can transmit conjunctivitis. Many other flies, especially Muscidae and Calliphoridae, move freely from filth to food and carry along a variety of microorganisms responsible for enteric (gastrointestinal) diseases. When flies have an even more intimate association with living vertebrates, developing under the skin or in the digestive system, it is referred to as myiasis. All species of Oestridae, some Calliphoridae and a few Sarcophagidae are obligate myiasis-causing flies whose larvae live as parasites inside vertebrates. Other families of flies have a more opportunistic approach to myiasis, only occasionally developing in or on vertebrates (including people). For example, larvae of many kinds of flies, including Stratiomyidae, Syrphidae, Phoridae, Piophilidae and Drosophilidae, can occur in materials ingested by people and are thus occasionally implicated in facultative enteric myiasis.

Even normally innocuous fly groups that neither bite nor cause myiasis can affect vertebrates, especially when fly population densities trigger respiratory problems or allergic reactions. Midges (Chironomidae), for example, often reach such densities, as do phantom midges (Chaoboridae). Midge species that use larval hemoglobin as a respiratory pigment can cause serious allergy problems when particles from decomposing adult flies become airborne.

OPPOSITE PAGE Mosquitoes, like this *Aedes* resting under a leaf, are the most important biting Diptera. The blood-feeding females of these delicate flies are familiar nuisances and fearsome carriers of some of humankind's most serious diseases.

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Book Review:
Biology of the Snail-killing Sciomyzidae Flies
by Lloyd V. Knutson & Jean-Claude Vala
2011, Cambridge University Press

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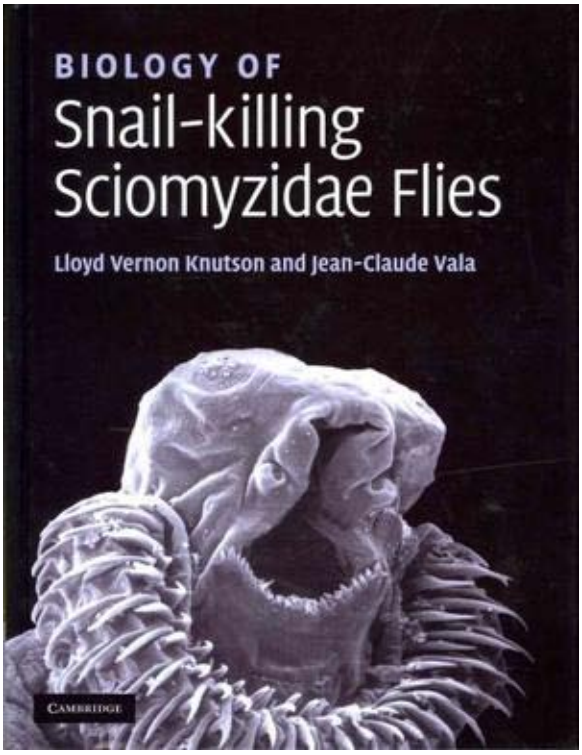

This 500+ page book brings together a great body of information concerning the biology of Sciomyzidae, a medium-sized family of acalyptrate flies. Information is also provided for the closely related Phaeomyiidae, and their biology attacking millipedes. With less than 550 species, at least some biological information is known for more than 200 species of Sciomyzidae, which is a remarkable proportion even in comparison with families including pest species! The knowledge of the biology for some species is extensive, and many details not typically addressed in general biological treatises are treated here. This provides an excellent "jumping off point" for studying the biologies for the remaining 350 species!

The introductory chapter defines terms relative to the biology of sciomyzids and snails (e.g., saprophage, parasite, parasitoid, predator), and provides an overview of the prey/host-types of Sciomyzidae. This overview includes tables of details about the molluscs attacked, including their classification, geographical region, and general habitat types. In addition, there are further details of their morphology (including figures), habitats and general biology. The next chapter provides a short overview of the non-dipteran natural enemies of molluscs in general, particularly focusing on true bugs and beetles. This chapter is followed by another short chapter focused on dipteran enemies of molluscs.

Then the focus changes specifically to Sciomyzidae. The next several chapters (4-13) are each short and focused on some small aspect of sciomyzid biology. These including chapters on life cycles, host/prey ranges and preferences, host/prey finding behavior, feeding behavior, competition (inter- and intraspecific), phenology, reproduction and development, habitats (including their potential use as bio-indicators), natural enemies, defense mechanisms (both mollusc vs sciomyzid and sciomyzd vs mollusc), and population dynamics for both aquatic and terrestrial species.

The next chapter (14) is a big one. The first 59 pages discusses the functional morphology of adults, eggs, larvae and puparia/pupae. Of particular note is the very detailed and well illustrated section discussing larval morphology. Terminology is well explained, and figures are well captioned and labeled to show what the terms mean. This chapter then goes further, giving a short discussion of the

functional aspects of sciomyzid physiology, including such things as nutrition, aspects of an aquatic larval life such as air swallowing, swimming, submerged feeding and respiration. Similar details are provided for semi-aquatic and terrestrial larvae.

The next three chapters (15-17) provide a more "taxonomy and systematics" viewpoint. The first of these chapters addresses their recognition and comparison with other families. There are several illustrations displaying the standard set of morphological terms for external and genitalic morphology of adults, as well as external morphology of larvae. The next part will surely prove to be very useful to sciomyzid workers and dipterists generally – the taxonomic keys to genera. There are several keys here, including keys to adults arranged by geographic region (Nearctic, Nearctic–Neotropical transition area, Neotropical, Palearctic, Afrotropical, Oriental, Oriental–Australian transition area, Australian and Oceanic, and Subantarctic). There are also keys to 3rd instars, also arranged by geographical region, and keys to puparia for the Nearctic and Palearctic Regions. Some couplets of the larval and puparial keys use biological information. After the keys is an overview of what is known about the interrelationships among sciomyzid genera, and among the other families of Sciomyzoidea. This summary covers most of the major works addressing the questions surrounding sciomyzid systematics, including the data that were used. The various classifications of older authors are also presented. The next chapter (16) is a treatment of zoogeography, including a useful table of the genera and where they are distributed. An attempt is made to work out dispersal routes and to discuss dispersal mechanisms. Chapter 17 is a very interesting treatment of evolutionary considerations. Among these, they present the idea that sciomyzids can be a particularly useful resource for evolutionary studies of transitions from saprophagy to predation to parasitoid behavior. This chapter goes on to discuss general aspects of sciomyzid diversity, evolutionary origins, and ecological specialization and generalization. The final sections of this chapter discuss the more recent phylogenetic studies and their data, as forming the basis for evolutionary considerations.

The next chapter (18) discusses their potential as biological control agents, including details of the various quantitative studies that have been undertaken in this regard – more than I had expected! There is a DVD enclosed, which centers around the use of sciomyzids in the biological control of snails for the prevention of snail-borne diseases caused by flukes. Particularly from a historical point of view, this is a very interesting 15 minute video narrated by sciomyzid worker Cliff Berg (who appears at the beginning and the end of the video, collecting sciomyzids!).

Chapter 19 gives a very nice historical review of the study of sciomyzids, including a short review of the relevant literature, a review of evolutionary and biological studies, morphological studies of immatures, and more quantitative research including biocontrol. Biographical notes are also given for three past sciomyzid workers (Cliff Berg, George Steyskal, Jean Verbeke), as well as three current colleagues (Rudolf Rozkošný, Stuart Neff, Ben Foote). The DVD should also be noted here, because it is historically interesting!

Chapter 20 gives an overview of the methods used for studying Sciomyzidae, including general collecting and rearing methods, and preservation techniques for studying adults and immatures. There are also notes on the major collections of Sciomyzidae. This is followed by the final chapter (21), which is a world checklist of Sciomyzidae and Phaeomyiidae, which is a large table arranged by subfamily, tribe, genus, and then alphabetical by species. Although it all appears to be presented accurately, the way species are listed when there are subgenera is odd. A genus is listed, with the subgenera listed and indented below; then the species are listed in alphabetical order by specific epithet with an abbreviation of the proper subgenus (e.g., under *Pherbellia*, the subgenera are listed in full, and then the species are arranged as "*Dt. cinerella, G. cingulata, Dt. clathrata, G. costata, C. czernyi*," etc. For each entry, the

author and year is provided (and the work is in the references), and for the species, which collection(s) hold the type(s) and the geographic distribution.

There is an extensive list of references, and a guide to the equations used in quantitative biological studies. There are indexes for subject, genera/species other than Sciomyzidae/Phaeomyiidae/ Mollusca, group names other than Sciomyzidae/Phaeomyiidae/Mollusca, and suprageneric names in Sciomyzidae/Phaeomyiidae. What is missing is an index covering sciomyzid, phaeomyiid and molluscan names – but the nature of such a work may have numerous entries for any given name, and might have been onerous to produce.

Overall, this work is certainly a necessity for the desk of any acalyptrate fly specialist, particularly those interested in sciomyzids, but there is certainly enough here to satisfy anyone with an interest in the evolution of predation and parasitoid behavior, and this book goes much further than that!

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Farewell from a (slightly) 'grumpy' editor

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For a decade I have been one of two, or three, now four editors of *Systematic Entomology* and have been responsible for handling papers concerning not only with Diptera, but across all orders including many Coleoptera after Frank Krell moved on, Hymenoptera before Lars Vilhelmsen replaced Frank, and Lepidoptera prior to Thomas Simonsen's addition to the editors. Each year I have summarised the previous years' statistics for the journal (as an "Editorial' carried as the first article in each year's volume) and in doing so have assessed some trends across the field. Some of these accumulated ideas have been presented by invitation (or without) at meetings including to PEET in Illinois in 2004, briefly to ECN (2009) and to joint Australian-New Zealand Entomological Societies in shaky Christchurch last year. Now that I am standing down as editor (following an overlap period with Shaun Winterton who replaces me fully next year) I thought it timely, and perhaps helpful to colleagues and the next generation of dipterists, to identify some lessons learned and to point up some issues where there has been significant misunderstanding concerning scientific publication.

Manuscripts concerning Diptera have been published in *Systematic Entomology* since its earliest issues. Over the past decade we have published on average 6 papers concerning Diptera each year, ranging between 2 and 10 per volume. This spread is equivalent to between 5 and 25% of all primary research papers: over the period the average is close to 15%. Since this period of 10 years covers my editorship of the journal, following on from dipterist Ralph Harbach who edited the journal unaided for many years previously, I can examine some trends in systematic entomology studies since the turn of the 21st century. In that period, the journal has logged over 1,000 submissions, of which approximately a quarter were deemed at the outset to be unsuitable ('fail to meet explicit journal guidelines for content'). Of those that enter the review process, half are accepted eventually for publication. These rough proportions have remained unchanged even as the annual page allocation has increased (now to 840 pages per year) and the published length of each article on paper has diminished with the increased use of Supporting Information for 'non-core' data.

What criteria are used in accepting or rejecting manuscripts ?
Quite a few papers do not go beyond the editor, or editor plus a specific adviser's review. All journals provide some guidance as to what is considered their remit (market niche). Of course most journals want a good flow of submissions and none want to be too prescriptive – but guidelines are there for a reason – journals seek a coherence in what is published even if few people read the articles as an issue. Although we treat *Systematic Entomology* broadly, we have narrowed by no longer taking non-insectan invertebrate papers. We think the discipline of systematics is quite well understood, but do receive requests to publish checklists, single species descriptions and other papers marginal to our core interests. Usually these come from scientists and regions in the world where it may be difficult to consult recent issues from which to gain an understanding of what we do publish. Sometimes papers that are of interest fail seriously to follow journal guidelines (of which, more below) and are returned at this stage for attention.

For manuscripts that enter the formal review system, next comes selection of reviewers. We use three, and often one is an official editorial panelist, especially where there is concern over the interest to the journal (actually to its readers). Reviewers are the life blood of the peer review system, and it is unfair to burden them with inevitable rejections, and asking also to comment on suitability of articles for a particular journal, which should be done prior or in parallel. That is, an editor is more than a PO Box for mailing requests and receiving reviews. If the editor does not know suitability, why should a reviewer?

It might be asked why we cannot accept every submission that meets the simple criterion of appropriate science judged by peer review – indeed why should criteria such as 'wider interest' matter at all? Well in reality there are economics associated with scientific publishing that are rather opaque even to many editors. Financing of publications is the subject of much recent discussion, but all we need to know here is that there is a page allowance for each issue (year). This is negotiated in advance, in our case between the editors, the Royal Entomological Society (RES) and Wiley-Blackwell who publish on behalf of the RES. Although it may seem that this is a relic of the days when costs of production of paper copy drove costs in the balance sheets, in reality these derive mainly from 'pre-production' and maintaining availability - and are much the same whether the product appears on paper or solely in e-form as a pdf. Note that payment to editors is not amongst the costs of production – we are volunteers.

This imposed constraint means that with articles of average length 17-18 printed pages, the years' allocation is filled maximally by between 40 and 45 articles. If the acceptance rate rises too high, we accumulate a backlog and problems arise: a careful balance is needed between page availability and accepted 'copy'. Many of us know of journals for which time between acceptance and paper publication has blown out, to as much as several years. Even with e-availability shortly after acceptance, this does not allow unlimited acceptance rates – for the foreseeable future, all papers need to be allocated to a paginated paper issue. And as outlined above, even if paper copy goes the way of the typewriter and an overnight postal service, any cost formula will limit the amount of copy handled even if fully electronic.

So how to avoid the reviewed but rejected category ?
Page limits mean that half of the manuscripts that go for review are rejected, or a substantial revise is requested. Inevitably this category includes manuscripts for which no reviewer or editor has demanded rejection, but approval is muted and less than enthusiastic. Typically such works will be competent (justifying review) but pedestrian, and unexciting to the reviewer(s) and editor. Problems originate often with the title and abstract which 'undersell' the study – lacking statement of hypotheses being tested, and with little or no encouragement for the non-specialist reader to persist. The work is usually not placed in a context, and is of narrow interest only to the taxonomic specialist. There are places to publish such studies, and their importance in deeper time is not challenged. However often it is no more

than a few hours' thought at the outset, or more importantly, after the meat of the paper is written, to take some care to explain to a wider systematics community why they should read, and as importantly, to cite, the work.

A secondary matter, but one that peeves me, is to receive a submission in which the research clearly is important (whether made clear or not in title and abstract) but is presented in a way that shows little or no attention to the author guidelines for the journal. Furthermore, evidently no recent copy of the journal has been viewed to determine issues such as allocation of core material to the text, and non-core supporting information to separate files. Images are sent in any style without thought for email capacity of editors or of subsequent reviewers. Last month I returned to our Author Guidelines to review and modify, convinced that there were many matters that had been neglected (judging by submissions). Not so: all of the issues typically ignored by submitting authors were there and clear to understand – but simply had been disregarded. Issues include onward mailing of manuscripts following rejection by another journal (even with that journal name still on title page) and with no effort made to modify content or layout for *Systematic Entomology*, nor even to incorporate the usually justified reviewers' requests from the previous submission. This is not only discourteous, but self-destructive, since a manuscript that shows no conformity to journal style is more likely to be rejected if reviews are ambivalent. Acceptance inevitably is more likely in these circumstances if authors have taken the courtesy to package the same data correctly. Furthermore, one should remember we are members of a small and incestuous field, the chances that any journal will invite one or more of the same reviewers who handled a manuscript at another journal is high. Three guesses how well they take reading an unmodified manuscript again? Editors have a self interest – a day spent reworking someone else's manuscript is a day not spent doing ones' own research.

Sad to say dipterists have been amongst the worst in terms of failure to follow guidance for submissions. Many manuscripts submitted would best be termed 'drafts for comment' - for which the journal gets all the work and none of the credit as these cannot be entered formally into the spreadsheets unless 'submitted' formally. This may be because a dipterist is perceived as a 'soft' editor: its hard to say, but other colleague dipterists involved in the editing process confirm this perception.

Citation statistics – why they matter

So the obvious question from the evidence above is why we (or indeed any author) should care about making their work of wider interest, and readable beyond the abstract. A simple answer, but one with much truth in it, is that if the science is unread, it might as well not have been done. Disseminating one's research involves more than emailing an unexpurgated thesis chapter to a journal editor. Equally, for journals, making science available only for the possible use of a sole reader in a decade or more's time is altruistic but inefficient when it overrides work of more urgency and relevance. The metrics we use to gain a general feel for wider interest, rates of citation (impact factors), surely has flaws and criticisms include those made trenchantly by my previous fellow editor (Krell, 2000, 2002). However all metrics are variably flawed, and we cannot escape the use of the expanded Science Citation Index (SCI) by a suite of people that need metrics concerning performance and relevance. The Royal Entomological Society and their publishers, Wiley-Blackwell, track the metrics of the stable of their seven entomological journals, because these provide an expedient way to monitor their relevance and audience capture across the discipline. This of course is the stated role of the RES and its mandate for the journals with funding rewards flowing from increased subscription and circulation. Every contributing author ought to have an eye on the metrics of their selected journals and of their own publications – even if they do not, their colleagues and administrators surely do so !

A significant element in getting cited is the clarity with which one presents the research, from title,

abstract and introduction through to the discussion – that is, aiding and encouraging the non-specialist to read, understand and cite. I believe a reason for higher citation (a true bias) attained by scientists from North America is not so much their institutional address, although it certainly does help, but reflects the quality of mentoring in communication that many students receive via seminars and from their dissertation committees.

But let's be clear, we do not request clarity of expression and coherent organisation because we get enhanced SCI, but these metrics do indicate whether we are getting submitted science to the widest readership. We may backtrack to review which accepted papers have highest, or little or no citation history, but never discriminate at acceptance on a presumption of citability. If we did so the journal would be filled with papers on molecular systematics, especially concerning mosquitoes, and with little or no morphological systematics – and it just isn't so.

Looking back as I step down as editor next year I have reviewed citation statistics for the past 10 years that are available from just a few seconds of searching in Thomson Reuters Web of Knowledge.

Citation statistics (and bias ?)

In the period 2003 to the present issue (4 of volume 37), the most cited paper of all is that of Steve Cameron and a suite of dipterists (Cameron *et al*, 2007) concerning the mitochondrial genome derived phylogeny of Diptera. In 6 years this paper has acquired 65 citations, significantly more than any other paper in the period. Also in the top10 'most cited' is Matt Bertone and coauthors (Bertone et al., 2008) on the phylogeny and temporal diversification of the flies, with 38 cites in only 4 years. These papers are worthy of this level of citation, and reflect the typical 'most highest cited' papers – which are dominated by molecular studies, with or without morphological consideration. They follow very much the earlier high citation papers handled by my predecessor Ralph Harbach, who encouraged publication of some of the earliest applications in molecular phylogenetics, those concerning the Culicidae.

At the other end of the spectrum of citation, 10 papers (of 52 concerning Diptera by their title) are uncited by anyone, even subsequently by the original authors themselves. I accepted and edited these, so either I did not consider their citability, or if I did, I got it very wrong. What if anything unites these ? I think all are interesting natural history type articles, as are several others with low citation rate. There is no general interest to them, and with hindsight, most fail to meet the journal guidelines and could have gone elsewhere more appropriately. Mea culpa ! But perhaps there is evidence of bias (towards or against) acceptance of papers according to the Order of insects ?

In the same period as the 52 papers concerning Diptera were published, almost exactly the same number concerned Hymenoptera. These had a similar spectrum of citation from 44 (often papers on ants, even more than those concerning bees) to a suite of uncited. Coleoptera papers, as might be predicted, had the most papers devoted to their systematics: 66 in total with a highest cited of 46 and a lengthy tail of uncited. These three megadiverse orders always have had an 'advocate editor' so it is interesting to seek the highest cited order for which no such editor has been in place. This is the Hemiptera – with 43 papers published, a disproportionate number relative to the lower diversity, and most papers with good visibility and citations. A partial explanation may be that there is an established history of publishing in the journal on Hemiptera (previously also under "Homoptera"), and continuing with overviews of relationships inside the order, and a range of studies of Coccoidea, Aphididae and more recently on Reduviidae, and including applied systematic studies. But also, having edited many, I can point to the high standard of scientific writing, clarity of organisation and amicable peer review amongst hemipterists – these works are easy to identify as important. The charismatic Lepidoptera, contrary to

expectation, provided only 38 papers, all of which have been cited at least once, and with nymphalid phylogenies being especially well cited.

I think in summary that the proportions of accepted papers belonging to the major orders suggests that there is no inherent advantage (or disadvantage) in having an editor that is a specialist handling the manuscript. Dipterists might even have a slight bias towards acceptance despite many failing to match the routine high quality of papers from Hemipterists. Whatever, with Shaun Winterton on board, you will have continuity with a specialist dipterist editor taking over.

Is there bias against morphological studies ?

Although it seems that there is little or no bias for or against any taxonomic group, I am often told that there is a perception of a bias towards molecular papers, and against morphological systematics. If this ever was so (and I doubt it) it has not been true for many years. Possibly the idea arose because a decade ago molecular systematists presented their work very well – with clear hypotheses tested by novel data. With hindsight some were oversold (for example, the position of Strepsiptera, published elsewhere) but it was clear to all how these papers added substantially to the body of knowledge. However, at the same time we continued to publish major morphological studies, many of which have been well cited. In fact a perceived reduction in studies of morphology formed the basis for two Opinion pieces (Wheeler, 2008; Bybee *et al*, 2010) assuring us that there was a place for such studies in modern systematics. I concur with David Yeates, a dipterist of course although in this case writing with colleagues about more general matters (Yeates *et al*., 2010) that continued morphological research is essential for the iterative studies that we believe to be the way forward in systematic entomology.

Acknowledgements

I thank all associated with the Royal Entomological Society and Blackwell, subsequently Wiley-Blackwell for their unstinting efforts to make journal editing as painless a procedure as possible. Any implied criticism of colleagues and authors is intentional but I hope constructive. I wish my successor Shaun Winterton the same or even better support that I have received from the unsung heroes of peer review – our reviewers. Steven Cameron, Martin Hauser and Laurence Mound read this in draft but should not be assumed to agree with all I have written.

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HISTORICAL DIPTEROLOGY

Dicera obscura: Germar's forgotten fly

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Ernst Friedrich Germar (1786–1853) (Fig. 1) was born on 3 November 1786 in Glauchau, Saxony, son of a wealthy merchant. In 1798 he was sent to the Meiningen Gymnasium (where Clairville, author of *Entomologie Helvétique,* was a reader at that time). Germar became interested in mineralogy and went to the Freiberg Mining Academy in 1804 to further his studies and in 1807 enrolled at the University of Leipzig. From an early time he was also interested in entomology (influenced by Clairville) and in 1812 purchased the large insect collection of Johann Gottfried Hübner. Germar's collection was later to be augmented by exchanges and gifts from some of the most famous entomologists of the time including Sturm, Say, Schonherr, Klug, and Eschscholtz. Germar kept up this dual specialty (mineralogy and entomology) throughout his career, publishing numerous papers on both subjects.

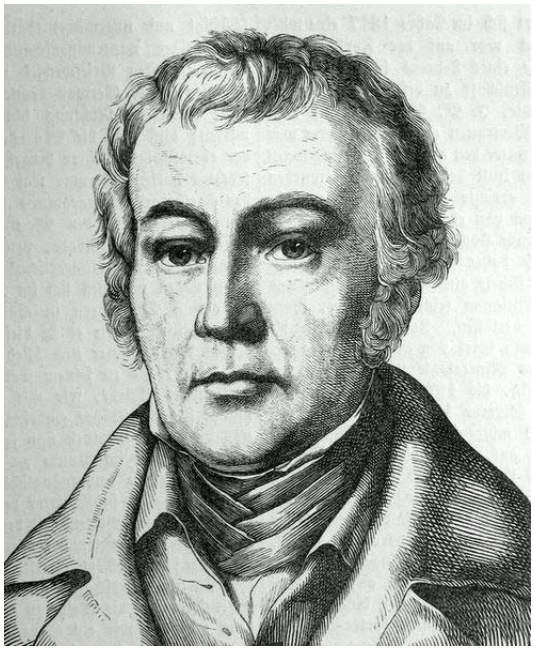
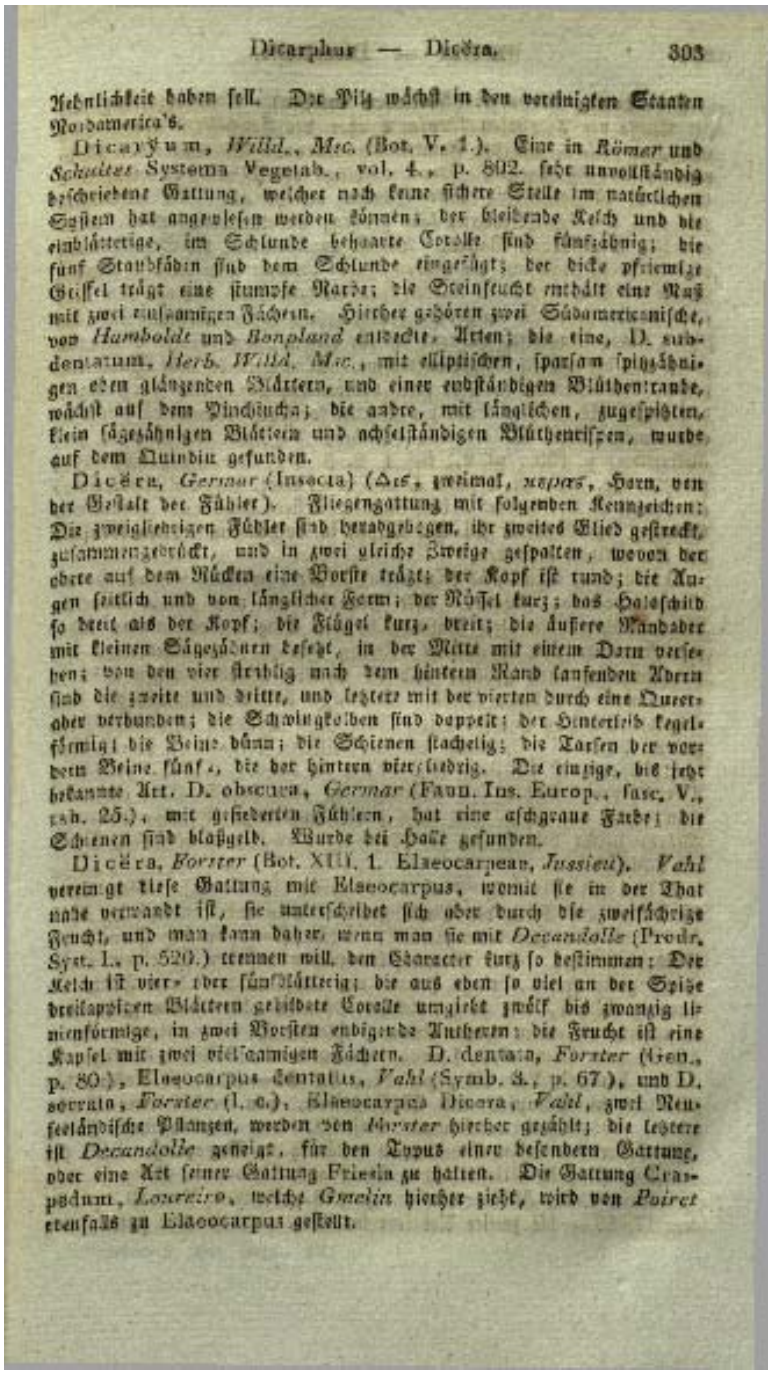


Fig. 1. Ernst Friedrich Germar (1786–1853).

After finishing his studies in Leipzig, Germar was hired by the botanist Curt Polycarp Joachim Sprengel and moved to Halle (Saale), where he lived the rest of his life. In 1811 he traveled to Dalmatia and made a large collection of insects, but Germar's 2-volume publication of the trip ("*Reise nach Dalmatien*") was delayed by the Napoleonic Wars that closed the University in 1813. It was finally published in 1817.

Upon his return to Leipzig from Dalmatia in 1812, he was appointed Director of the Museum of Mineralogy in Halle (Saale) and in 1824 was appointed Professor at the University. Although remaining in Halle (Saale) and gladly opening his house and collection (considered at the time one of the largest in Europe) to visiting entomologists from all over Europe, he did make a few small excursions to Silesia, Bohemia, Zurich and Copenhagen in his later years. After suffering gout for many years, he fell ill once more in 1853 and did not recover, dying in Halle (Saale) on 8 July 1853 after two months of painful suffering.

Germar is not a name that normally pops up when one is asked to name a dipterist contemporary with Meigen or Wiedemann (the first two that come to mind might be Fallén or Zetterstedt). Germar is probably better known as a coleopterist or hemipterist and also as the person who took over August Ahrens's *Fauna Insectorum Europae* after Ahrens died (it ended up being 30-years of work for



Dicarpha — Dicëra. 303

Aehnlichkeit haben soll. Der Pilz wächst in den vereinigten Staaten Nordamerica's.

Dicarÿum, *Willd., Mnc.* (Bot. V. 1.). Eine in *Römer* und *Schultes* Systema Vegetab., vol. 4., p. 802. sehr unvollständig beschriebene Gattung, welcher noch keine sichere Stelle im natürlichen System hat angewiesen werden können; der bleibende Kelch und die einblättrige, im Schlunde behaarte Corolle sind fünfzähnig; die fünf Staubfäden sind dem Schlunde eingefügt; der dicke pfriemliche Griffel trägt eine stumpfe Narbe; die Steinfrucht enthält eine Nuß mit zwei einsamigen Fächern. Hierher gehören zwei Südamericanische, von *Humboldt* und *Bonpland* entdeckte Arten; die eine, D. subdentatum, *Herb. Willd. Mnc.*, mit elliptischen, sparsam spitzzähnigen eben glänzenden Blättern, und einer endständigen Blüthentraube, wächst auf dem Pinchincha; die andre, mit länglichen, zugespitzten, klein sägezähnigen Blättern und achselständigen Blüthenrispen, wurde auf dem Quindiu gefunden.

Dicëra, *Germar* (Insecta) (Δις, zweimal, κερας, Horn, von der Gestalt der Fühler). Fliegengattung mit folgenden Kennzeichen: Die zweigliedrigen Fühler sind herabgebogen, ihr zweites Glied gestreckt, zusammengedrückt, und in zwei gleiche Zweige gespalten, wovon der obere auf dem Rücken eine Borste trägt; der Kopf ist rund; die Augen seitlich und von länglicher Form; der Rüssel kurz; das Halsschild so breit als der Kopf; die Flügel kurz, breit; die äußere Randader mit kleinen Sägezähnen besetzt, in der Mitte mit einem Dorn versehen; von den vier ästelig nach dem hintern Rand laufenden Adern sind die zweite und dritte, und letztere mit der vierten durch eine Querader verbunden; die Schwingkolben sind doppelt; der Hinterleib kegelförmig; die Beine dünn; die Schienen stachelig; die Tarsen der vordern Beine fünf-, die der hintern viergliedrig. Die einzige, bis jetzt bekannte Art. D. obscura, *Germar* (Faun. Ins. Europ., fasc. V., tab. 25.), mit gefiederten Fühlern, hat eine aschgraue Farbe; die Schienen sind blaßgelb. Wurde bei Halle gefunden.

Dicëra, *Forster* (Bot. XIII. 1. Elaeocarpeae, *Jussieu*). *Vahl* vereinigt diese Gattung mit Elaeocarpus, womit sie in der That nahe verwandt ist, sie unterscheidet sich aber durch die zweifächrige Frucht, und man kann daher, wenn man sie mit *Decandolle* (Prodr. Syst. I. p. 520.) trennen will, den Character kurz so bestimmen: Der Kelch ist vier- oder fünfblättrig; die aus eben so viel an der Spitze dreilappigen Blättern gebildete Corolle umgiebt zwölf bis zwanzig linienförmige, in zwei Borsten endigende Antheren; die Frucht ist eine Kapsel mit zwei vielsamigen Fächern. D. dentata, *Forster* (Gen., p. 80.), Elaeocarpus dentatus, *Vahl* (Symb. 3., p. 67.), und D. serrata, *Forster* (l. c.), Elaeocarpus Dicera, *Vahl*, zwei Neuseeländische Pflanzen, werden von *Forster* hierher gezählt; die letztere ist *Decandolle* geneigt, für den Typus einer besondern Gattung, oder eine Art seiner Gattung Friesia zu halten. Die Gattung Crapedum, *Loureiro*, welche *Gmelin* hierher zieht, wird von *Poiret* ebenfalls zu Elaeocarpus gestellt.

Fig. 2. Page 303 of volume 4 of the *Wörterbuch der Naturgeschichte* (1828) with the entry for *Dicera* Germar.

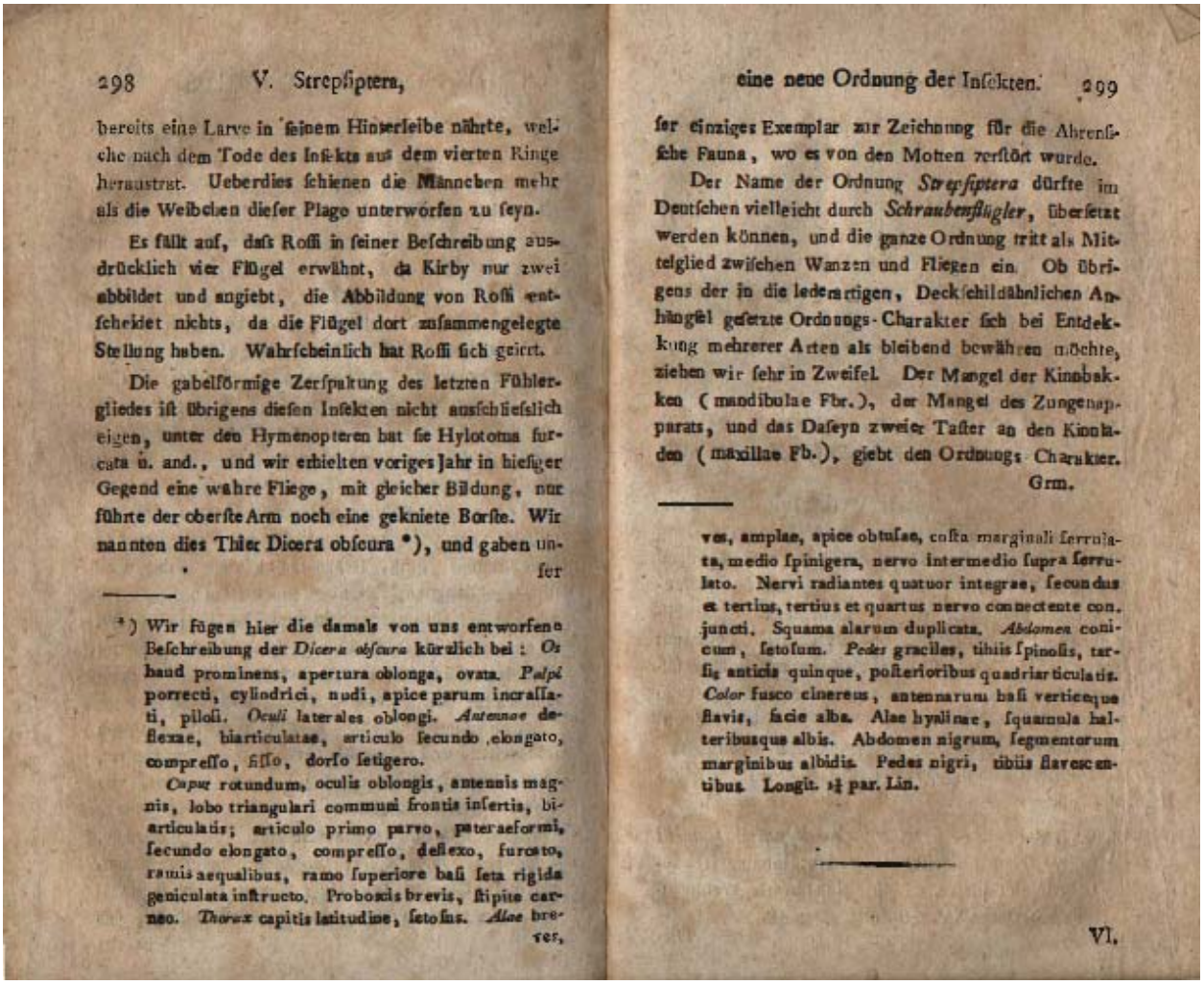
Germar); but he was not really known as a dipterist. Yet Germar <u>did</u> describe around 20 species of Diptera and even a couple of alleged fossil Diptera genus-group names (*Anthracida*, *Asilicus*). And all of these taxa are accounted for in regional or world Diptera catalogues … except one: *Dicera obscura*, a new genus and species of Diptera that Germar described in 1817.

In examining an old German natural history dictionary (Anonymous, 1828, "*Wörterbuch der Naturgeschichte*", vol. 4) for Diptera entries and type designations, I came across an entry for the genus-group name *Dicera* that was defined as a "Fliegengattung" of Germar (Fig. 2). However, a check of Sherborn's *Index Animalium* and Neave's *Nomenclator Zoologicus* showed that both listed *Dicera* Germar 1817 as a hymenopteran. Curious.

Next came a check of Germar's original description (Germar, 1817: 298–299). The description is actually a footnote in an article dealing with Strepsiptera; however, it is still odd that Sherborn would list it as a hymenopteran (Neave no doubt was only following Sherborn's listing) when the description is pretty clear that Germar says he was describing a "true fly" from Halle (Saale).

The description itself (Fig. 3) appears to be a description of a dipteran with unusual antennae, but to be sure it was actually a fly, it would be nice to see the actual specimen. Unfortunately, in the original description, Germar (1817: 298) said the single specimen of *Dicera obscura* was destroyed by moths after it was sent to Ahrens to be illustrated in his *Fauna Insectorum Europae*. So, the bad news: there is no extant type specimen; but the good news: there <u>is</u> an illustration.

There was a delay in that illustration appearing in print (obviously it had been completed before Germar's 1817 paper was published since he knew about it and the specimen's subsequent destruction);



298 V. Strepſiptera,

bereits eine Larve in ſeinem Hinterleibe nährte, welche nach dem Tode des Inſekts aus dem vierten Ringe herauskrat. Ueberdies ſchienen die Männchen mehr als die Weibchen dieſer Plage unterworfen zu ſeyn.

Es fällt auf, daſs Roſſi in ſeiner Beſchreibung ausdrücklich vier Flügel erwähnt, da Kirby nur zwei abbildet und angiebt, die Abbildung von Roſſi entſcheidet nichts, da die Flügel dort zuſammengelegte Stellung haben. Wahrſcheinlich hat Roſſi ſich geirrt.

Die gabelförmige Zerſpaltung des letzten Fühlergliedes iſt übrigens dieſen Inſekten nicht ausſchlieſslich eigen, unter den Hymenopteren hat ſie Hylotoma furcata u. and., und wir erhielten voriges Jahr in hieſiger Gegend eine wahre Fliege, mit gleicher Bildung, nur führte der oberſte Arm noch eine gekniete Borſte. Wir nannten dies Thier Dicera obſcura *), und gaben unſer

*) Wir fügen hier die damals von uns entworfene Beſchreibung der *Dicera obſcura* kürzlich bei: *Os* haud prominens, apertura oblonga, ovata. *Palpi* porrecti, cylindrici, nudi, apice parum incraſſati, piloſi. *Oculi* laterales oblongi. *Antennae* deflexae, biarticulatae, articulo ſecundo elongato, compreſſo, ſiſſo, dorſo ſetigero.

Caput rotundum, oculis oblongis, antennis magnis, lobo triangulari communi frontis inſertis, biarticulatis; articulo primo parvo, pateraeformi, ſecundo elongato, compreſſo, deflexo, furcato, ramis aequalibus, ramo ſuperiore baſi ſeta rigida geniculata inſtructo. Proboscis brevis, ſtipite carneo. *Thorax* capitis latitudine, ſetoſus. *Alae* breves,

eine neue Ordnung der Inſekten. 299

ſer einziges Exemplar zur Zeichnung für die Ahrensſche Fauna, wo es von den Motten zerſtört wurde.

Der Name der Ordnung *Strepſiptera* dürfte im Deutſchen vielleicht durch *Schraubenflügler*, überſetzt werden können, und die ganze Ordnung tritt als Mittelglied zwiſchen Wanzen und Fliegen ein. Ob übrigens der in die ledernartigen, Deckſchildähnlichen Anhängel geſetzte Ordnungs-Charakter ſich bei Entdekkung mehrerer Arten als bleibend bewähren möchte, ziehen wir ſehr in Zweifel. Der Mangel der Kinnbakken (mandibulae Fbr.), der Mangel des Zungenapparats, und das Daſeyn zweier Taſter an den Kinnladen (maxillae Fb.), giebt den Ordnungs-Charakter.

Grm.

ves, amplae, apice obtuſae, coſta marginali ſerrulata, medio ſpinigera, nervo intermedio ſupra ſerrulato. Nervi radiantes quatuor integrae, ſecundus et tertius, tertius et quartus nervo connectente conjuncti. Squama alarum duplicata. *Abdomen* conicum, ſetoſum. *Pedes* graciles, tibiis ſpinoſis, tarſis anticis quinque, poſterioribus quadriarticulatis. *Color* fusco cinereus, antennarum baſi verticeque flavis, facie alba. Alae hyalinae, ſquamula halteribusque albis. Abdomen nigrum, ſegmentorum marginibus albidis. Pedes nigri, tibiis flavescentibus. Longit. 1½ par. Lin.

VI.

Fig. 3. Pages 298–299 of *Magazin der Entomologie*, vol. 2 (Germar, 1817) showing original description of *Dicera obscura*.

it was not until 5 years later (1822, Heft 5) that the illustration of *Dicera obscura* appeared in the *Fauna Insectorum Europae*, now under the editorship of Germar. Examination of the illustration (Fig. 4) shows that *Dicera obscura* is clearly a fly and it appears from the description and illustration to be a fissicorn tachinid.

I leave it to the tachinid experts to decide what it may be, but at least we now know that the first fissicorn tachinid genus and species was described by Germar in 1817, and (probably because of its destruction by moths) was unfortunately forgotten soon after it was described and illustrated.

Note on authorship

The plate in Germar (1822) gives the authorship of *Dicera obscura* as “Germar & Zinck.” [the latter is an abbreviation for Julius Leopold Theodor Friedrich Zincken (1770–1856)], who was the co-editor with Germar of the *Magazin der Entomologie*. Zincken is listed with Germar on the title page of the volume and is the co-signee with Germar of the *Vorrede*, but only Germar’s abbreviated surname (as “Grm.”) appears at the end of the Strepsiptera article. The Strepsiptera article is the only full article in this volume without authorship given after the title. But for the notes on recent literature, etc. in this volume, authorship is attributed to either Germar or Zincken by denotation of an abbreviation at the end

of the note: “G.” for Germar and “Z.S.” for Zincken. Thus, given the “Grm.” abbreviation at the end of the Strepsiptera article, I concur with subsequent zoological indexers such as Sherborn that Germar is the sole author of that article and the new names that appear in it.

Acknowledgments

Many thanks to Darren Mann of the Oxford University Museum off Natural History for the scan of Heft 5, plate 25 of *Dicera obscura* and Adrian Pont who helped with the translation of some of the narrative in Germar’s 1817 paper. Much of the biographical information on Germar derives from his obituary in Fairmaire’s translation of Schaum in the *Ann. Soc. Entomol. Fr.* (1853), the entry in the *Allgemeine Deutsche Biographie*, vol.9 (1879), and the brief biography in Nonveiller (1999, *The Pioneers of the research on the Insects of Dalmatia*).

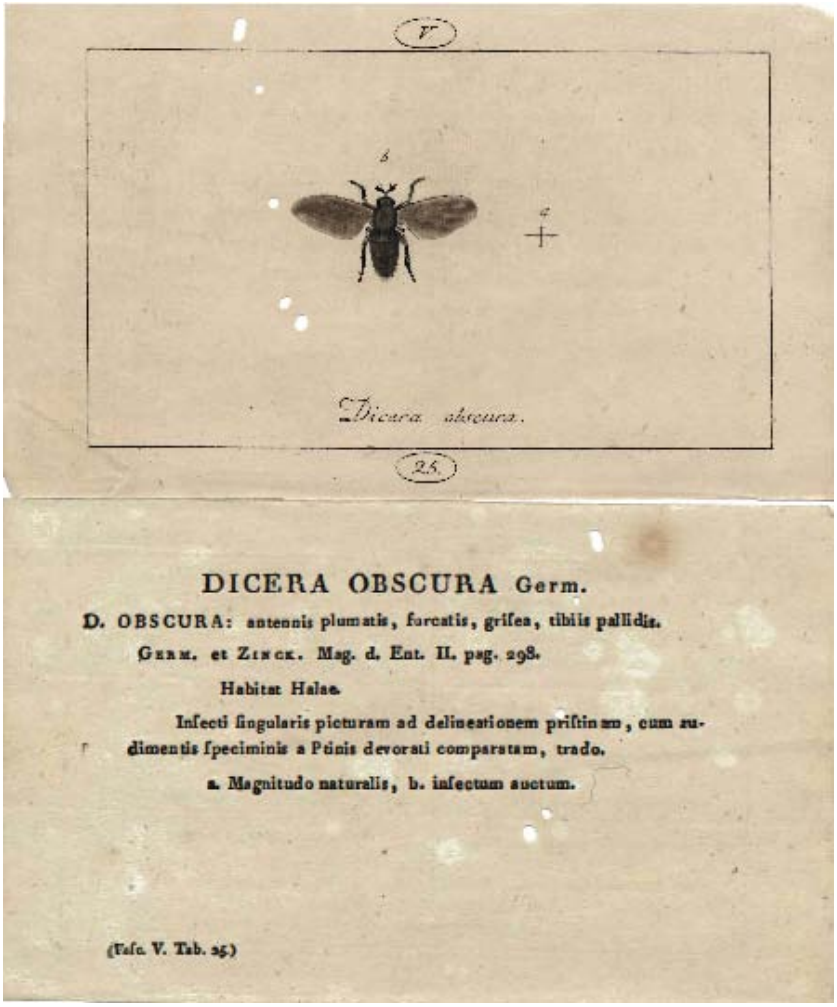


Fig. 4. Plate 25 of Heft 5 of Germar’s *Fauna Insectorum Europae* showing habitus of *Dicera obscura*.

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Sid Camras and his conopid legacy

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In September 2008, the three of us went for one of several visits to the Field Museum of Natural History, Chicago IL to work on the conopid collection. At the age of 89, Sid Camras had decided that he was done his taxonomic work and was ready to have loans returned and the collection re-organized. He had maintained the collection in good shape, and therefore it only took us a few days to do the necessary curatorial work. Sid had done an amazing job building the Field Museum of Natural History (Chicago IL) conopid collection. There are 4035 specimens of 5 subfamilies, 35 genera, and 348 species deposited in the museum. This is undoubtedly the best conopid collection in the world. We have included an annotated list of the material present in the collection (Table 1).

Fig. 1. Sid working at the Field Museum circa 1990s.

Sid (Fig. 1) was born in Chicago, April 22, 1919. His parents were Russian Jews who immigrated to the U.S.A. in 1905. Sid became interested in Natural History, especially birds, during high school. He began working as a volunteer in the Bird department at the Field Museum under W. Rudyerd Boulton in 1935. Later, he became a paid employee under the WPA in 1938. He started his taxonomic career with a paper on birds, co-authored with Ernst Mayr (Mayr & Camras 1938). Later, he described a new subspecies of Savannah Sparrow (*Passerculus sandwichensis rufofuscus*) (Camras 1940). He soon followed with his first conopid paper in 1943.

Sid made his living as a medical doctor. In 1939, Sid injured his knee playing baseball and required surgery. From that experience, he decided to become a surgeon. During the Korean War, he served in a real M.A.S.H. unit. According to Sid, that unit was not much different from how it was portrayed in

the movie and on television! After the war, he returned to Chicago to work in medicine. For his love of dipteran taxonomy he had a lab set up in the back of his medical practice. Sid spent hours each day working there on his flies.

Sid was methodical, working through continental faunas and publishing 42 refereed papers on conopids and describing 201 conopid taxa until his most recent paper in 2012. A full list of Sid's publications is included here (Table 2). Reprints of most of Sid's papers are still available from the Field Museum. JHS and JFG have made pdf copies of all and will share these with other workers upon request.

Sid's taxonomic approach almost exclusively focused on external characters. His papers were often minimalistic, with short descriptions, keys, and no illustrations. Nonetheless, most of his species concepts have been borne out in later revisions and most of his higher taxa have survived the first quantitative test of monophyly (Gibson *et al.*, 2010). Our unpublished data suggests that some of his species can be synonymized. Unlike many in his era, Sid was a splitter rather than a lumper. Sid recognized that some of his species graded into one another but split them as endpoints of distinctive clines. Within North America, *Thecophora* and *Physocephala* are most in need of revision.

All systematists revise and refine their work with growing experience over the years and Sid was no exception. His experience with conopids grew to a level that few, if any, of us will reach in our careers. His retirement has left us with a fabulous legacy and some tantalizing questions for anyone with an interest to pursue work on conopids. Having nearly 45% of the world's conopid species in a single collection at the Field Museum will greatly facilitate this future work.

A list of the 201 conopid taxa named by Sid are included in Table 3, followed by a list of taxa named in honor of Sid in Table 4. Photos of Sid and his colleagues are also included below (Figs. 2-7).

Table 1 (on following 11 pages): List of the 4035 conopid specimens in the collection of Sid Camras, including 5 subfamilies, 35 genera, 348 species; the regions are abbreviated as follows: NE=Nearctic, NT=Neotropical, PA=Palearctic, AF=Afrotropical, AU=Australasian, OR=Oriental; other abbreviations are as follows: HT=holotype, AT=allotype, PT=paratype, syn.=synonym, det.=determination. The following notes are referenced in this table:

note 1: det. Camras 1999; in catalogue as syn. of *C. rhodesiensis*

note 2: identified as *P. nigricoxa* by Camras in 2000, then reidentified as *P. digitata* by Camras in 2001; *P. digitata* is currently considered as syn. of *P. maculipes* but Sid may be considered elevating it to species status

note 3: 1 of each sex identified as *P. ammophiliformis*

note 4: 1 f# labeled '?nr. *limbipennis*'

note 5: identified as *P. persica* (syn. of *P. pusilla*)

note 6: 1 specimen identified as *P. obscura* (syn. of *P. rufipes*)

note 7: 4 specimens identified as *P. furax* Becker (syn. of *P. variegata*)

note 8: possibly a dark form of *P. brachyrhynchus* (GA, TN, FLA, ARK)

note 9: this species is under *Physocephala* in the catalogue, but the specimen Sid identified has ocelli and is labelled as *Physoconops* by him

note 10: 2 Palaearctic specimens identified as *M. strandi* (syn. of *M. vicaria*)

note 11: listed as syn. of *T. cinerascens* in Nomenclator; left under *T. pusilla* since Sid has them determined that way

note 12: listed as syn. of *T. fulvipes* in Nomenclator; Sid had them included in a box with *T. atra* but they still have their *T. sundewalli* det labels on them

			NE	NT	PA	AF	AU	OR	Types	Comments
CONOPINAE										
Abrachyglossum	*capitatum*	Loew			4					
Archiconops	*erythrocephalus*	Fabricius						1		♀
Archiconops	*morosus*	De Meijere						1		
Archiconops	*pseudoerythrocephala*	Stuke				2				♂♂
Archiconops	sp. nov.				1					♀
Brachyceratias	*brevicornis*	Loew			2					
Caenoconops	*bicolor*	Kroeber				1				♀; see note 1
Conops (Asiconops)	*apicalis*	Kroeber				1				♂
Conops (Asiconops)	*ater*	Macquart				1				♀
Conops (Asiconops)	*atratus*	Camras				1			HT ♂	
Conops (Asiconops)	*aureocinctus*	Kroeber				1				♀
Conops (Asiconops)	*aureomicans*	Kroeber				1				♂
Conops (Asiconops)	*bicingulatus*	Camras				1				PT ♂
Conops (Asiconops)	*bilineatus*	Camras				1				AT ♂
Conops (Asiconops)	*brunnipennis*	Kroeber				4				3 ♂, 1 ♀
Conops (Asiconops)	*diffusipennis*	Camras						1		PT ♂
Conops (Asiconops)	*kanoi*	Camras			1				HT ♂	
Conops (Asiconops)	*nubeculosus*	Bigot						3		2 ♂, 1 ♀
Conops (Asiconops)	*pactyas*	Walker						5		2 ♂, 4 ♀
Conops (Asiconops)	*simplex*	Kroeber				1				♂
Conops (Asiconops)	*simukans*	Camras				1			HT ♂	
Conops (Asiconops)	*stuckenbergi*	Camras				1				PT ♀
Conops (Asiconops)	*szechwanensis*	Camras			1				HT ♂	
Conops (Asiconops)	*tristis*	Chen			1					♀
Conops (Asiconops)	*unicolor*	Kroeber				3				2 ♂, 1 ♀
Conops (Asiconops)	*weinbergae*	Camras & Chvala			2					
Conops (Conops)	*aurantius*	Brunetti				1				♀
Conops (Conops)	*bakeri*	Kroeber						1		♂
Conops (Conops)	*ceriaeformis*	Meigen			8					
Conops (Conops)	*claripennis*	Brunetti						2		♂♂
Conops (Conops)	*elegans*	Meigen			64	18				
Conops (Conops)	*flavicaudus*	Bigot			1					
Conops (Conops)	*flavifrons*	Meigen			2					♂, ♀
Conops (Conops)	*flavipes*	Linnaeus			18					

			NE	NT	PA	AF	AU	OR	Types	Comments
Conops (Conops)	*insignis*	Loew			2					♂♂
Conops (Conops)	*lieftincki*	Camras						1		
Conops (Conops)	*longiventris*	Kroeber			2					♂, ♀
Conops (Conops)	*nigritarsis*	Brunetti				1				♂
Conops (Conops)	*nubeculipennis*	Bezzi				2				♂, ♀
Conops (Conops)	*quadrifasciatus*	De Geer			21					
Conops (Conops)	*rufofemoralis*	Camras						2		AT ♀, PT ♂
Conops (Conops)	*scutellatus*	Meigen			10					
Conops (Conops)	*silaceus*	Wiedemann			3					1 ♂, 2 ♀
Conops (Conops)	*strigatus*	Wiedemann			12					
Conops (Conops)	*vesicularis*	Linnaeus			15					
Conops (Conops)	*vitellinus*	Loew			2					♂, ♀
Conops (Diconops)	*trichus*	Camras		2					HT ♀	and PT ♀
Conops (Smithiconops)	*rondanii*	Bezzi				15				
Conops (Spenoconops)	*brunneosericeus*	Krober		1						
Conops (Spenoconops)	*nobilis*	Williston		2						♀♀
Dacops	*abdominalis*	Kroeber				5				♂♂
Leopoldius	*brevirostris*	Germar			1					♂
Leopoldius	*coronatus*	Rondani			15					
Leopoldius	*diadematus*	Rondani			1					♂
Leopoldius	*signatus*	Wiedemann			1					♂
Neobrachyceraea	*obscuripennis*	Krober			1					
Physocephala	*antiqua*	Wiedemann			3					2 ♂, 1 ♀
Physocephala	*antiqua or syriaca*				1					det. uncertain
Physocephala	*aterrima*	Kroeber						1		♀
Physocephala	*aurantiaca*	Brunetti						1		♂
Physocephala	*aurifrons*	Walker		4						3 ♀, 1 ♂
Physocephala	*bennetti*	Camras		1						♀
Physocephala	*bequaertortum*	Camras				1				♂; det. uncertain
Physocephala	*bicolor*	Kroeber		1						♂
Physocephala	*bimarginipennis*	Karsch				2				2 ♀
Physocephala	*bipartita*	Doleschall						6		4 ♂, 2 ♀
Physocephala	*bipunctata*	Macquart		30						
Physocephala	*brevipennis*	Camras				1			HT ♂	
Physocephala	*brunnipes*	Kroeber		3						1 ♂, 2 ♀

			NE	NT	PA	AF	AU	OR	Types	Comments
Physocephala	*burgessi*	Williston	28							
Physocephala	*calopa*	Bigot						1		♂
Physocephala	*carbonaria*	Bigot		2						♂, ♀
Physocephala	*cayennensis*	Macquart		3						♂♂
Physocephala	*chrysorrhoea*	Meigen			3					2♂, 1♀
Physocephala	*diffusa*	Brunetti						2		♂♂
Physocephala	*digitata*	Speiser				3				2♂, 1♀; see note 2
Physocephala	*floridana*	Camras	1						HT ♂	
Physocephala	*fumivena*	Camras				1				PT ♂
Physocephala	*fumosa*	Camras					2			♂, ♀
Physocephala	*furcillata*	Williston	57							
Physocephala	*gigas*	Macquart						6		2♂, 2♀; see note 3
Physocephala	*halterata*	Brunetti				4				2♀, 2♂
Physocephala	*inhabilis*	Walker		11						
Physocephala	*laticincta*	Brulle			2					♂, ♀
Physocephala	*limbipennis*	Meijere						9		4♂, 5♀; see note 4
Physocephala	*lineifrons*	Camras				1				♂
Physocephala	*lugubris*	Macquart		6						5♂, 1♀
Physocephala	*maculigera*	Kroeber				3				2♂, 1♀
Physocephala	*maculipes*	Bigot				30				
Physocephala	*madagascariensis*	Kroeber				6				
Physocephala	*marginata*	Say	24							
Physocephala	*nervosa*	Kroeber		3						2♂, 1♀; see note 5
Physocephala	*nigra*	De Geer			2					♂, ♀
Physocephala	*picipes*	Kroeber		1						♀
Physocephala	*pusilla*	Meigen			11					2♂, 1♀; see note 5
Physocephala	*rufifrons*	Camras			1					♂
Physocephala	*rufipes*	Fabricius			14					see note 6
Physocephala	*rufithorax*	Kroeber		10						
Physocephala	*sagittaria*	Say	44							
Physocephala	*sagittaria x texana*		4							
Physocephala	*segethi*	Rondani		28						
Physocephala	*simplex*	Kroeber				3				1♂, 2♀
Physocephala	*sinensis*	Kroeber			4					
Physocephala	*sororcula*	Williston		1						♂

			NE	NT	PA	AF	AU	OR	Types	Comments
Physocephala	*tenella*	Bigot						4		1♂, 3♀
Physocephala	*texana*	Williston	58							
Physocephala	*theca*	Camras			1					AT♂
Physocephala	*thecata*	Camras		1					HT♀	
Physocephala	*tibialis*	Say	69							
Physocephala	*truncata*	Loew			4					2♀, 2 w/o abdomens
Physocephala	*unicolor*	Kroeber		1						PT♀
Physocephala	*vaginalis*	Rondani			3					1♂, 2♀
Physocephala	*variegata*	Meigen			12					see note 7
Physocephala	*vittata*	Fabricius			28					
Physocephala	*wulpi*	Camras		4						3♂, 1♀
Physoconops (Aconops)	*antennatus*	Kroeber		1						♂
Physoconops (Aconops)	*costatus*	Fabricius		5						4♂, 1♀
Physoconops (Aureoconops)	*aureolus*	Camras		1					HT♂	
Physoconops (Gyroconops)	*ocellatus*	Giglio-Tos		4						3♂, 1♀
Physoconops (Gyroconops)	*parvus*	Williston		1						♀
Physoconops (Gyroconops)	*sylvosus*	Williston	34							
Physoconops (Gyroconops)	*argentinus*	Camras		1					HT♂	
Physoconops (Kroeberoconops)	*rufipennis*	Macquart		10						
Physoconops (Pachyconops)	*bahamensis*	Parsons		1						♂
Physoconops (Pachyconops)	*brachyrhynchus*	Macquart	50							
Physoconops (Pachyconops)	*bulbirostris*	Loew	22	8						
Physoconops (Pachyconops)	*costaricensis*	Kroeber		2						♂♂
Physoconops (Pachyconops)	*excisus*	Wiedemann	43							
Physoconops (Pachyconops)	*floridanus*	Camras	17						HT♂	
Physoconops (Pachyconops)	*gracilis*	Williston	10							
Physoconops (Pachyconops)	*grandis*	Williston		4						2♂, 2♀
Physoconops (Pachyconops)	*guianicus*	Curran		3						1♂, 2♀
Physoconops (Pachyconops)	*pallifrons*	Coquillett		4						2♂, 2♀
Physoconops (Pachyconops)	*pictifrons*	Kroeber		7						
Physoconops (Pachyconops)	*pictus*	Fabricius		2						♀♀
Physoconops (Pachyconops)	*rufipennis*	Macquart		2						
Physoconops (Pachyconops)	*rufus*	Williston		2						♂, ♀
Physoconops (Pachyconops)	*shannoni*	Camras		2						1♂, 1 w/o abdomen
Physoconops (Pachyconops)	n.sp. nr. *brachyrhynchus*		4							3♂, 1♀; see note 8

			NE	NT	PA	AF	AU	OR	Types	Comments
Physoconops (Pachyconops)	*thompsoni*	Camras		9						
Physoconops (Pachyconops)	*townsendi*	Camras	10							
Physoconops (Pachyconops)	*travassosi*	Camras		4						1♂, 3♀
Physoconops (Physoconops)	*abruptus*	Kroeber		6						3♂, 3♀
Physoconops (Physoconops)	*analis*	Fabricius		17						
Physoconops (Physoconops)	*discalis*	Williston	7	73						
Physoconops (Physoconops)	*fronto*	Williston	38							
Physoconops (Physoconops)	*gilmorei*	Camras		6						
Physoconops (Physoconops)	*infuscatus*	Camras		4						3♂, 1♀
Physoconops (Physoconops)	*inornatus*	Williston		4						♂♂
Physoconops (Physoconops)	*nigrimanus*	Bigot	6							3♂, 3♀
Physoconops (Physoconops)	*nigroclavatus*	Camras		19					HT ♂	
Physoconops (Physoconops)	*nigromarginatus*	Kroeber		7						
Physoconops (Physoconops)	*nitens*	Camras		4						2♂, 2♀
Physoconops (Physoconops)	*obscuripennis*	Williston	40							
Physoconops (Physoconops)	*ornatifrons*	Kroeber		25						
Physoconops (Physoconops)	*peruvianus*	Camras		1					HT ♀	
Physoconops (Physoconops)	*weemsi*	Camras	19							
Physoconops	*longicornis*	Kroeber				1				♀; see note 9
Physoconops	*quadripunctatus*	Kroeber				1				♂
Pseudophysocephala	*acroschista*	Speiser				3				
Pseudophysocephala	*barbata*	Camras				2				
Pseudophysocephala	*braunsi*	Kroeber				3				
Pseudophysocephala	*caenoneura*	Kroeber				8				
Pseudophysocephala	*constricta*	Kroeber				6				
Pseudophysocephala	*fenestralis*	Kroeber				1				
Pseudophysocephala	*meii*	Camras				2			HT ♀	and AT ♂
Pseudophysocephala	*microvena*	Brunetti				9				
Pseudophysocephala	*nigritarsis*	Kroeber				4				
Pseudophysocephala	*pilitarsis*	Kroeber				2				
Pseudophysocephala	*pubescens*	Brunetti				2				
Pseudophysocephala	*rufitarsis*	Camras				1				
Siniconops	*elegans*	Chen			3					1♂, 2♀
Siniconops	*grandens*	Camras			1					♂
Siniconops	*maculifrons*	Kroeber			1					♀

			NE	NT	PA	AF	AU	OR	Types	Comments
Siniconops	*microvalvus*	Kroeber						6		3♂, 3♀
Siniconops	*nigripes*	Kroeber						8		
Tropidomyia	*alexanderi*	Camras		5						4♂, 1♀
Tropidomyia	*aureifacies*	Kroeber			1					♂
Tropidomyia	*bimaculata*	Williston		7						2♂, 7♀
Tropidomyia	*ornata*	Kroeber				3				
DALMANNIINAE										
Baruerizodion	*steyskali*	Papavero		1						
Dalmannia	*aculeata*	Linnaeus			4					
Dalmannia	*affinis*	Chen			1					
Dalmannia	*blaisdelli*	Cresson	10							
Dalmannia	*dorsalis*	Fabricius			2					
Dalmannia	*heterotricha*	Bohart	1							
Dalmannia	*marginata*	Meigen			2					
Dalmannia	*nigriceps*	Loew	25							
Dalmannia	*pacifica*	Banks	16							
Dalmannia	*picta*	Williston	20							
Dalmannia	*punctata*	Fabricius			6					
Dalmannia	*vitiosa*	Coquillett	26							
MYOPINAE										
Melanosoma	*bicolor*	Meigen			9					
Melanosoma	*mundum*	Czerny			2					
Myopa	*bohartorum*	Camras	7							
Myopa	*buccata*	Linnaeus			43					
Myopa	*castanea*	Bigot	4							
Myopa	*clausa*	Loew	22							
Myopa	*curticornis*	Kroeber	25							
Myopa	*dorsalis*	Fabricius			14					
Myopa	*extricata*	Collin			18					
Myopa	*fasciata*	Meigen			5					
Myopa	*fenestrata*	Coquillett		1						
Myopa	*flavopilosa*	Kroeber	7							
Myopa	*longipilis*	Banks	7							

			NE	NT	PA	AF	AU	OR	Types	Comments
Myopa	*melanderi*	Banks	7							
Myopa	*metallica*	Camras		1					HT ♂	
Myopa	*minor*	Strobl			1					
Myopa	*morio*	Meigen			2					
Myopa	*occulta*	Wiedemann			8					
Myopa	*perplexa*	Camras	16							
Myopa	*picta*	Panzer			5					
Myopa	*plebeia*	Williston	1							
Myopa	*polystigma*	Rondani			1					
Myopa	*pulchra*	Coquillett	1							
Myopa	*rubida*	Bigot	24							
Myopa	*stigma*	Meigen			1					
Myopa	*tessellatipennis*	Motschulsky			4					
Myopa	*testacea*	Linnaeus			1					
Myopa	*variegata*	Meigen			2					
Myopa	*vesiculosa*	Say	29							
Myopa	*vicaria*	Walker	20		4					see note 10
Myopa	*virginica*	Banks	21							
Myopa	*willistoni*	Banks	14							
Myopotta	*rubripes*	Villeneuve			2					
Pseudomyopa	*camrasi*	Pearson		2					HT ♂	
Scattoccemyia	*plaumanni*	Camras		1					HT ♂	
Sicus	*abdominalis*	Kroeber						6		
Sicus	*ferrugineus*	Linnaeus								
Sicus	*fusenensis*	Ouchi			1					
Sicus	*nigritarsis*	Zimina			3					
Sicus	*nishitapensis*	Matsumura			3					
Thecophora	*abbreviata*	Loew	31							
Thecophora	*atra*	Fabricius			26					
Thecophora	*distincta*	Wiedemann			8					
Thecophora	*flavicornis*	Kroeber				5				
Thecophora	*longicornis*	Say	18							
Thecophora	*longirostris*	Lyneborg			1					
Thecophora	*luteipes*	Camras	18							
Thecophora	*melanopa*	Rondani			1					

			NE	NT	PA	AF	AU	OR	Types	Comments
Thecophora	*modesta*	Williston	40							
Thecophora	*nigra*	Van Duzee	2							
Thecophora	*nigripes*	Camras	41						HT ♂	
Thecophora	*nigrivena*	Camras				1				
Thecophora	*occidensis*	Walker	85	1						
Thecophora	*philippinensis*	Camras						1		
Thecophora	*pilosa*	Kroeber				1				
Thecophora	*propinqua*	Adams	65							1 pair in copula
Thecophora	*pusilla*	Meigen			10					see note 11
Thecophora	*sundewalli*	Zetterstedt			6					see note 12
STYLOGASTRINAE										
Stylogaster	*abdominalis*	Kroeber		4						
Stylogaster	*aldrichi*	Camras & Parrillo		30					HT	
Stylogaster	*amazonasi*	Camras		2						PT ♀♀
Stylogaster	*banksi*	Aldrich		25						
Stylogaster	*biannulata*	Say	68	2						
Stylogaster	*brasilia*	Camras & Parrillo		6						♂
Stylogaster	*breviventris*	Aldrich		32						
Stylogaster	*camrasi*	Stuckenberg				2				♀
Stylogaster	*complexa*	Bigot				1				♀
Stylogaster	*costaricae*	Camras & Parrillo		1					HT ♂	
Stylogaster	*currani*	Aldrich		9						
Stylogaster	*decorata*	Aldrich		47						
Stylogaster	*dispar*	Camras & Parrillo		16						
Stylogaster	*elongata*	Camras		1					HT	
Stylogaster	*ethiopa*	Townsend		12						
Stylogaster	*fidelis*	Monteiro		1						dissected
Stylogaster	*frontalis*	Kroeber				4				1♂, 3♀
Stylogaster	*geijskesi*	Curran		1						♂
Stylogaster	*hirticosta*	Camras & Parrillo		1						PT ♂
Stylogaster	*hirtinervis*	Lopes & Monteiro		9						
Stylogaster	*horvathi*	Szilady		22						
Stylogaster	*indistincta*	Aldrich		6						
Stylogaster	*intermedia*	Camras & Parrillo		1						♀

			NE	NT	PA	AF	AU	OR	Types	Comments
Stylogaster	*iviei*	Camras		2						♂, ♀
Stylogaster	*jactata*	Lopes & Monteiro		15						
Stylogaster	*latipes*	Camras & Parrillo		3						1 uncertain det.
Stylogaster	*leonum*	Westwood				16				
Stylogaster	*subapicalis*	Camras				1			HT ♀	syn. of *S. leonum*
Stylogaster	*lepida*	Lopes & Monteiro		1						det. uncertain
Stylogaster	*longicornis*	Lopes		1						dissected
Stylogaster	*longispina*	Camras & Parrillo		5						
Stylogaster	*lopesi*	Camras		4						
Stylogaster	*macrura*	Lopes		1						♀
Stylogaster	*maculifrons*	Camras & Parrillo		1						♀
Stylogaster	*minuta*	Townsend		24						
Stylogaster	*murielae*	Camras		2					HT	
Stylogaster	*neglecta*	Williston	58							
Stylogaster	*nigricoxa*	Camras		1						PT ♂
Stylogaster	*nitens*	Brunetti				2				♀♀
Stylogaster	*obscurinotum*	Kroeber				5				
Stylogaster	*orientalis*	Brunetti						1		♀
Stylogaster	*ornatipes*	Kroeber		3						
Stylogaster	*paradecorata*	Camras & Parrillo		41					HT	
Stylogaster	*paradecorata* or *ornata*			24						♀♀
Stylogaster	*parrilloi*	Camras		1						
Stylogaster	*paulsiani*	Camras				1				PT ♂
Stylogaster	*peruviana*	Aldrich		8						
Stylogaster	*petersoni*	Camras & Parrillo		5						1 det. uncertain
Stylogaster	*plumidecorata*	Camras & Parrillo		5						
Stylogaster	*rafaeli*	Camras & Parrillo		1						
Stylogaster	*rectinervis*	Aldrich		112						
Stylogaster	*schlingeri*	Camras & Parrillo		4						
Stylogaster	*sedmani*	Camras & Parrillo		3					HT	
Stylogaster	*shannoni*	Lopes & Monteiro		5						
Stylogaster	*sinaloae*	Camras		1					HT ♂	
Stylogaster	*smithiana*	Lopes		9						
Stylogaster	*souzalopesi*	Camras		1						dissected
Stylogaster	*speciosa*	Aldrich		6						

			NE	NT	PA	AF	AU	OR	Types	Comments
Stylogaster	*stylata*	Fabricius		141						
Stylogaster	*stylosa*	Townsend		7						
Stylogaster	*tarsata*	Lopes		14						
Stylogaster	*tibialis*	Camras & Parrillo		3						
Stylogaster	*varifrons*	Malloch				6				3♂, 3♀
Stylogaster	*westwoodi*	Smith				4				2♂, 2♀
ZODIONINAE										
Parazodion	*schmidti*	Krober		1						
Robertsonomyia	*mexicana*	Camras		2						
Robertsonomyia	*painteri*	Camras		1						
Robertsonomyia	*palpalis*	Robertson	16							
Robertsonomyia	*parva*	Adams	12							
Robertsonomyia	*pearsoni*	Camras		5					HT ♂	
Zodion	*abitus*	Adams	47							
Zodion	*affine*	Kroeber		4						
Zodion	*americanum*	Wiedemann	177	100						
Zodion	*anale*	Kroeber	10	24						
Zodion	*aureopygium*	Kroeber		3						
Zodion	*auricaudatum*	Williston	16							
Zodion	*bifasciatum*	Pearson & Camras		1					HT ♂	
Zodion	*californicum*	Camras	8							
Zodion	*canescens*	Parsons		1						
Zodion	*cinereiventre*	Van Duzee	27							
Zodion	*cinereum*	Fabricius			43					
Zodion	*cyanescens*	Camras	6						HT ♀	
Zodion	*dibaphus*	Kroeber		7					HT ♂	
Zodion	*erythrurum*	Rondani			2					
Zodion	*flavocaudatum*	Bigot		3						
Zodion	*flavostriatum*	Camras		7						
Zodion	*fulvifrons*	Say	163							
Zodion	*griseatum*	Pearson & Camras		4					HT ♂	
Zodion	*intermedium*	Banks	87							
Zodion	*marstoni*	Pearson & Camras		1						PT ♂
Zodion	*nigrifrons*	Kroeber	25							

			NE	NT	PA	AF	AU	OR	Types	Comments
Zodion	*notatum*	R-D			8					
Zodion	*obliquefasciatum*	Macquart	44							
Zodion	*perlongum*	Coquillett	16							
Zodion	*pictulum*	Williston	1							
Zodion	*pictum*	Schiner		3						
Zodion	*punctipennis*	Kroeber		7						
Zodion	*rossi*	Camras		1						
Zodion	*simis*	Camras		2						
Zodion	*teutoniense*	Pearson & Camras		2					HT ♂	and ♀
Zodion	*triangulare*	Kroeber		6						
Zodion	*triste*	Bigot	4							
Zodion	*zebrinum*	Bigot		2						
	Specimens per region		1973	1242	535	214	2	69		**TOTAL 4035**
	Species per region, and types		68	133	77	59	1	22	28	

Table 2: List of scientific publications of Sid Camras

Camras S (1940) A new Savannah sparrow from Mexico. Field Museum of Natural History. Zoological Series, 24: 159-160.
Camras S (1940) Comment on a Californian record of the eastern Tree Sparrow. Condor 42: 307-308.
Camras S (1943) Notes on the North American species of the *Zodion obliquefasciatum* group (Diptera: Conopidae). Entomological News 54: 187-192.
Camras S (1944) Notes on the North American species of the *Zodion fulvifrons* group. Pan-Pacific Entomologist 20: 121-128.
Camras S (1945a) Further notes on some species of *Zodion* (Diptera, Conopidae). Pan-Pacific Entomologist 21: 31.
Camras S (1945b) A study of the genus *Occemyia* in North America. Annals of the Entomological Society of America 38: 216-222.
Camras S (1953a) Notes on Neotropical *Zodion* and *Parazodion* (Diptera: Conopidae). Annals and Magazine of Natural History (12) 6: 395-399.
Camras S (1953b) A review of the genus *Myopa* in North America (Diptera: Conopidae). The Wasmann Journal of Biology 11: 97-114.
Camras S (1954) A new species of *Zodion* from California. Pan-Pacific Entomologist 30: 165-166.
Camras S (1955a) New Conopidae from South America, Africa and Australia (Diptera). Entomological News 66: 119-125.
Camras S (1955b) A review of the New World flies of the genus *Conops* and allies (Diptera: Conopidae). Proceedings of the United States National Museum 105: 155-187.
Camras S (1957a) Descriptions and records of Neotropical Conopidae. Psyche 64: 9-16.
Camras S (1957b) On some Conopidae (Dipt.) from Ceylon. Verhundlungen der Naturforschenden Gesellschaft in Basel 68: 68-71.
Camras S (1957c) On some Conopidae (Dipt.) from Flores and Sumba. Verhundlungen der Naturforschenden Gesellschaft in Basel 68: 160-164.
Camras S (1957d) On some Conopidae from the East Indies (Diptera). Treubia 24: 107-117.
Camras S (1957e) A review of the New World *Physocephala* (Diptera: Conopidae). Annals of the Entomological Society of America 50: 213-218.
Camras S (1960) Flies of the family Conopidae from Eastern Asia. Proceedings of the United States National Museum 112: 107-131.
Camras S (1961) Notes on Australian flies of the family Conopidae. Proceedings of the United States National Museum 113: 61-76.
Camras S (1962a) The Conopidae of Madagascar (Diptera). Mémoires de l'Institut Scientifique de Madagascar. Série E 13: 179-186.
Camras S (1962b) Records and descriptions of African Conopidae (Diptera). Revue de Zoologie et de Botanique Africaines 66: 203-242.
Camras S (1963) Notes on some New World Conopidae (Diptera). Annals of the Entomological Society of America 56: 824-826.
Camras S (1965) Family Conopidae. Pp. 625-632. In Stone A, Sabrosky CW, Wirth W W, Foote RH, Coulson JR, A catalog of the Diptera of America north of Mexico. [USDA], Agricultural Handbook 276, iv + 1696 pp. [1965.08.23]
Camras S (1966) Conopidae from Nepal and the Oriental region. Diptera from Nepal. Bulletin of the British Museum (Natural History), Entomology 17: 431-434.
Camras S (1967) Notes on Neotropical *Stylogaster* (Diptera: Conopidae). Journal of the Kansas Entomological Society 40: 4-9.

Camras S (1976) *Zodion pearsoni*, sp. nov. in memoriam. Annals of the Entomological Society of America 69: 699-700.
Camras S (1979) New species and key to *Robertsonomyia* (Diptera: Conopidae). Journal of the Kansas Entomological Society 52: 109-111.
Camras S (1981) New Conopidae from Argentina (Diptera). Journal of the Kansas Entomological Society 54: 741-742.
Camras S (1989a) A new species of *Stylogaster* (Diptera: Conopidae) with notes on some types. Entomological News 100: 79-80.
Camras S (1989b) A new species of *Stylogaster* from Brazil (Diptera: Conopidae). Memorias do Instituto Oswaldo Cruz 84: 75.
Camras S (1992) New Neotropical Conopidae (Diptera). Entomological News 103: 83-85.
Camras S (1994a) Case 2881. *Sicus* Scopoli, 1763 and *Myopa* Fabricius, 1775 (Insecta, Diptera): proposed conservation by the designation of *Conops buccata* Linnaeus, 1758 as the type species of *Myopa*. Bulletin of Zoological Nomenclature 51: 31-34.
Camras S (1994b) A new subfamily for the fossil conopid fly, *Palaeomyopa tertiaria* (Diptera: Conopidae). Entomological News 105: 175-177.
Camras S (1996) New information on the New World *Physocephala* (Diptera: Conopidae). Entomological News 107: 104-112.
Camras S (2000) New information on Afrotropical Conopidae (Diptera). Entomologist's Monthly Magazine 136: 219-233.
Camras S (2001) Additional information on Afrotropical Conopidae (Diptera). Entomologist's Monthly Magazine 137: 179-214.
Camras S (2003) New Conopidae from the Neotropical Region (Diptera). Entomological News 114: 86-90.
Camras S (2007a) First species of *Pleurocerinella* from the New World (Diptera: Conopidae), with the description of a new species. Entomological News 118: 487-488.
Camras S (2007b) A new conopid fly from Florida and Georgia (Diptera: Conopidae). Insecta Mundi 0007: 1-4.
Camras S (2007c) On the *Archiconops Insularis*-group species of Madagascar (Diptera: Conopidae). Entomologist's Monthly Magazine 143: 161-165.
Camras S (2009) [*Pleurocerinella srilankai* Stuke & Camras, new species] in Stuke, J.-H. (2009) Vier neue Arten der Gattung *Pleurocerinella* Brunetti, 1923 un Anmerkungen zu weiteren Arten der Gattung (Diptera: Conopidae). Beiträge zur Entomologie 59: 211-231. [2009.07.15]
Camras S & Chvála M (1984) A new species of *Conops* (Diptera, Conopidae) from Rumania, with notes on *C. elegans*. Acta Entomologica Bohemoslovaca 81: 232-235.
Camras S & Hurd PDJ (1957) The conopid flies of California (Diptera). Bulletin of the California Insect Survey 6: 19-49.
Camras S & Parrilo PP (1985) Review of New World *Stylogaster* (Diptera: Conopidae). Annals of the Entomological Society of America 78: 111-126.
Camras S & Parrillo PP (1995) New *Stylogaster* and ranges of Conopidae (Diptera) from the Brazilian and Bolivian Amazonia. Acta Amazonica 25: 221-234.
Gibson JF, Skevington JH & Camras S (2012) Conopidae (Diptera), Vol. 3: Biodiversidad de Artrópodos Argentinos (ed. by LE Claps, G Debandi & S Roig-Juñent) Sociedad Entomológica Argentina, p. in press.
Mayr, E. & Camras S (1938) Birds of the Crane Pacific Expedition. Field Museum of Natural History, Zoological Series 20: 453-473.
Pearson DL & Camras S (1978) Notes and key to Neotropical *Zodion* (Diptera: Conopidae). Journal of the Kansas Entomological Society 51: 198-206.

Skevington JH, Thompson FC & Camras S (2010) Conopidae (Thick-headed Flies), Vol. 2: Manual of Central American Diptera (ed. by BV Brown, A Borkent, JM Cumming, DM Wood, NE Woodley & MA Zumbado) INBio, San Jose, pp. 847-855.

Thompson FC, Skevington JH, Gibson JF & Camras S (in press) Neotropical Conopidae. A conspectus. Neotropical Diptera

Table 3. Taxa described by Sid Camras

Names are arranged alphabetically and their documentation format follows that of *Systema Dipterorum*.

Family-group taxa

Palaeomyopinae Camras 1994: 177. Type-genus, *Palaeomyopa* Meunier

Genus-group taxa

Aureoconops Camras 2004: 86 (proposed as a subgenus). Type-species, *Physoconops aureolus* Camras by original designation.

Australoconops Camras 1961: 64. Type-species, *Conops splendidus* Krober by original designation.

Ceratoconops Camras 1955: 159 (proposed as a subgenus). Type-species, *Conops ornatus* Williston by original designation.

Diconops Camras 1957(proposed as a subgenus): 9. Type-species, *Conops trichus* Camras by original designation.

Gyroconops Camras 1955: 174 (proposed as a subgenus). Type-species, *Conops sylvosus* Williston by original designation.

Kroeberoconops Camras 1955: 175 (proposed as a subgenus). Type-species, *Physoconops hermanni* Kroeber by original designation.

Mallochoconops Camras 1955: 160. Type-species, *Conops atratulus* Malloch by original designation

Pachyconops Camras 1955: 161 (proposed as a subgenus). Type-species, *Conops bulbirostris* Loew by original designation.

Pseudoconops Camras 1962: 183. Type-species, *antennatus* Camras by original designation.

Scatoccemyia Camras 1957: 13. Type-species, *plaumanni* Camras by original designation.

Shannonoconops Camras 1955: 172 (proposed as a subgenus). Type-species, *Physoconops apicalis* Camras by original designation.

Smithiconops Camras 2000: 221 (proposed as a subgenus). Type-species, *Conops rondanii* Bezzi by original designation.

Sphenoconops Camras 1955: 159 (proposed as a subgenus). Type-species, *Conops nobilis* Williston by original designation.

Zodiomyia Camras 1957: 163. Type-species, *sumbaensis* Camras by original designation.

Species-group taxa

abbreviatus Camras, 1955: 174 (*Physoconops)*. TL: Mexico. Guerrero: Xucumanatlan, 7000 feet (HT M BMNH). *Physoconops* (*Gyroconops*) *abbreviatus*. (NT: NT) Mexico (Guerrero)

afenestralis Camras, 2001: 190 (*Pseudophysocephala*). TL: Zimbabwe. North Vumba (HT M NMP). *Pseudophysocephala afenestralis*. (AF: AF) Zimbabwe

africana Camras, 2001: 207 (*Tropidomyia*). TL: South Africa. East Cape Prov., Katberg (HT M BMNH). *Tropidomyia africana*. (AF: AF) South Africa

aldrichi Camras & Parrillo, 1985: 118 (*Stylogaster*). TL: Panama. Canal Zone: Barro Colorado Is. (HT M FMNH). *Stylogaster aldrichi*. (NT: NT) Costa Rica, Panama, Ecuador, Venezuela

alexanderi Camras, 1955: 119 (*Tropidomyia*). TL: Brazil. Mato Grosso: Maracaju (HT M USNM). *Tropidomyia alexanderi*. (NT: NT) Brazil (Mato Grosso, Goias, Sao Paulo), Paraguay

alinea Camras, 2001: 193 (*Pseudophysocephala*). TL: Tanzania. Usamara Mts., Amami, 1000 m (HT M UZMC). *Pseudophysocephala alinea*. (AF: AF) Tanzania

amazonasi Camras, 1963: 825 (*Stylogaster*). TL: Brazil. Amazonas: Itapiranga (HT F AMNH). *Stylogaster amazonasi*. (NT: NT) Brazil (Amazonas)

antennatus Camras, 1962: 183 (*Pseudoconops*). Madagascar. East: along railway between Tananarive and Tamatave (HT F AMNH). *Pseudoconops antennatus*. (AF: AF) Madagascar

apicalis Camras, 1955: 172 (*Physoconops*). TL: Brazil. Mato Grosso: Maracaju (HT M USNM). *Physoconops* (*Shannonoconops*) *apicalis*. (NT: NT) Peru, Brazil (Mato Grosso, Santa Catarina)

argentinus Camras, 2004: 87 (*Physoconops*). TL: Argentina. Volcan (HT M USNM). *Physoconops* (*Kroeberoconops*) *argentinus*. (NT: NT) Argentina

aristalis Camras, 1961: 723 (*Paraconops*). TL: Australia. Western Australia. Perth (HT F BMNH). *Pleurocerina aristalis*. (AU: AU) Australia (Western Australia)

ater Camras, 1961: 70 (*Microconops*). TL: Australia. New South Wales. Sydney (HT M USNM). *Camrasiconops ater*. (AU: AU) Australia (New South Wales)

atratus Camras, 1962: 214 (*Conops*). TL: Kenya. Taveta Forest (HT F BMNH). *Conops* (*Asiconops*) *atratus*. (AF: AF) Kenya

atrofemorus Camras, 1963: 824 (*Physoconops*). TL: Bahamas. Crooked Island, Landrail Point (HT F AMNH). *Physoconops* (*Physoconops*) *atrofemorus*. (NT: NT) Bahamas

atronota Camras, 2001: 183 (*Physocephala*). TL: Uganda. Kibale Forest (HT M BMNH). *Physocephala atronota*. (AF: AF) Uganda

atroviolaceus Camras, 1962: 213 (*Conops*). TL: Zimbabwe. Umtali (HT M Natal). *Conops* (*Asiconops*) *atroviolaceus*. (AF: AF) Zimbabwe

aureofuscus Camras, 1957: 107 (*Conops*). TL: Indonesia. Irian Jaya. Numfoor Is., off NW New Guinea (HT M CAS). *Conops* (*Asiconops*) *aureofuscus*. (AU: AU) New Guinea

aureolus Camras, 2004: 86 (*Physoconops*). TL: Peru. Madre de Dios: Manu, Rio Manu, Pakitza, 12 7 S 70 58 W, 250 M (HT M USNM (Peru)). *Physoconops aureolus*. (NT: NT) Peru

australiana Camras, 1955: 124 (*Occemyia*). TL: Australia. New South Wales (HT M USNM). *Thecophora australiana*. (AU: AU) Australia (New South Wales)

australiana Camras, 1961: 74 (*Physocephala*). TL: Australia. Western Australia: Yanchep, 32 miles N Perth (HT M BMNH). *Physocephala australiana*. (AU: AU) Australia (Western Australia)

australianus Camras, 1961: 62 (*Conops*). TL: Australia. Queensland, Cairns (HT M USNM). *Conops* (*Asiconops*) *australianus*. (AU: AU) Australia (Queensland)

barbata Camras, 2001: 194 (*Pseudophysocephala*). TL: Zimbabwe. North Vumba (HT M NMP). *Pseudophysocephala barbata*. (AF: AF) Zimbabwe

basilewskyi Camras, 1962: 238 (*Pseudophysocephala*). TL: Congo. Kibali-Ituri, Irumu (HT F MRAC). *Pseudophysocephala basilewskyi*. (AF: AF) Congo

bellatus Camras, 1957: 109 (*Conops*). TL: Indonesia. Sumatra: Benkoelen (HT M BMNH). *Conops* (*Conops*) *bellatus*. (OR: OR) Sumatra

bellum Camras, 2004: 89 (*Zodion*). TL: Mexico. El Camaron, 20 miles east of Oaxaca (HT M FMNH). *Zodion bellum*. (NT: NT) Mexico

bennetti Camras, 1996: 105 (*Physocephala*). TL: Trinidad. Curipe (HT F CNC). *Physocephala bennetti*. (NT: NT) Trinidad

bequaertorum Camras, 1962: 226 (*Physocephala*). TL: Congo. Kivu, Kamaniola (HT F AMNH). *Physocephala bequaertorum*. (AF: AF) Congo

bicingulatus Camras, 2000: 223 (*Conops*). TL: Tanzania (HT M BMNH). *Conops* (*Asiconops*) *bicingulatus*. (AF: AF) Tanzania

bifasciatum Pearson & Camras, 1978: 200 (*Zodion*). TL: Brazil. Sao Paulo: Itaringa (HT M MZUSP). *Zodion bifasciatum*. (NT: NT) Brazil

bilineatus Camras, 2000: 224 (*Conops*). TL: South Africa. Natal: Ndumu Reserve, Ingwavuma district, Zululand (HT M NMP). *Conops* (*Asiconops*) *bilineatus*. (AF: AF) South Africa

bohartorum Camras, 1953: 107 (*Myopa*). TL: USA. California: Napa (HT M CAS). *Myopa bohartorum*. (NE: NE) California

brasilia Camras & Parrillo, 1985: 113 (*Stylogaster*). TL: Brazil. Rio de Janeiro: Represa do Rio Grande (HT M CNC). *Stylogaster brasilia*. (NT: NT) Brazil

brevipennis Camras, 1962: 224 (*Physocephala*). TL: South Africa. Zululand: Ngutu (HT M FMNH). *Physocephala brevipennis*. (AF: AF) South Africa

brevipetiolata Camras, 1962: 233 (*Pseudophysocephala*). TL: Congo. Eala (HT M MRAC). *Pseudophysocephala brevipetiolata*. (AF: AF) Congo

brevivertex Camras, 2001: 195 (*Pseudophysocephala*). TL: Nigeria. Ibadan, Olokemeji (HT M USNM). *Pseudophysocephala brevivertex*. (AF: AF) Nigeria

bridwelli Camras, 1961: 65 (*Conops*). TL: Australia. Queensland. Stradbroke Island (HT M USNM). *Australoconops bridwelli*. (AU: AU) Australia (Queensland, New South Wales)

californicum Camras, 1954: 165 (*Zodion*). USA. California: Riverside Co., Ripley (HT F CAS). *Zodion californicum*. (NE: NE) USA (California), Mexico (Baja California, Sinaloa)

chinensis Camras, 1960: 112 (*Conops*). TL: China. Fujian: Yenping (HT M AMNH). *Conops* (*Asiconops*) *chinensis*. (OR: OR) China [Fukien]

chvalai Camras, 2004: 89 (*Zodion*). TL: Argentina. Cordoba: Capilla del Monte (HT M Coll. Chvala). *Zodion chvalai*. (NT: NT) Argentina

claripennis Camras, 1962: 220 (*Physoconops*). TL: Nigeria. Ibadan, Olokemeji (HT F USNM). *Physoconops claripennis*. (AF: AF) Nigeria

cockerelli Camras, 1960: 108 (*Abrachyglossum*). TL: Russia. Siberia: Kongasus (HT F USNM). *Abrachyglossum cockerelli*. (PA: PA) Russia (Far East)

coei Camras, 1966: 432 (*Physocephala*). TL: Nepal. Eastern, Arun Valley, Tumlingtar plateau, c. 2000 ft (HT M BMNH). *Physocephala coei* Camras. (OR: OR) Nepal

congoensis Camras, 1962: 217 (*Conops*). TL: Congo. Epulu (HT F Cornell). *Conops* (*Asiconops*) *congoensis*. (AF: AF) Congo

connectens Camras, 1955: 169 (*Physoconops*). TL: Guatemala. Rabinal, 3000 feet (HT M AMNH). *Physoconops* (*Pachyconops*) *connectens*. (NT: NT) Mexico, Guatemala

costaricae Camras & Parrillo, 1985: 123 (*Stylogaster*). TL: Costa Rica. Puerto Viejo, 10 26 N 83 59 W, 89 m (HT F UCB). *Stylogaster costaricae*. (NT: NT) Costa Rica

ctenitarsa Camras & Parrillo, 1996: 227 (*Stylogaster*). TL: Brazil. Roraima: Pacaraima (HT M INPA). *Stylogaster ctenitarsa*. (NT: NT) Brazil

cyanescens Camras, 1943: 188 (*Zodion*). TL: USA. North Carolina: Smokemont (HT M FMNH). *Zodion cyanescens*. (NE: NE) Illinois toN.J., s. to Miss.andFla.

diffusipennis Camras, 1957: 113 (*Conops*). TL: Indonesia. North Celebes: Minahasa, Modoinding, Minahasa (HT M Leiden). *Conops* (*Asiconops*) *diffusipennis*. (OR: OR) Celebes

discale Pearson & Camras, 1978: 200 (*Zodion*). TL: Brazil. Sao Paulo (HT M AMNH). *Zodion discale*. (NT: NT) Brazil

discalis Camras, 1962: 232 (*Physocephala*). TL: Uganda. Behungi (HT M AMNH). *Pseudophysocephala discalis*. (AF: AF) Uganda

dispar Camras & Parrillo, 1985: 112 (*Stylogaster*). TL: Peru. Madre de Dios, Avispas (HT M CNC). *Stylogaster dispar*. (NT: NT) Ecuador, Peru, Brazil

elongata Camras, 1963: 825 (*Stylogaster*). TL: Ecuador. Rio Negro, 1300 m. (HT F FMNH). *Stylogaster elongata*. (NT: NT) Ecuador

elongata Camras, 1960: 125 (*Physocephala*). TL: Malaysia. Selangor: Ulu Gombak (HT M USNM). *Physocephala elongata*. (OR: OR) Malaya

ethiopica Camras, 1962: 227 (*Physocephala*). TL: Ethiopia. Dilla (Sidamo) (HT F BMNH). *Physocephala ethiopica*. (AF: AF) Ethiopia

fairchildi Camras, 1957: 216 (*Physocephala*). TL: Brazil. Mato Grosso: Maracaju (HT M USNM). *Physocephala unicolor* Kröber. (NT)

fenestralis Camras, 1962: 215 (*Conops*). TL: Congo. Lualaba, Kabongo (HT F MRAC). *Conops* (*Asiconops*) *fenestralis*. (AF: AF) Congo

flavostriatum Camras, 1953: 399 (*Zodion*). TL: Brazil. Santa Catarina: Nova Teutonia (HT M BMNH). *Zodion flavostriatum*. (NT: NT) Brazil (Santa Catarina)

floridana Camras, 1957: 214 (*Physocephala*). TL: USA. Florida: Crescent City (HT M FMNH). *Physocephala floridana*. (NE: NE) Lousiana, Georgia

floridanus Camras, 1955: 163 (*Physoconops*). TL: USA. Florida: Cocoa (HT M FMNH). *Physoconops* (*Pachyconops*) *floridanus*. (NE: NE) Florida, North Carolina

freidbergi Camras, 2000: 230 (*Caenoconops*). TL: Kenya. Kakamega Forest (HT M TAUI). *Caenoconops freidbergi*. (AF: AF) Kenya

fumivena Camras, 2001: 184 (*Physocephala*). TL: Zimbabwe. N. Vumba (HT M NMP). *Physocephala fumivena*. (AF: AF) Zimbabwe

fumosa Camras, 1957: 116 (*Physocephala*). TL: Indonesia. Maluku (HT M NMB, Basel). *Physocephala fumosa*. (AU: AU) Indonesia. Maluku

geminatus Camras, 1957: 10 (*Conops*). TL: Peru. Huanuco: Tingo Maria, Monson Valley (HT F CAS). *Conops* (*Diconops*) *geminatus*. (NT: NT) Peru (Huanuco)

gilmorei Camras, 1955: 176 (*Physoconops*). TL: Brazil. Mato Grosso: Maracaju (HT M USNM). *Physoconops* (*Physoconops*) *gilmorei*. (NT: NT) Brazil (Mato Grosso, Goias), Paraguay

gracilianus Camras, 1955: 165 (*Physoconops*). TL: Mexico. Morelos: Cuernavaca (HT M USNM). *Physoconops* (*Pachyconops*) *pallifrons* Coquillett. (NE)

grahami Camras, 1960: 113 (*Conops*). TL: China. Sichuan: Suifu, Uen Chuan Shien (HT M USNM). *Conops* (*Asiconops*) *grahami*. (PA: PA) China

grandens Camras, 1960: 119 (*Siniconops*). TL: China. Sichuan: Yachow (HT M USNM). *Siniconops grandens*. (PA: PA) China

griseatum Pearson & Camras, 1978: 198 (*Zodion*). TL: Brazil. Santa Catarina: Nova Teutonia (HT M FMNH). *Zodion griseatum*. (NT: NT) Brazil

hirta Camras & Parrillo, 1985: 124 (*Stylogaster*). TL: Brazil. Sao Paulo: Casa Grande, Boraceia Field Station (HT F FSCA). *Stylogaster hirta*. (NT: NT) Brazil

hirticosta Camras & Parrillo, 1985: 117 (*Stylogaster*). TL: Venezuela. Aragua: Rancho Grande, 1,100 m (HT M CNC). *Stylogaster hirticosta*. (NT: NT) Venezuela

inca Camras & Parrillo, 1985: 125 (*Stylogaster*). TL: Peru. Cuzco: Quincemil, 780 m (HT F CNC). *Stylogaster inca*. (NT: NT) Peru

infuscatus Camras, 1955: 179 (*Physoconops*). TL: Brazil. Mato Grosso: Maracaju (HT M USNM). *Physoconops* (*Physoconops*) *infuscatus*. (NT: NT) Brazil (Mato Grosso to Sao Paulo, Santa Catarina)

intermedia Camras, 1966: 433 (*Microbrachyceraea*). TL: Thailand. Northwestern, Chiangmai, Fang, 500 m (HT F BPBM). *Microbrachyceraea intermedia*. (OR: OR) Thailand

intermedia Camras & Parrillo, 1985: 120 (*Stylogaster*). TL: Brazil. Distrito Federal: Parque Nacional, 1,100 m (HT M CNC). *Stylogaster intermedia*. (NT: NT) Brazil

iviei Camras, 1992: 84 (*Stylogaster*). TL: Dominican Republic. Pedernales: Cabo Rojo, 24 km N (HT M USNM). *Stylogaster iviei*. (NT: NT) Dominican Republic

kanoi Camras, 1960: 110 (*Conops*). TL: Japan. Tokyo: Niijima (HT M FMNH). *Conops* (*Asiconops*) *kanoi*. (PA: PA) Japan

kaplanae Camras, 2001: 204 (*Dacops*). TL: Ethiopia. Rd Addis Abeda-Debre Zeyit (HT F TAUI). *Dacops kaplanae*. (AF: AF) Ethiopia

keiseri Camras, 1957: 69 (*Conops*). TL: Sri Lanka. Central Prov.: Teldeniya (HT M NMB, Basel). *Conops* (*Conops*) *keiseri*. (OR: OR) Sri Lanka, Java, Sumatra

latipes Camras & Parrillo, 1985: 114 (*Stylogaster*). TL: Ecuador. Napo: Limoncocha (HT M UCB). *Stylogaster latipes*. (NT: NT) Ecuador

lieftinki Camras, 1957: 110 (*Conops*). TL: Indonesia. West Java: Mt. Pangrango, Tjisarua S., 1000 , (HT M Leiden). *Conops* (*Conops*) *lieftinki*. (OR: OR) Java

lineifrons Camras, 1962: 226 (*Physocephala*). TL: South Africa. Natal: Pietermaritzburg, Town Bush (HT M Natal). *Physocephala lineifrons*. (AF: AF) South Africa

longispina Camras & Parrillo, 1985: 115 (*Stylogaster*). TL: Peru. Cuzco, Quincemil, 780 m (HT M CNC). *Stylogaster longispina*. (NT: NT) Peru, Brazil, Bolivia

longitheca Camras, 2001: 185 (*Physocephala*). TL: Angola. 5 miles NE of Negola (HT F BMNH). *Physocephala longitheca*. (AF: AF) Angola

lopesi Camras, 1957: 15 (*Stylogaster*). TL: Brazil. Santa Catarina: Nova Teutonia (HT F FMNH). *Stylogaster lopesi*. (NT: NT) Brazil (Santa Catarina)

luteipes Camras, 1945: 220 (*Occemyia*). TL: USA. Washington: Pullman (HT F CAS). *Thecophora luteipes*. (NE: NE) British Columbia to Colorado, sw.to Calif.

maculifacies Camras, 2001: 185 (*Physocephala*). TL: Angola. Chianga (HT M BMNH). *Physocephala maculifacies*. (AF: AF) Angola

maculifrons Camras & Parrillo, 1985: 124 (*Stylogaster*). TL: Peru. Cuzco: Quincemil, 470 m (HT F CNC). *Stylogaster maculifrons*. (NT: NT) Peru

magna Camras & Parrillo, 1985: 125 (*Stylogaster*). TL: Costa Rica. Turrialba (HT F USNM). *Stylogaster magna*. (NT: NT) Costa Rica

malgachensis Camras, 1962: 185 (*Stylogaster*). Madagascar. Ankarafantsika Forest, Tsaramandroso (HT F MNHN, Paris). *Stylogaster malgachensis*. (AF: AF) Madagascar

marstoni Pearson & Camras, 1978: 202 (*Zodion*). TL: Brazil. Parana: Marinja (HT M USNM). *Zodion marstoni*. (NT: NT) Brazil

meii Camras, 2001: 198 (*Pseudophysocephala*). TL: Guinea. Faranah, Sidakoro (HT F FMNH). *Pseudophysocephala meii*. (AF: AF) Guinea

melana Camras, 1960: 124 (*Physocephala*). TL: Vietnam: Trang Bom, 30 mi NW of Saigon (HT F USNM). *Physocephala melana*. (OR: OR) S Viet Nam

metallica Camras, 1962: 182 (*Thecophora*). Madagascar. Vohiparara (HT F MNHN, Paris). *Thecophora metallica*. (AF: AF) Madagascar

metallica Camras, 1992: 84 (*Myopa*). TL: Chile. Santiago: Quebradu, Ramon (HT M FMNH). *Myopa metallica*. (NT: NT) Chile

mexicana Camras, 1979: 109 (*Robertsonomyia*). TL: Mexico. Guerrero: Chilpancingo, 2.5 miles E (HT M USNM). *Zodion mexicana*. (NT: NT) Mexico

murielae Camras, 1967: 6 (*Stylogaster*). TL: Ecuador. Rio Negro, 1300 m. (HT M FMNH). *Stylogaster murielae*. (NT: NT) Ecuador

neotropica Camras, 2008: 487 (*Pleurocerinella*). TL: Bolivia. Cochabomba (HT F CNC). *Physoconops* (*Jelte*) *neotropica*. (NT: NT) Bolivia

nepalensis Camras, 1966: 432 (*Thecophora*). TL: Eastern, Taplejung District, above Sangu, c. 9200 ft. (HT F BMNH). *Thecophora nepalensis*. (OR: OR) Nepal

nigeriensis Camras, 1962: 211 (*Conops*). TL: Nigeria. Olokemeji (HT M USNM). *Conops* (*Asiconops*) *nigeriensis*. (AF: AF) Nigeria

nigrescens Camras, 1961: 64 (*Conops*). TL: Australia. Queensland. Redlynch (HT F BMNH). *Conops* (*Asiconops*) *nigrescens*. (AU: AU) Australia (Queensland)

nigricoxa Camras, 1967: 5 (*Stylogaster*). TL: Panama. Chiriqui: Valley of the Clouds, El Volcan de Chiriqui (HT F USNM). *Stylogaster nigricoxa*. (NT: NT) Costa Rica, Panama

nigripes Camras, 1945: 218 (*Occemyia*). TL: Canada. Ontario: Thunder Bay Beach (HT F FMNH). *Thecophora nigripes*. (NE: NE NT) B.C.to N.S., s. to Mexico and Georgia,Guatemala

nigrita Camras, 1962: 235 (*Pseudophysocephala*). TL: Sierra Leone. Laowa (HT AM MCZ). *Pseudophysocephala nigrita*. (AF: AF) Sierra Leone

nigrivena Camras, 1962: 240 (*Thecophora*). TL: Burundi. Bururi, 1900 m (HT F MRAC). *Thecophora nigrivena*. (AF: AF) Burundi

nigroclavatus Camras, 1992: 83 (*Physoconops*). TL: Brazil. Santa Catarina: Nova Teutonia (HT M FMNH). *Physoconops* (*Physoconops*) *nigroclavatus*. (NT: NT) Brazil

nitens Camras, 1955: 181 (*Physoconops*). TL: Brazil. Mato Grosso: Maracaju (HT M USNM). *Physoconop*s (*Physoconops*) *nitens*. (NT: NT) Brazil (Mato Grosso, Santa Catarina)

notatifrons Camras, 1962: 219 (*Physoconops*). TL: Cameroun. Lolodorf (HT F CM). *Physoconops notatifrons*. (AF: AF) Cameroun

painteri Camras, 1979: 110 (*Robertsonomyia*). TL: Mexico. Morelos: Tepotzlan, 2 mi S, 5600ft (HT F USNM). *Zodion painteri*. (NE: NE) Mexico (Morelos)

papuana Camras, 1961: 75 (*Thecophora*). TL: Papua New Guinea. Mount Tafa, 8,500 ft. (HT F BMNH). *Thecophora papuana*. (AU: AU) New Guinea

paradecorata Camras & Parrillo, 1985: 121 (*Stylogaster*). TL: Brazil. Santa Catarina: Nova Teutonia, 300-500 m (HT M FMNH). *Stylogaster paradecorata*. (NT: NT) Costa Rica, Colombia, Ecuador, Peru, Brazil

parrilloi Camras, 2004: 90 (*Stylogaster*). TL: Costa RIca. Alajuela: Upala, 20 km south of (HT M Utah). *Stylogaster parrilloi*. (NT: NT) Costa Rica

parsonsi Camras, 1955: 171 (*Physoconops*). TL: Cuba. Trinidad Mountains, Buenos Aires (HT F USNM). *Physoconops* (*Pachyconops*) *parsonsi*. (NT: NT) Cuba

parva Camras, 1955: 121 (*Stylogaster*). TL: Uganda. Kawanda (HT M BMNH). *Stylogaster nitens* Brunetti. (AF)

pauliani Camras, 1962: 186 (*Stylogaster*). Madagascar. Analavelona Mt., 1320 m (HT F MNHN, Paris). *Stylogaster pauliani*. (AF: AF) Madagascar

pearsoni Camras, 1976: 699 (*Zodion*). TL: Brazil. Santa Catarina: Nova Teutonia (HT M FMNH). *Zodion pearsoni*. (NT: NT) Brazil (Santa Catarina)

penai Camras & Parrillo, 1985: 125 (*Stylogaster*). TL: Ecuador. Napo: Coca, Napo RIver (HT F CNC). *Stylogaster penai*. (NT: NT) Ecuador

perplexa Camras, 1953: 103 (*Myopa*). TL: USA. California: Contra Costa Co., Antioch (HT F CAS). *Myopa perplexa*. (NE: NE) Washington and Idaho, s. to Calif. & Ariz.

peruvianus Camras, 1955: 178 (*Physoconops*). TL: Peru. Pucallpa (HT F FMNH). *Physoconops* (*Physoconops*) *peruvianus*. (NT: NT) Peru

petersoni Camras & Parrillo, 1985: 114 (*Stylogaster*). TL: Mexico. Chiapas: Montebello National Park, 5,000 ft (HT M CNC). *Stylogaster petersoni*. (NT: NT) Mexico

philippinensis Camras, 1960: 130 (*Thecophora*). TL: Philippines. Luzon: Benguet, Panal (HT MM USNM). *Thecophora philippinensis*. (OR: OR) Philippines [Luzon]

plaumanni Camras, 1957: 14 (*Scatoccemyia*). TL: Brazil. Santa Catarina: Nova Teutonia (HT M FMNH). *Scatoccemyia plaumani*. (NT: NT) Brazil (Santa Catarina)

plumidecorata Camras & Parrillo, 1985: 122 (*Stylogaster*). TL: Peru. Cuzco: Quincemil, 700 m (HT M CNC). *Stylogaster plumidecorata*. (NT: NT) Peru, Brazil (Goias, Rondonia)

pulcher Camras, 1961: 67 (*Conops*). TL: Australia. New South Wales: Sydney (HT M USNM). *Australoconops pulcher*. (AU: AU) Australia (New South Wales)

pulcher Camras, 2000: 219 (*Conops*). TL: Uganda. Koputh to Karenga Road (HT M BMNH). Preocc. Camras 1961*Conops* (*Conops*) *pulcher*. (AF: AF) Uganda

punctipennis Camras, 1981: 741 (*Pseudomyopa*). TL: Argentina. Bemberg (HT F USNM). *Pseudomyopa punctipennis*. (NT: NT) Argentina

rafaeli Camras & Parrillo, 1996: 223 (*Stylogaster*). TL: Brazil. Rondonia: Ariquemes Rio Ji-Parana, 9 44S 61 52W (HT M INPA). *Stylogaster rafaeli*. (NT: NT) Brazil

rettenmeyeri Camras, 1967: 7 (*Stylogaster*). TL: Costa Rica. Monteverde, 10 29N 85 50W (HT M USNM). *Stylogaster rettenmeyeri*. (NT: NT) Costa Rica

rossi Camras, 1957: 12 (*Zodion*). TL: Mexico. San Luis Potosi: Cidad del Maiz, 40-50 mi NW (HT M CAS). *Zodion rossi*. (NE: NE NT) Mexico (San Luis Potosi)

rufa Camras & Parrillo, 1985: 116 (*Stylogaster*). TL: Peru. Cuzco, Quincemil, 700 m (HT M CNC). *Stylogaster rufa*. (NT: NT) Peru, Brazil (Rondonia)

rufa Camras, 2001: 200 (*Pseudophysocephala*). TL: Malawi. Mulanje Mt., near Likabula, 1500 m (HT F TAUI). *Pseudophysocephala rufa*. (AF: AF) Malawi

rufifrons Camras, 1960: 121 (*Physocephala*). TL: China. Sichuan: Ningyuenfu (HT F USNM). *Physocephala rufifrons*. (PA: PA) China (Szechwan)

rufifrons Camras, 1981: 742 (*Thecophora*). TL: Argentina. Dean Funes (HT F USNM). *Thecophora rufifrons*. (NT: NT) Argentina

rufigaster Camras, 1960: 115 (*Conops*). TL: Philippines. Biliran Island (HT M USNM). *Conops* (*Asiconops*) *rufigaster*. (OR: OR) Philippines [Biliran]

rufitarsis Camras, 1962: 229 (*Pseudophysocephala*). TL: South Africa. Cape: Katberg (HT F BMNH). *Pseudophysocephala rufitarsis*. (AF: AF) South Africa

rufofemoralis Camras, 1957: 160 (*Conops*). TL: Indonesia. West Flores: Ruteng (HT M NMB, Basel). *Conops* (*Conops*) *rufofemoralis*. (OR: OR) Flores

rufofemoris Camras, 1961: 71 (*Microconops*). TL: Australia. New South Wales: Sydney (HT M USNM). *Camrasiconops rufofemoris*. (AU: AU) Australia (New South Wales)

rufus Camras, 1955: 120 (*Euconops*). TL: Kenya. Emali Range, Sultan Hamud (HT F BMNH). *Tammo rufus*. (AF: AF) Kenya

ruwenzoria Camras, 1962: 239 (*Thecophora*). TL: Congo. Mwenda: Mt Ruwenzori, 1455 m (HT F Cornell). *Thecophora ruwenzoria*. (AF: AF) Congo

sabroskyi Camras, 1996: 106 (*Physocephala*). TL: Bahamas. Andros, 5 miles S Point Simon, West Coast (HT M USNM). *Physocephala sabroskyi*. (NT: NT) Bahamas

schlingeri Camras & Parrillo, 1985: 113 (*Stylogaster*). TL: Colombia. Valle, 6 miles W Calli (HT M CAS). *Stylogaster schlingeri*. (NT: NT) Colombia

sedmani Camras & Parrillo, 1985: 112 (*Stylogaster*). TL: Mexico. Vera Cruz: Jalapa (HT M FMNH). *Stylogaster sedmani*. (NT: NT) Mexico

seguyi Camras, 1962: 184 (*Stylogaster*). Madagascar. "Mtge. d'Ambre" (HT M MNHN, Paris). *Stylogaster seguyi*. (AF: AF) Madagascar

shannoni Camras, 1955: 162 (*Physoconops*). TL: Brazil. Mato Grosso: Maracaju (HT M USNM). *Physoconops* (*Pachyconops*) *shannoni*. (NT: NT) Brazil (Mato Grosso)

similis Camras, 1961: 67 (*Conops*). TL: Australia. Queensland. Stradbroke Island (HT M USNM). *Australoconops similis*. (AU: AU) Australia (Queensland, New South Wales)

simis Camras, 1953: 397 (*Zodion*). TL: Brazil. Santa Catarina: Nova Teutonia (HT M BMNH). *Zodion simis*. (NT: NT) Brazil (Santa Catarina)

simulans Camras, 1962: 209 (*Conops*). TL: Kenya. Naivasha (HT F BMNH). *Conops* (*Asiconops*) *simulans*. (AF: AF) Kenya

sinaloae Camras, 1989: 79 (*Stylogaster*). TL: Mexico. Sinaloa: Chupaderos, 4.6 miles E (HT M UCB). *Stylogaster sinaloae*. (NT: NT) Mexico

souzalopesi Camras, 1990: 75 (*Stylogaster*). TL: Brazil. Roraima: Rio Uraricoera, Ilha de Maraca (HT M INPA). *Stylogaster souzalopesi*. (NT: NT) Brazil (Roraima)

spheniformis Camras, 1957: 217 (*Physocephala*). TL: Brazil. Rio de Janeiro: Itatiaia, 700 m. (HT M USNM). *Physocephala spheniformis*. (NT: NT) Brazil (Rio de Janeiro)

spinipes Camras, 2001: 201 (*Pseudophysocephala*). TL: Tanzania. Amani (HT F BMNH). *Pseudophysocephala spinipes*. (AF: AF) Tanzania

splendens Camras, 1960: 118 (*Siniconops*). TL: China. Sichuan: Yachow (HT M USNM). *Siniconops splendens*. (PA: PA) China

srilankai Stuke & Camras, 2009: 322 (*Pleurocerinella*). TL: Sri Lanka. East District: Hankgala Sanctuary (HT M USNM). *Pleurocerinella srilankai*. (OR: OR) Sri Lanka

stuckenbergi Camras, 1962: 180 (*Conops*). Madagascar. Ankaratra massif, Manjakatompo, forest station (HT F MNHN, Paris). *Conops* (*Asiconops*) *stuckenbergi*. (AF: AF) Madagascar

subapicalis Camras, 1955: 122 (*Stylogaster*). TL: Cameroun. Lolodori (HT F FMNH). *Stylogaster leonum* Westwood. (AF)

sumbaensis Camras, 1957: 163 (*Zodiomyia*). TL: Indonesia. Central Sumba: Lokojengo (HT F NMB, Basel). *Zodiomyia sumbaensis*. (OR: OR) Sumba

sydneyi Camras, 1961: 69 (*Conops*). TL: Australia. New South Wales: Sydney (HT M USNM). *Australoconops sydneyi*. (AU: AU) Australia (New South Wales)

szechwanensis Camras, 1960: 114 (*Conops*). TL: China. Sichuan: Suifu to Hongya, 1,000-1,400 ft (HT F USNM). *Conops* (*Asiconops*) *szechwanensis*. (PA: PA) China

tarsia Camras & Parrillo, 1985: 120 (*Stylogaster*). TL: Ecuador. Napo: Coca, Napo River (HT M CNC). *Stylogaster tarsia*. (NT: NT) Ecuador

tetraspilotus Camras, 1962: 218 (*Physoconops*). TL: Congo. Kivu, Uvira (HT F MRAC). *Physoconops tetraspilotus*. (AF: AF) Congo

tetratarsata Camras, 2001: 202 (*Pseudophysocephala*). TL: Cameroun. Yaounde Nkolbisson (HT F BMNH). *Pseudophysocephala tetratarsata*. (AF: AF) Cameroun

teutoniense Pearson & Camras, 1978: 201 (*Zodion*). TL: Brazil. Santa Catarina: Nova Teutonia (HT M FMNH). *Zodion teutoniense*. (NT: NT) Brazil

theca Camras, 1960: 123 (*Physocephala*). TL: China. Hebei: Chao Yang (HT F USNM). *Physocephala theca*. (PA: PA) China

thecala Camras, 1957: 215 (*Physocephala*). TL: Brazil. Santa Catarina: Nova Teutonia (HT F FMNH). *Physocephala thecala*. (NT: NT) Brazil (Santa Catarina)

thecoides Camras, 1960: 109 (*Conops*). TL: China. Sichuan: Uen Chuan (HT M USNM). *Conops* (*Conops*) *thecoides*. (PA: PA) China

thecus Camras, 1960: 115 (*Conops*). TL: China. Sichuan: Suifu (HT F USNM). *Conops* (*Asiconops*) *thecus*. (PA: PA) China

thompsoni Camras, 2004: 87 (*Physoconops*). TL: Bahamas. San Salvador Is., North Point (HT M USNM). *Physoconops* (*Pachyconops*) *thompsoni*. (NT: NT) Bahamas

tibialis Camras & Parrillo, 1985: 113 (*Stylogaster*). TL: Panama. Canal Zone: Barro Colorado Is. (HT M USNM). *Stylogaster tibialis*. (NT: NT) Panama

townsendi Camras, 1955: 170 (*Physoconops*) new name for *auratus* Townsend. *Physoconops* (*Pachyconops*) *townsendi*. (NE: NE NT) USA (California, Arizona,Texas), Mexico

travassosi Camras, 1955: 168 (*Physoconops*). TL: Brazil. Mato Grosso: Maracaju (HT M USNM). *Physoconops* (*Pachyconops*) *travassosi*. (NT: NT) Brazil (Mato Grosso, Goias, Rio de Janeiro, Sao Paulo)

triannulata Camras & Parrillo, 1985: 123 (*Stylogaster*). TL: Costa Rica. Turrialba (HT F USNM). *Stylogaster triannulata*. (NT: NT) Costa Rica, Panama

trichus Camras, 1957: 9 (*Conops*). TL: Brazil. Santa Catarina: Nova Teutonia (HT F FMNH). *Conops* (*Diconops*) *trichus*. (NT: NT) Brazil (Santa Catarina)

turneri Camras, 1961: 72 (*Paraconops*). TL: Australia. Western Australia. Southern Cross (HT M BMNH). *Pleurocerina turneri*. (AU: AU) Australia (Western Australia)

verus Camras, 1955: 157 (*Conops*). TL: Brazil. Sao Paulo: Rio Claro (HT M USNM). *Conops* (*Conops*) *verus*. (NT: NT) Brazil (Sao Paulo)

weemsi Camras, 2007: 1 (*Physoconops*). TL: USA. Florida: Alachua Co. (HT F FSCA). *Physoconops weemsi*. (NE: NE) Florida, Georgia

wegneri Camras, 1957: 162 (*Physocephala*). TL: Indonesia. West Sumba: Wainmangura, Matakori (HT MM NMB, Basel). *Physocephala wegneri*. (OR: OR) Sumba

weinbergae Camras & Chvala, 1984: 232 (*Conops*). TL: Romania. Periprava (Letea) (HT M Mus. "Grigore Antipa," Bucarest). *Conops weinbergae*. (PA: PA) Romania

wulpi Camras, 1996: 105 (*Physocephala*), new name for *testaceus* Wulp. *Physocephala wulpi*. (NT: NT) Costa Rica to Argentina

Table 4. Names in honor of Sid Camras

Camrasiconops Schneider 2010: 78 (Diptera: Conopidae).
Stylogaster camrasi Stuckenberg 1963: 269 (Diptera: Conopidae)
Pseudomyopa camrasi Pearson 1974: 148 (Diptera: Conopidae)
Austaloconops camrasi Schneider 2010: 50 (Diptera: Conopidae)
Valdivia camrasi Sedmann 1965: 199 (Diptera: Syrphidae)

Photographs of Sid Camras and colleagues

Fig. 2. Sid Camras, Kenneth Spencer, John Deeming and Howard Weems, Jr. in Washington, DC, August 1976.

Fig. 3. George Steyskal and Sid Camras, Washington, 1988.

Fig. 4. Sid Camras, Lloyd Davis, Steve Bullington and Chris Maier at the Southwest Research Station, Portal, AZ, 3 June 1991.

Fig. 5. Chris Thompson and Sid Camras sorting out conopid issues at the Field Museum, Sept. 2003.

Fig. 6. Sid Camras and Jeff Skevington at the Field Museum, 9 July 2004.

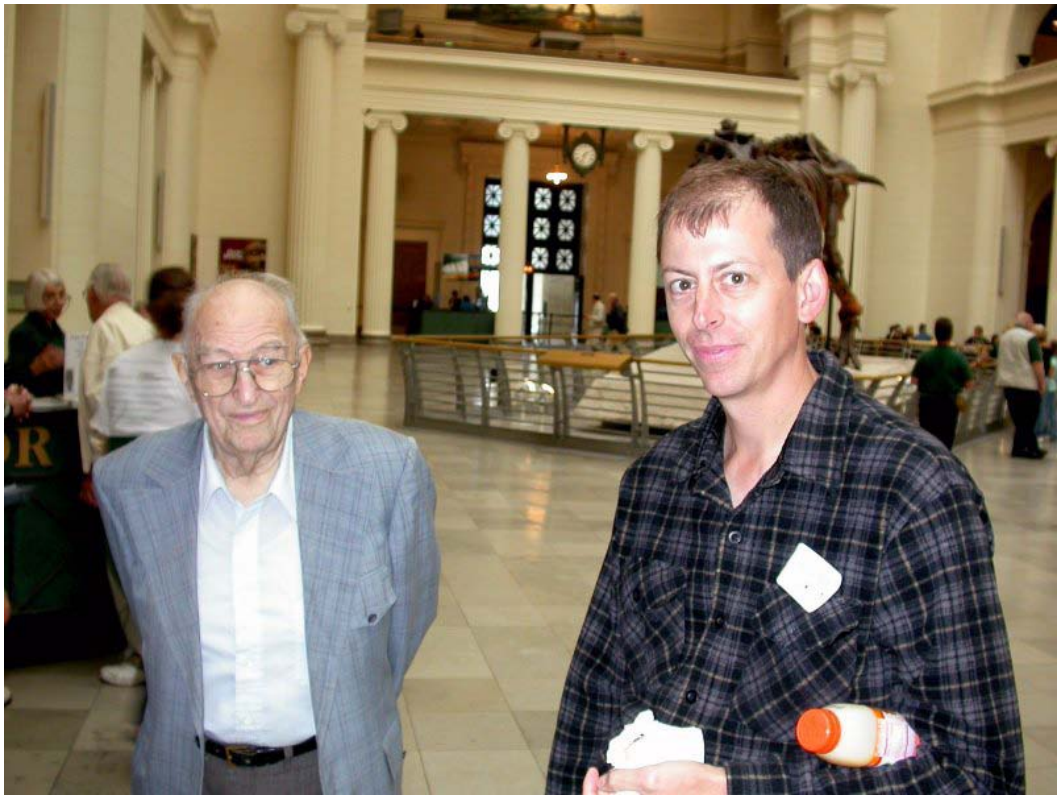

Fig. 7. Sid Camras and Jeff Skevington at the Field Museum, October 2008.

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Our friend and colleague, Donald Wayne Webb, passed away
12 July 1939 – 5 September 2012

Stephen Gaimari

Plant Pest Diagnostics Branch, California Department of Food & Agriculture, 3294 Meadowview Rd., Sacramento, California 95832, USA;
stephen.gaimari@cdfa.ca.gov

Our fellow dipterist, Donald Wayne Webb, born in Brandon, Manitoba, Canada on 12 July 1939, passed away on 5 September 2012. Don worked at the Illinois Natural History Survey for more than 40 years, and will be missed by his friends and colleagues. I had the pleasure of having Don on my dissertation committee, sharing numerous field experiences collecting flies in exotic places (and in Illinois...), and getting to know Don and his wife Lois outside of dipterology. Don did his BS and MS degrees at University of Manitoba, and in 1981 earned his PhD from the University of Illinois. Don's greatest impact on me, and on the several concurrent students of Diptera at the

University of Illinois, was his studies of Therevidae. Don's pragmatic approach to therevids saw him get through revisions of numerous genera of New World therevids through his career. In honor of Don's legacy, I list here Don's publications on Therevidae, although his publications include several other groups of flies, from Rhagionidae, Athericidae and Xylophagidae even to Chironomidae! Thanks very much to F.C. Thompson for providing a partial list of his therevid publications – we hope to provide a more extensive view of Don's career in a future issue of Fly Times! I hope many of you will raise a rum&coke (Don's favorite) to his memory! Please note, the last item on the list is one that I know Don was very proud of, and we unfortunately couldn't quite get it finished and published before he died – but the work is currently in press (in proof, in fact). Here is the list, in chronological order:

Webb, D. & Irwin, M. E. (1988) The genera *Ataenogera* and *Phycus* in the new world (Diptera: Therevidae: Phycinae). Proceedings of the Entomological Society of Washington 91(1): 35-50.

Webb, D. W. & Irwin, M. E. (1991) A revision of the Nearctic species of *Dialineura* Rondani and *Pallicephala* Irwin and Lyneborg (Diptera: Therevidae: Therevinae). Proceedings of the Entomological Society of Washington 93: 869-898.

Webb, D. W. & Irwin, M. E. (1991) The Nearctic genus *Nebritus* Coquillett (Diptera: Therevidae: Therevinae). Proceedings of the Entomological Society of Washington 93: 899-913.

Webb, D. W. & Irwin, M. E. (1991) The North American genus *Megalinga* Irwin and Lyneborg (Diptera: Therevidae: Therevinae). Proceedings of the Entomological Society of Washington 93: 914-924.

Irwin, M. E. & Webb, D. (1992) Brasilian Therevidae (Diptera): a checklist and discriptions of species. Acta Amazonica 21: 85-121.

Webb, D. & Irwin, M. E. (1995) The New World Genus *Chromolepida* Cole (Diptera: Therevidae: Therevinae). Proceedings of the Entomological Society of Washington 97(1): 197-224.

Webb, D. W. & Irwin, M. E. (1999) Revision of *Tabuda* Walker and *Tabudamima* Irwin & Lyneborg, with the description of a new genus *Incoxoverpa* Webb & Irwin (Diptera: Therevidae: Therevinae). Annals of the Entomological Society of America 92: 644-674.

Metz, M. & Webb, D. W. (2003) *Distostylus* gen. nov., a monotypic therevine genus (Diptera: Asiloidea: Therevidae) from the Caribbean Island of Dominica. Zootaxa 222, 12 pp.

Metz, M. A., Webb, D. W. & Irwin, M. E. (2003) A review of the genus *Psilocephala* Zetterstedt (Diptera: Therevidae) with the description of four new genera. Studia Dipterologica 10: 227-266.

Webb, D. W. (2003) The genera *Cliorismia*, *Dichoglena*, and *Psilocephala* in the Nearctic Region (Diptera: Therevidae:Therevinae). Journal of the Kansas Entomological Society 76: 484-508.

Webb, D. W. & Metz, M. A. (2003) The Nearctic species of*Pandivirilia* Irwin and Lyneborg (Diptera: Therevidae: Therevinae). Annals of the Entomological Society of America 96: 369-402.

Webb, D. W. & Metz, M. A. (2003) The South American genus *Protothereva* Malloch (Diptera: Therevidae: Therevinae)with description of two new species. Zootaxa. 234, 24 pp.

Webb, D. W. & Metz, M. A. (2004) The South American genus *Nigranitida* Metz (Diptera: Therevidae: Therevinae) with the description of new species. Zootaxa 757, 16 pp.

Webb, D. W. (2005) A revision of the Holarctic genus *Spiriverpa* Irwin and Lyneborg (Diptera: Therevidae:Therevinae). Zootaxa 816: 1-56.

Webb, D. W. (2005) New genera of Neotropical Therevidae (Insecta: Diptera). Zootaxa 1091: 1-26.

Webb, D. W. (2005) Revision of the Neotropical stiletto fly genus *Notiothereva* Metz & Irwin (Diptera: Therevidae:Therevinae). Zootaxa 1059: 1-32.

Webb, D.W. (2006) The neotropical genera *Microthereva* Malloch and *Peralia* Malloch (Diptera: Therevidae: Therevinae).Zootaxa, 1295: 1-27.

Webb, D. W. & Metz, M. A. (2006) A revision of the New World Genera *Brachylinga* Irwin and Lyneborg and *Lysilinga* Irwin and Lyneborg (Diptera: Therevidae: Therevinae) with thedescription of a new genus, *Elcaribe* Webb. Zootaxa 1288, 241 pp.

Hauser, M. & Webb, D. W. (2007) A revision of the new world stiletto fly genus *Ataenogera* Krober (Diptera: Therevidae: Phycinae) with the description of two new species. Zootaxa.1530: 41-67.

Webb, D. W. (2007) A new genus and new species of NearcticTherevidae (Insecta: Diptera) from southern New Mexico. Zootaxa. 1495: 41-46.

Webb, D. W. & Metz, M. A. (2008) A revision of the New Worldgenus *Penniverpa* Irwin and Lyneborg (Diptera: Therevidae:Therevinae). Zootaxa. 1720: 1-45.

Gaimari, S.D. & Webb, D.W. (2009) Therevidae. Pages 633-647, *in* Brown, B.V., A. Borkent, J.M. Cumming, D.M. Wood, N.E. Woodley & M. Zumbado (eds.), Manual of Central American Diptera, Volume 1. National Research Council Press, Ottawa, 714 pp.

Lambkin, C.L., Trueman, J.W.H., Yeates, D.K., Holston, K.C., Webb, D.W., Hauser, M., Metz, M.A., Hill, H.N., Skevington, J.H., Yang, L., Irwin, M.E. & Wiegmann, B.M. (2009) Supertrees and the Tree of Life: generating a metaphylogeny for a diverse invertebrate family (Insecta: Diptera: Therevidae) using constraint trees and the parsimony ratchet to overcome low taxon overlap. Invertebrate Systematics 23(2): 171-191.

Webb, D.W. (2009) A revision of the genera *Acrosathe* Irwin and Lyneborg, *Arenigena* Irwin and Lyneborg, and *Litolinga* Irwin and Lyneborg (Diptera: Therevidae: Therevinae) from the Nearctic Region. Zootaxa 2091: 1-67.

Webb, D. W. & Hauser, M. (2011) Revision of the genus *Stenogephyra* Lyneborg (Diptera: Therevidae: Phycinae).Zootaxa 2837: 67-85.

Webb, D.W., Gaimari, S.D., Hauser, M., Holston, K.C., Metz, M.A., Irwin, M.E., Kampmeier, G.E. & Algmin, K. [in press] An annotated catalogue of the New World Therevidae (Insecta: Diptera: Asiloidea). Zootaxa.

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MEETING NEWS

8th International Congress of Dipterology
10-15 August, 2014, Potsdam, Germany
http://www.icd8.org

Dr. Marion Kotrba

Sektion Diptera, ICD8 chair
SNSB Zoologische Staatssammlung München
Münchhausenstr. 21, 81247 München, Germany

Dear fellow Dipterists
On behalf of the Council for the International Congresses of Dipterology, the ICD8 Organizing Committee and the Senckenberg Gesellschaft für Naturforschung, I cordially invite you to attend the 8th International Congress of Dipterology in Potsdam, Germany, from 10th to 15th August, 2014.

Organizing Committee
The ICD8 Organizing Committee includes Marion Kotrba (chair), Netta Dorchin and Frank Menzel. The Scientific Committee is headed by Netta Dorchin and includes Daniel Bickel, Martin Hauser, Ashley Kirk-Spriggs and Rudolf Meier. The professional company handling the congress organization is pcma (http://www.pcma.de/de).

Important Dates
Early registration: September 2013 – 1st February 2014
Regular registration: until 1st July 2014
Abstract submission deadline: 1st May 2014

Venue
Located in the heart of Europe, Germany is easily and affordably accessible to many. Due to its history and scientific tradition, it is a popular destination for tourists in general and for scientists in particular. Among the attractions for entomologists are several world ranking collections that hold thousands of type specimens and other important historic material. The chosen venue combines the comfort of a modern congress center on a scenic lakeshore setting with the beauties of the historic and picturesque town of Potsdam. The bustling capital city of Berlin and two of Germany's largest Diptera collections (Museum für Naturkunde Berlin, Senckenberg Deutsches Entomologisches Institut) are within easy reach.

Sessions
All congress sessions will be held at the Kongresshotel Potsdam. The main congress hall seats 500 and simultaneous sessions will take places in adjacent rooms, seating 80 and 45-50 persons. Additional rooms will be available if needed. The congress center offers ample areas for exhibitions, posters, and relaxation as well as two restaurants, a bar and several smaller sites for beverages.

Scientific Program
The scientific program will include theme- and taxon-based symposia and poster sessions. We strive to cover all major aspects of Dipterology including systematics, morphology, physiology, evolution, biodiversity and conservation, ecology, agriculture and forensics.

Suggestions for symposia are welcome. Proposals should include a title, justification, and a list of potential speakers. Please e-mail symposia suggestions to Netta Dorchin at ndorchin@post.tau.ac.il.

Congress Language
The official congress language is English.

Congress Schedule
August 10 (Sun) Registration, Reception
August 11 (Mon) Full day Congress
August 12 (Tue) Full day Congress
August 13 (Wed) Full day congress, Congress Dinner
August 14 (Thu) Full day congress
August 15 (Fri) Congress sessions, Closing ceremony
Various tours during and after the congress will be offered to delegates and accompanying persons.

Accommodation
The hotel rooms adjoin the congress center and can accommodate all congress delegates. The current daily rates, including breakfast, are 85 € (single) and 100 € (double).

Fees
Full registration fee will be approximately 400 € (350 € early; 200 € student), including the reception, lunch and coffee breaks. The Congress Dinner will be booked and charged separately. The Senckenberg Gesellschaft für Naturforschung supports the Congress with 30,000 €. We make efforts to recruit additional support from exhibitors and sponsors (please refer to our webpage for further information) and will try to reduce the registration fee and/or offer travel grants for students depending on our success in obtaining additional funds.

Registration of interest
To receive further information about the ICD8 please refer to the Congress website at http://www.icd8.org. Assist us in planning ahead for the Congress by sumitting the Registration of Interest Form which is provided there.

Looking forward to meeting you in Potsdam 2014!

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Great Basin National Park Diptera Bioblitz, 19-21 June 2012

Rebecca Clement[1], C. Riley Nelson[2], Matthew D. Otis[3]

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Most people don't simply stumble across Great Basin National Park (Fig. 1). To get to Great Basin National Park, you have to want to be there. Situated about 15 miles west of the Utah-Nevada border, the park boasts of some of the darkest nights in the country, which also means it is hours away from any major city's stray rays. Each summer for the past few years the Great Basin National Park has hosted a Bioblitz to target a specific group of invertebrates. In other words, they invited scientists, volunteers and families to go to every conceivable place in the park and catch everything they could. Habitats in the park range from alpine at 13000 feet to salt desert shrublands at 5300 feet. This year, under the direction of park ecologist Gretchen Baker (Fig. 2), Diptera was the focus of the extensive frenzy. With the help of several entomologists and a group of energetic volunteers, the 2012 Bioblitz was a great success. Thousands of flies were collected, adding many new families, genera, and species to the park's list. And good times were had by all.

Fig. 1. Wheeler Peak, in Great Basin National Park. White Pine Co., Nevada. 19-21 June 2012.

We arrived early in the afternoon on 18 June 2012 at Grey Cliffs Campground, reasonably named for the nearby striking rock ledges. After quickly setting up malaise traps to collect some samples in preparation for the next day's training and presentation, our new friend, German dipterist Bjorn Rulik, reported sighting a giant rattlesnake! Some members of our party (Riley and Matt) were thrilled at the news and quickly stalked, frightened, captured, and photographed the beautiful creature, making the

Fig. 2. Great Basin National Park ecologist Gretchen Baker directed the 2012 BioBlitz, helpfully leading a tour of Lehman caves as well as various cave entrances throughout the park. Great Basin National Park, White Pine Co., Nevada, 20 June 2012.

Great Basin Rattlesnake the first catch of the Bioblitz (Fig. 3). Other members of our party (Becca) were rather disturbed that our campground was in such close proximity to the snake's territory, but the terror was only momentary, and our group experienced no further rattlesnake encounters for the remainder of the trip. Later that night, we hung a big sheet from the bed of our truck and set up a blacklight. Becca—a novice entomologist—was fascinated by the huge scarab beetles and magnificent giant silk moths that were attracted to the light. But, being surrounded by dipterists, she quickly discovered that we were mainly looking for other things: tipulids, sciarids, chironomids, asilids and other –ids to name a few.

The next morning we set out early for the hilltops near the entrance to Lehman Caves for some early morning collecting. There we found huge tachinids along with a few impressive asilids. In spite of this success there was less activity on the hilltop than we had hoped. We decided to wrap it up. So we climbed into the truck and headed down to the base of the mountain to attend the opening meeting of the Bioblitz at the Baker Community Hall.

Fig. 3. Great Basin Rattlesnake (*Crotalus oreganus lutosus*) next to our campground seen while setting up malaise traps. Great Basin National Park, White Pine Co., Nevada, 18 June 2012.

The Bioblitz officially started with a talk by Dr. Riley Nelson introducing the fly families, the goals of the trip, and the collection methods to be used. Participants were equipped with nets, vials, plastic bags, alcohol and some spiffy green water bottles supplied by the Great Basin National Park Foundation! We

received advice from Gretchen on how to adequately record localities with a grid system and GPS. After being adequately equipped the participants were then unleashed into the 120 square mile park with high hopes and fly dreams of glory. There were over fifty “Bioblitz team members” during the next 48 hours (Fig. 4). This may not have been the largest Bioblitz in the park’s history, but it turned out to be the most international group the Great Basin National Park has ever had, including a family from Hungary and Bjorn from Germany. There were several families who just happened to be in the area and excitedly joined in our efforts. A large portion of the group consisted of seasonal park employees, volunteers, and trail workers. The Nevada Department of Food and Agriculture sent a group to join the team from across the state in Reno. And our group came from Brigham Young University, in Provo, Utah (Fig. 5). All were enthusiastic about this variation from their routine work.

Fig. 4. Great Basin National Park 2012 Bioblitz Diptera Team, after closing “ceremonies” in front of Baker Hall. White Pine Co., Nevada, 21 June 2012.

After half a day of collecting we all assembled to hear a campfire talk entitled, “Desert Flies are Voluptuous,” featuring Dr. Riley Nelson. The talk was geared around dispelling the myth that flies are repulsive. The event was open to the public, and park guests left the presentation convinced that flies are indeed voluptuous.

The following day, Gretchen led a group of us on a quest to find rare specimens in numerous cave entrances. A few of the recently described endemic cave dwelling sciarids were collected (Fig. 6). After rummaging around in cave entrances, Gretchen was gracious enough to give us a spectacular tour of Lehman Caves, the 1.5-mile-long chain of caverns famous for containing over 300 shield formations (Fig. 7). These disc-like formations protruded from the walls, decorating the rooms with a strange splendor. The collecting wasn’t great but the sightseeing was. That night, Dr. Ken Kingsley favored us with a talk called, “Through a Fly’s Eyes” with some particularly interesting information about

mosquitoes. He played the devil's advocate to Riley's praising description, and made sure we understood exactly how many bacteria lived on one housefly.

Fig. 5. Matt shows Becca some of the flies he collected doing sweeps at Teresa Lake during the Bioblitz. Great Basin National Park, White Pine Co., Nevada. 21 June 2012.

Fig. 6. We found a few of the newly described cave-dwelling species of sciarids while searching in cave entrances. Great Basin National Park, White Pine Co., Nevada, 20 June 2012.

Fig. 7. We saw hundreds of cave formations like these on our tour of Lehman Caves. Great Basin National Park, White Pine Co., Nevada, 19-21 June 2012.

Fig 8. Great Basin National Park is famous for its groves of several thousand-year-old bristlecone pine trees. We caught asilids and syrphids under these ancient wonders. Great Basin National Park, White Pine Co., Nevada, 21 June 2012.

On Thursday Morning, we took a jovial little hike up to the bristlecone pine forest and collected more flies as we enjoyed the beauty of 13,065 foot towering Wheeler Peak, the serene Teresa Lake, and the groves of 3000-5000 year old bristlecones (Fig. 8). We collected hundreds of anthomyiids and ephydrids at the lake. One sweep of the net and it was black with flies! We soon grew exhausted from trying to funnel so many flies into our vials and paused to admire the scenery. The beauty of the area was astounding; the majesty of Wheeler Peak reflected on the surface of a pristine alpine lake was a sight to behold (Fig. 9). It was also amazing to be collecting asilids and syrphids under the old, gnarled branches of the ancient bristlecone pines. After a wondrous morning of collecting at an elevation of 11,000 to 12,000 feet, we drove back down the mountain with our samples (Fig. 10).

The participants gathered the morning of 21 June to sort their findings, and at noon, the Great Basin National Park Foundation provided a farewell luncheon with raffle prizes provided by the Western National Parks Association. At the conclusion of the luncheon Riley Nelson presented the preliminary results of the Bioblitz to the volunteers. The 2012 Diptera Bioblitz added a number of new families,

genera, and species to Great Basin National Park's repertoire of flies. In the 48 hours allotted to the Bioblitz, team members gathered over 125 samples of flies from 47 different families, which added 19 new families to the park list. There were four families known to the park that we didn't find, but our additions brought the total number of Diptera families to 51! (Table 1). Gretchen Baker labeled the entire proceedings as "a great success".

The results remain incomplete as we continue to sort and identify the numerous samples. If you're interested in looking at any of the specimens, let us know! For more pictures visit http://www.flickr.com/groups/gbnp_bioblitz/pool/ or http://desertsurvivor.blogspot.com/2012/06/bioblitz-2012.html.

Fig. 9. Reflection of Wheeler Peak across Teresa Lake. Here, we collected thousands of anthomyiids and ephydrids. Great Basin National Park, White Pine Co., Nevada, 21 June 2012.

Fig. 10. Notch Peak in the distance as seen on the way down from Wheeler Peak. Great Basin National Park, White Pine Co., Nevada, 21 June 2012.

Table 1. Flies of Great Basin National Park. Scale of numbers in samples: abundant>common>rare>one.

Family	**Before Bioblitz**	**During Bioblitz**	**How many**		**Family**	**Before Bioblitz**	**During Bioblitz**	**How many**
Agromyzidae	1	1	common		Periscelididae	0	1	one
Anthomyiidae	1	1	abundant		Phoridae	1	1	common
Asilidae	0	1	common		Psilidae	0	1	rare
Bibionidae	0	1	rare		Psychodidae	1	1	rare
Bombyliidae	1	1	common		Ptychopteridae	0	1	one
Calliphoridae	1	1	common		Rhagionidae	0	1	one
Carnidae	1	0	rare		Sarcophagidae	1	1	common
Cecidomyiidae	1	1	common		Scathophagidae	1	1	common
Ceratopogonidae	1	1	common		Scatopsidae	0	1	one
Chamaemyiidae	0	1	rare		Sciaridae	1	1	common
Chironomidae	1	1	abundant		Sciomyzidae	0	1	common
Chloropidae	1	1	common		Sepsidae	1	1	common
Clusiidae	0	1	one		Simuliidae	1	1	rare
Conopidae	1	1	one		Sphaeroceridae	1	1	rare
Culicidae	1	0	rare		Stratiomyidae	0	1	rare
Dixidae	0	1	rare		Streblidae	1	0	rare
Dolichopodidae	1	1	common		Syrphidae	0	1	common
Drosophilidae	1	1	rare		Tabanidae	0	1	one
Empididae	1	1	common		Tachinidae	1	1	common
Ephydridae	1	1	abundant		Tephritidae	1	1	common
Heleomyzidae	1	1	rare		Tethinidae	0	1	one
Lauxaniidae	0	1	rare		Therevidae	1	1	rare
Micropezidae	0	1	one		Tipulidae	1	1	common
Milichiidae	0	1	one		Trichoceridae	1	0	rare
Muscidae	1	1	abundant		Ulidiidae	0	1	rare
Mycetophilidae	1	1	one		**Total**	**32**	**47**	

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Second Announcement for the 2013 Field Meeting of the North American Dipterists' Society: Mississippi, 17–20 May 2013

Richard L. Brown

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Mississippi State, MS 39762, USA; email: rbrown@entomology.msstate.edu

The first announcement in Issue 35 of Fly Times (April) provided an overview of plans for the 2013 meeting to be hosted by Mississippi Entomological Museum near Starkville, MS. Note that the date has been changed to May 17-20 to take advantage of the more favorable conditions for collecting as well as to avoid a conflict with the syrphid meeting in Russia during June. The average high temperature ranges 82-85°F for this time of May in Starkville. This announcement provides a tentative schedule and information on travel arrangements, accommodations, and registration.

Information provided in these first two announcements is summarized on the Mississippi Entomological Museum website http://mississippientomologicalmuseum.org.msstate.edu/ under links to entomological organizations. A registration form can be downloaded on this page and returned to Richard Brown. A secure website is currently being established for paying registration fees by credit card in advance of the meeting. Fees may be paid upon arrival at the meeting by check. Registration fees will be $30/participant and $15 for each accompanying person who plans to attend group activities (no charge for children seven years or younger). If you would like to present a paper, please send a list of authors, with speaker's name in bold, and a title to Richard Brown no later than 1 March, 2013, The program of presentations will be provided in the spring issue of Fly Times.

The Mississippi Entomological Museum is located in the Lyle Entomology Building (33°27'13"N 88°48'05"W) on the western side of the Mississippi State University campus. Directions and maps for those driving are provided at the museum's website (scroll to bottom of info page): http://mississippientomologicalmuseum.org.msstate.edu/museumsites/info.services.html. The campus map (linked on this page) has the Lyle Entomology building labeled as the electron microscope center. For those with GPS devices, the Lyle Building is on Robert Louis Jones Circle, Starkville (a red-brick, one-story building). Free parking is available in front and behind the building.

For those flying, the Golden Triangle Regional Airport (GTR) services Starkville, ten miles to the west. Transportation will be provided to those arriving at GTR if arrival times are sent to me. GTR has commuter flights (Delta) from Atlanta three times daily, arriving 11:40 AM, 3:54 PM, 7:40 PM. Ticket prices to GTR often cost $100 or more than prices for flying to Memphis, TN (2 3/4 hours drive) or Jackson, MS (2 hours drive), but this is not the case for some departures from the West Coast. If a rental car is desired, we can take you to a less expensive rental agency in Starkville than the ones at the airport.

A block of rooms has been reserved at Microtel Inn in Starkville for the period of May 16-20. A discount rate of $69.00 + tax has been arranged for those identifying themselves as attending the Diptera meeting at MSU Entomology. The address for Microtel Inn (33°28'10"N 88°46'05"W) is 1121 Highway 182E (not Highway 82, which is now the bypass but is still given on some websites as the address). Driving from the east on U.S. 82, take exit 182W to Starkville, and the motel is less than one mile from the exit. From the west, take exit 182E for Clayton Village, but turn right at the intersection for 182W to go to Microtel. The hotel is across the highway from the MSU experiment farm, which crosses Sand Creek, just east of a small Cretaceous chalk outcrop with prairie flora along the highway.

To reach the Lyle Entomology building from Microtel, drive west on Highway 182 for 1.7 miles, past the first entrance to MSU, to the exit for Highway 12, entering the ramp from the left lane. Drive south on 12 for 0.6 mile, turning left onto Stone Blvd, then make an immediate right on Sheely Circle continuing straight past the fraternity houses to the T-intersection, and after a dog-leg (right then left), cross the divided Bully Blvd and bear right after the signal light to Lyle Entomology.

Field trips are scheduled for the Cove Preserve, Noxubee National Wildlife Refuge, Tombigbee National Forest, and Natchez Trace National Parkway. We will arrange for a choice of catered lunches that can be purchased for all day field trips. For those wanting to extend their visit, other recommended sites within 2-6 hours of Mississippi State University include Bibb County Glades Preserve, Bon Secour National Wildlife Refuge, and Grand Bay National Estuarine Research Reserve. The third announcement in the spring issue of Fly Times will include information on these latter sites. We will supply the necessary permits for all these public lands.

The Tombigbee National Forest (33°13'49"N 88°59'20"W) is 25 miles south of the MEM and covers 39,500 acres. The topography varies from flat floodplains to deeply dissected hills with steep ravines. Forests include a mixture of hardwood and pines on ridges, with slopes and bottoms of ravines having a variety of oaks, hickories, magnolia, tulip poplar, beech and other species (Fig. 1). Several streams, as well as springs and seeps (Fig. 2) are present though this area. The high plant diversity includes 14 state-listed species because of their rarity.

Figs 1–2. Tombigbee National Forest. **1.** Bottom of ravine. **2.** Seep area.

The Noxubee National Wildlife Refuge (33°16'15"N 88°47'04"W), 12 miles south of the MEM, occupies 48,000 acres and includes reservoirs (Fig. 3), streams, cypress sloughs and other wetlands. The refuge is dominated by bottomland and upland hardwood forests and pine/hardwood forests. Other habitats include cedar woodlands (Fig. 4), old fields and a restored natural grassland.

The Natchez Trace National Parkway crosses the state but we will visit the northern part that crosses the Pontotoc Hills and enters the southern Appalachian foothills. We will make stops on the Parkway to sample a diversity of wetlands and forested areas (Fig. 5) and terminate the trip with collecting at the adjacent Tishomingo State Park (Fig. 6).

Figs 3–4. Noxubee National Wildlife Refuge. **3.** Shore of Bluff Lake. **4.** Cedar woodland

Figs 5–6. 5. Natchez Trace Parkway. **6.** Tishomingo State Park

The Cove Preserve (33°36'47"N 89°24'34"W) is located about 25 miles from the MEM. The Weyerhauser Company has preserved this site because it is a biological island of rare and disjunct species. It's a deep ravine with a small stream bordered by beeches and other plants not in the surrounding sweet gum-pine habitat. Some of the rarely collected Diptera previously collected at this site are mentioned in the first announcement.

Tentative Schedule for NADS 2013

Note: A choice of catered lunches will be provided for each to purchase for field trips.

Friday, May 17th

All day/night	Open house in Mississippi Entomological Museum
8:00 – 5:00 PM	Registration at Clay Lyle Entomology Bldg. Fee: $30 ($15 accompanying person)
9:00 – 1:30 PM	Field trip to "The Cove Reserve"
3:00 – 5:00 PM	Sorting and pinning specimens in Entomology Laboratory
5:00 – 7:00	Happy Hour and Dinner in downtown Starkville
7:00 PM	Presentations and Announcements

Saturday, May 18th

8:00 – 5:00	Collecting at Tombigbee National Forest
5:00 – 7:00	Happy Hour and Dinner at restaurant of choice
7:00	Presentations and Announcements
Late evening	Sorting and Pinning of specimens in Entomology laboratory

Sunday, May 19th

8:00 – 6:00	Collecting at Noxubee National Wildlife Refuge
6:00 PM	BBQ at Environmental Education Center, Noxubee National Wildlife Refuge (covered by registration fees)
Late evening	Sorting and Pinning of specimens in Entomology laboratory

Monday, May 19th

7:30 – 5:30	Natchez Trace Parkway and Tishomingo State Park (or visit previous locations)
6:30 – 7:30	NADS dinner at local restaurant (not covered by registration fees)
Late evening	Sorting and Pinning of specimens in Entomology laboratory

Contact information for those of us assisting with the meeting are as follows:
Terry Schiefer (tschiefer@entomology.msstate.edu; 662-325-2989)
Joe MacGown (jmacgown@entomology.msstate.edu; 662-325-9551)
Richard Brown (rbrown@entomology.msstate.edu; 662-325-2990 or cell 662-694-0174).

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DIPTERA ARE AMAZING!

Thank you very much to Adrian Plant for sending in this series of excellent empidid photographs, for your viewing pleasure! I encourage others to send their Diptera photographs!

Ceratomerus mediocris Collin

Chelipodozus mapucheensis Plant

Empis maccrorrhyncha-group

Heterophlebus sp.

Hilarempis gubernator Collin

BOOKS AND PUBLICATIONS

Zootaxa. Currently, regarding Zootaxa statistics, they are slightly behind schedule, with only May and July listed in the "Most accessed papers" section since the last Fly Times – http://www.mapress.com/zootaxa/collections/mostaccess/index.html – however, in these two months, no Diptera papers hit the list! Hopefully we'll have more to report in the next issue!

In terms of longer term statistics, in Zootaxa's list of their most highly-cited papers according to Science Citation Index Expanded – http://www.mapress.com/zootaxa/collections/citation/index.html, the paper on Diptera reported in the last few Fly Times remains in the top 10 list, as follows (cited 66 times):

> Sinclair, B.J., and J.M. Cumming (2006) The morphology, higher-level phylogeny and classification of the Empidoidea (Diptera). Zootaxa 1180: 1-172. [open access at http://www.mapress.com/zootaxa/2006f/zt01180p140.pdf (part A) http://www.mapress.com/zootaxa/2006f/zt01180p172.pdf (part B)]

Note from the editor: First, I want to thank (profusely!) Chris Borkent for accumulating the various citations listed below, and for the text following this paragraph. The various citations listed here were brought together by scanning through the Zoological Record, Web of Science, and other resources – since they are often 1 or 2 months behind, some recent papers were surely missed. By inclusion, we do not attest to quality (of course we haven't read all of them)! In any case, please feel free to send me citations for papers (your own or those of others) that you would like to see here. I am happy to include them! As a generality, I try to keep the focus either broad-based (e.g., large treatises) or of general interest. Of course there are many many more Diptera papers if you include developmental biology in *Drosophila*, issues surrounding malaria and other diseases and mosquitoes, and numerous other topics. Also, you authors out there - please don't be offended if we missed diacritics in your names! Zootaxa has them correctly, but Zoological Record removes them!

Once again we have pulled together all of the recent Diptera literature (from our last issue until the end of October) for your reading enjoyment. Along with the usual great taxonomic and phylogenetic papers we also have some detailing a variety of new discoveries. This includes: new techniques for trapping, rearing, and mounting flies; Diptera as pollinators; flies as drivers of vertebrate spottiness; the smallest fly ever; the effects of cocaine on fly development; fly larvae as a new source of biodiesel; how mosquitoes fly in the rain; and how Bats listen in on fly sex. I urge you to read through the list and see what gems you can find!

There were also two book-sized publications on Diptera produced in the last six months. The first of these was the 'Gedenkschrift in honour of Brian Roy Stuckenburg (1930-2009)' (African Invertebrates Vol. 53 (1)). This issue of the journal contains a biography of Brian's amazing career, followed by 20 Diptera papers describing new taxa and celebrating Brian's wonderful contributions to Diptera Systematics. All of these papers are cited below.

Another important (and beautiful!) contribution to Diptera literature was the publication of Steve Marshall's most recent book, 'Flies: the natural history and diversity of Diptera.' I can't say enough good things about this book; it is clearly a Magnus Opus on Diptera, with tons of great photos and stories about our favorite group of arthropods! The next time anyone tells you that flies are boring this

is the reference to show them. Along with the information on each family there is also general information on the broader roles of Diptera in the ecosystem, as well as info on how to collect and identify them (key to all families included!). Every entomologist should have this invaluable reference on their shelf (if not their coffee table!)

Marshall, S.A. (2012) *Flies: The Natural History and Diversity of Diptera*. Firefly Books, 616 pp. (77.36$ on Amazon.com)

Journal articles:

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