

Hamuli

Newsletter of the International Society of Hymenopterists



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Report from your Outgoing President

By: *James B. Whitfield, University of Illinois, Urbana-Champaign, IL, USA*

It has been another banner year for ISH, thanks to the hard work of your Executive Committee and your incoming President, Andy Polaszek, who stepped up behind the scenes early to make sure things happened smoothly during my absence on medical leave much of the past year. I would like to heartily thank all of those, including Andy, who stepped up to cover for me during the past year, and it certainly bodes well for the coming years that the Society is in such good hands.

I am happily back at work now and feeling great, and very much look forward to seeing many of you in Orlando at our ISH-sponsored symposia and the ISH business meetings!

Another thing I am not sure all of you are aware of is that ESA is launching a new journal this coming year, *Insect Systematics and Diversity*, with Sydney Cameron and yours truly as founding co-editors. The editorial board is still shaping up and some invited articles still being arranged for the first issue, but suffice it to say for now that the aim of the new journal is to provide a relatively high-impact outlet for insect systematics and diversity research, shooting more or less in the space between *System-*

atic Entomology and *Systematic Biology*. In other words, inviting papers of more broad interest, covering comparative biology, phylogeny, morphological ontology, biodiversity estimation as well as more traditional taxonomic papers when there is additional broad impact involved. There are already a number of fine outlets (including *JHR!*) for descriptive taxonomic papers (and others) of varying sizes, but ESA has been missing an outlet for some of our more pathbreaking papers in insect systematics and diversity. I fully expect hymenopterists to be very much at the forefront of this movement! ◦

Notes from the ISH business meeting 25 September 2016, ESA/ICE, Orlando - Florida

By: *Natalie Dale-Skey, The Natural History Museum, London*

Chair: Andy Polaszek (current ISH President, 2016-2018); 55 ISH members attending.

Election results: Dr Barbara Sharanowski, University of Central Florida, Orlando, has been elected as President-Elect, and Natalie Dale-Skey, Natural History Museum London, as Secretary.

Awards: Award of ISH distinguished research medal to Mark Shaw. Mark could not be present but forwarded the following message: “I am really blown away by this! Such an honour ... and so very kind. Thank you—and everyone—so much; it really gives me a huge boost to think that maybe I have contributed something that colleagues feel was worthwhile.” We hope to present Mark with his medal in London sometime in early November.



Mark Shaw, Distinguished Research Medal awardee, in his element.

The ISH distinguished service medal was presented to Lars Krogmann (ISH Secretary, 2012-2016).

Recipients of ISH travel awards. Eight applications had been received, and two candidates selected for USD

1,000 awards: Erinn Fagan-Jeffries (University of Adelaide) and Michael Hass (State Museum of Natural History, Stuttgart), who are both expected to write a short report about their experiences during ICE for inclusion in *Hamuli*.

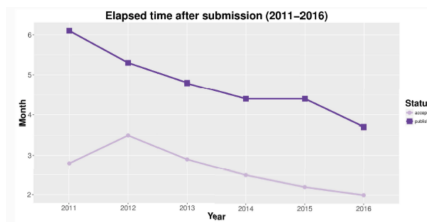
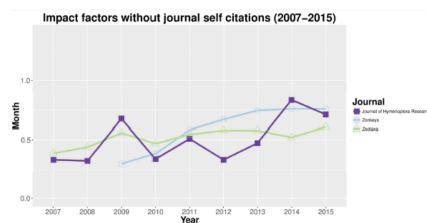
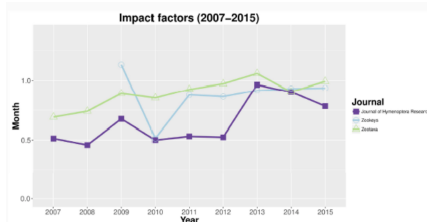
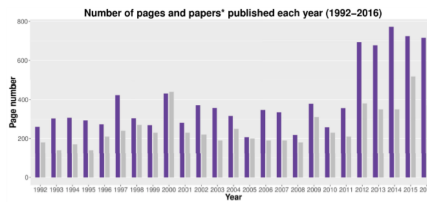
Archivist report (Rebecca Kittel): An account has been set on MEGA to upload all business notes and documents, as well as photographs; please forward any documents and images that you think should be saved in the ISH archives (e.g., pictures taken at meetings) directly to RK.



Lars Krogmann, Distinguished Service awardee. Photo by John Heraty.

The braconid Manual has now been OCR'ed and is available as a MS Word document. It is possible, using Amazon Createspace, to self-publish the book.

Editor report (Hannes Baur): HB highlighted in particular that the number of papers has almost doubled with the introduction of Open Access, and that the Impact Factor, without taking into account self-citations, is comparable to that of *ZooKeys* or *Zootaxa*. HB also noted that Pensoft is providing a very good service. Andy Polaszek noted that the contract with Pensoft is up for renewal in about one month and that this would be discussed under AOB.



Treasurer report (Craig Brabant): See figures below. CB noted that page charges are in fact a neutral post in that Pensoft charges ISH for page charges and authors are charged the same amount. The final balance at the end of the year will be between \$2,000 and 3,000 (income over expenses).

Income	2016 (20 Sept)	2015 (14 Nov)
Member dues	\$6,465.37	\$7,290.42
Page charges	\$10,972.43	\$8,760.49
Other income*	\$203.56	\$256.13
Totals:	\$17,641.36	\$16,307.04

*Taxapad income, interest, etc.

Expenses	2016 (20 Sept)	2015 (14 Nov)
JHR	\$14,231.37	\$9,851.20
Ann. Mtg. expenses	~\$300.00	\$410.95
Travel awards	\$3,000.00	\$0.00
Other expenses *	\$1,148.92	\$1,367.43
Totals:	\$18,680.29	\$11,629.58

* Credit card processing fees, PayPal fees, wire transfer and other bank fees, award medal, ECN sponsorship, plaque, etc.

Current balances, working accounts	2016 ICE (Orlando, FL)	2015 ESA (Minneapolis, MN)
UWCU - checking	\$3,619.81	\$3,662.59
UWCU - MM checking	\$12,000.00	\$13,000.00
UWCU - savings	\$5.00	\$5.00
PayPal	\$58.15	\$54.30
Total:	\$15,682.96	\$16,721.89

Endowment report (Andy Austin): AA noted that the Endowment was set up about 15 years ago to allow in particular the allocation of student awards. The Endowment Committee is currently looking at how to increase the income it generates while remaining safe (currently the investment is completely safe but yields no return) and has found a potential portfolio. This is a long term strategy and there would be no contribution to student awards before another 10 to 15 years. AA explained that there had been discussion with the ESA endowment but this proved to be too expensive.

ISH Endowment September 2016

Balance, 1/1/16	\$85,582.46
interest to date 2016	\$29.51
Two Endowment Awards for ICE	-\$2,010.00

Balance, Sept. 21, 2016	\$83,601.97
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- 1) Detailed examination of conservative investment options to improve interest
- 2) New web page for the Endowment on the ISH site
- 3) More proactive and targeted fund raising for the Endowment
- 4) Need to modify the Constitution

Endowment travel awards: Four applications had been received, and two candidates selected for USD 1,000 awards: Svetlana Orlovskyte (Nature Research Centre, Lithuania) and Shuangshuang Li (University Guangzhou), who are both expected to write a short report about their experiences during ICE for inclusion in *Hamuli*.

Secretary report (Lars Krogmann): LK highlighted the drop in member-

ship (in particular an important loss of students after the Cusco meeting), and suggested the Society must offer more to be more attractive to members. Several suggestions were made by members present, including:

# members	2014	2015	2016
total	285	209	182 (249)
regular	191	157	132 (184)
student	73	28	31 (44)
life	12	12	15
family	8	6	4 (6)

53 members have not renewed since 2015
105(!) members have not renewed since 2014 (year of ISH congress in Cusco)

In brackets number of active members that have renewed for 2015

- Encouraging people to pay for more than one year (LK noted that currently in Paypal you can select to have the payment automatically renewed every year)
- Encouraging to register for life membership
- Have ISH student-specific competitions at meetings
- Set up a student research award as incentive between congresses
- Create regional chapters, which could organise yearly symposia
- Get the ISH names on relevant events
- Marketing ISH branded stickers, t-shirts, posters, puzzles *etc.* as print on demand.
- Upload media on YouTube (which could be done by the new Webmaster / Social Media person)
- Broaden the membership to include non-taxonomists
- Offering free membership for bringing in new members

Student representative report (Katherine Nesheim): KN noted that the student lunch had been well-attended and that no concern had been brought up. She highlighted the Students Facebook page (Student of ISH) and Twitter handle (@ISHstudents).

Webmaster report: Katja Seltnann wishes to step down from this post, while very willing to help with the

handover. It was agreed that the current platform needs updating, and that the new webmaster(s) should be willing to take this on.

Next Hymenopterists Congress (Toshiharu Mita): The next ISH congress will be held in Japan, in Matsuyama City (Ehime Prefecture, Shikoku), at Ehime University - Nanka Kinen Hall, from 23 to 27 July 2018. Two collecting trips will be organised in connection with the meeting: Tsuchigoya (1500 m asl) and Omogokei (700 m asl). The registration fee is currently estimated at USD 400. The possibility of providing housing on the campus for students attending the congress will be looked into.

Next ISH business meeting: The next ISH business meeting will take place during the ESA meeting, to be held in Denver 5 to 8 November 2017.

Anti-harassment policy for ISH events and congresses (Carly Tribull) The policy was proposed during the ISH business meeting held in Minneapolis in 2015, and tabled for information gathering.

CT reported that it is felt such a Policy is needed as harassment in scientific communities is well documented, and in the absence of an anti-harassment policy incidents do not get reported. As more and more societies adopt such policies, not having one sends the wrong message to the membership.

CT suggested basing an ISH anti-harassment Policy on that implemented by ESA:

Harassment and Safety: ESA is dedicated to providing a safe, hospitable, and productive environment for everyone attending our events, regardless of ethnicity, religion, disability, physical appearance, gender, or sexual orientation. It is important to remember that a community where people feel uncomfortable or threatened is neither healthy nor productive. Accordingly, ESA prohibits intimidat-

ing, threatening, or harassing conduct during our conferences. This policy applies to speakers, staff, volunteers, and attendees. Conference participants violating these rules may be sanctioned or expelled from the conference, at the discretion of ESA leadership.

The Policy needs to: (A) Define harassment; (B) explain that reports of harassment will be investigated and that leadership will determine consequences ranging from warning to expulsion; (C) provides the contact information of a responder—a person who complaints of harassment can be reported to. Such Responders must be available at events, in a position where they can report harassment (*e.g.* have a permanent position), and understand strict confidentiality and the target's wishes.

Proposal: Amend the ISH constitution to include an anti-harassment policy that will be posted at all Societal events/conferences and implemented at said events. Structure of policy and enforcement will follow the Entomological Society of America's anti-harassment policy. The proposal was presented to the membership who voted in favour by a very clear majority. The ISH Executive will finalize the policy and potential event responders will be consulted.

Constitution reform (Andy Austin): AA explained that the ISH constitution (which is available on the ISH website) needs revising, and that he and Jim Woolley are writing a draft of the changes that should be made; this will then be submitted to the ISH membership for voting. The pros and cons of soliciting input from the membership at the draft writing stage was discussed. Some additional possible constitutional changes were discussed, such as making the Student Representative part of the Executive, and including the possibility of *ad hoc* positions.

Need for Revision of the ISH Constitution and By-laws

- Current constitution dated 6 November 2010
- Last revised in approximately 2000 ??
- Numerous sections well out of date so that several functions of the Society are currently run unconstitutionally
- This is a potentially serious issue as the Society is legally incorporated and is therefore required to follow the procedures laid down by its constitution and associated by-laws
- No constitution should be seen as a permanent document but should be modified to cater for changes in the functions and directions of a society
- Any changes require a majority vote by the membership

Some Issues with the ISH Constitution and By-laws

- All binding decisions for the Society are made by the elected officers of the Society who comprise the **Executive**. This does NOT include the Webmaster/Archivist, Student representative, Chair of the Endowment Committee, etc
- The Webmaster/Archivist is now two different people
- Student representation is not covered by the constitution
- We have provision for Emeritus Members but have not used this ??
- The annual membership fees should not be stated in the By-laws. Currently, fees cannot be increased without changing the constitution
- The Editor, Secretary and Treasurer positions are currently not renewable for a second term
- The term of the Endowment Committee needs to be longer.

Other business: Publication model. Andy Austin explained that the current publishing model, with Pensoft, yields no revenue; AA has suggested that the current contract, up for renewal in November, be renewed for one year only, and that tenders from other publishers be sought. AP will set up a meeting with Lyubomir Penev to discuss this.

Hym Course. M. Buffington noted that the next Hym Course will take place in Taiwan and will be linked to the ISH Congress in Japan. ○

Points discussed during ISH Executive lunch meeting, Orlando September 2016

By: *Natalie Dale-Skey, The Natural History Museum, London*

Past President:

- Jim Whitfield has accepted the role of ISH Past President 2016-2018.

Membership:

- AP suggested that the new website could be jointly be run by Erinn and Carly, who have since accepted their roles as the new ISH Webmasters.
- HB suggestion: create an internet platform with blog posts that could

advertise e.g. new articles published, research being done and general Hymenoptera news, which could be tagged (with e.g. taxonomic coverage, content) and later collated to form a book.

- Should *Hamuli* be moved to “blog platform”? a Newsletter and a blog serve different purposes
- Membership currently centred around people working on parasitoids—it should be extended to include Symphyta and Aculeata workers.
- Supervisors should register their students.
- Benefits of being a member of ISH are currently not extensive.
- Society could be advertised through branded t-shirts *etc.*
- Facebook presence of ISH should be reinforced - maybe through fusion with the Hymenopterists’ Forum page, which currently has nearly 8× (!) as many members as ISH Facebook page (5,282 vs. 693).
- Membership should be advertised to non-students/professionals (e.g. through the Facebook Hymenoptera page).



L-R: Katherine Nesheim (Student Representative), Jim Whitfield (Past President), John Heraty (former President), Lars Krogmann (outgoing Secretary), Jim Woolley (Endowment Committee), Andy Polaszek (President), Istvan Miko (Hamuli co-editor), Hannes Baur (JHR Editor), Natalie Dale-Skey (Secretary), Rebecca Kittel (Archivist), Erinn Fagan-Jeffries (incoming Webmaster), Andy Austin (Endowment Committee).

Publishing Model:

- Suggestion of renewing contract with Pensoft for one year only, and ask for tenders from other publishers, has been adopted.
- Possibility of asking for a charge “per article” rather than per page, but cost of typesetting, semantic marking *etc.* has to be taken into account.
- Current support from Pensoft, including, e.g., registration with ZooBank, is very good.
- Possibility of moving JHR to Research Ideas and Output, with all ISH members being invited to review all papers, or *BDJ*.
- Consider pre-publishing and pre-print.
- Find benefactor to cover page charges of 6 to 7,000 USD per year: free publishing might raise number of submissions and therefore costs, and raising number rejections may not be feasible (would upset authors - papers of a quality high enough to be published now would have to be turned down).
- The cost of Open Access may stop people from publishing in JHR.
- Is free page charges a good business model going forward?
- Open access may not be the right model for a small society.
- Should open access be offered to ISH members only? Craig Brabant to provide figures on how many JHR authors are ISH members.
- Should offers from other publishers include offers without open access?
- Zootaxa model: not open access (but people just send the PDFs around), free to publish.
- The number of members affects the model that can be adopted (e.g. Coleopterists and Lepidopterists Society: no Open Access, but have thousands of members). ○

International Congress of Entomology: a first-timer's perspective

By: Erinn Fagan-Jeffries, University of Adelaide, South Australia

Having arrived in the US a few weeks before the conference to spend some time in the Whitfield lab at The University of Illinois, I couldn't join my fellow Aussies in jetlag complaints as the ECN (Entomological Collections Network) meeting kicked off on Friday morning. I felt their pain empathetically though—Orlando is a long way from Australia!

I found the two day ECN meeting a great introduction to ICE. There were no concurrent sessions to worry about and a variety of really interesting talks including “stories from the field” featuring bears, snake bites and near-death experiences that made me wonder how more entomologists don't die in the pursuit of their work!

Sunday began ICE in earnest, with the International Hymenopterists Student lunch kindly organised by our student rep Katherine Nesheim. As the only student in my lab currently studying Hymenoptera, it felt pretty awesome to meet so many peers who are excited about their studies on our ant, wasp and bee friends! On Sunday afternoon, at the ISH business meeting, I finally put faces to names of many people—it was so lovely to meet you all.

A few hours later a marching band full of horn players kicked off the conference proper with a welcome reception for delegates ... quite a few delegates in fact! The final numbers came in at 6600+ attendees from 102 countries; ICE2016 was the biggest gathering of entomologists in history.

The following days were full of excellent presentations on hymenopteran phylogenetics, morphology, taxonomy, citizen science, science communication, social media in entomology, outreach and education ... and those were only the ones I managed to make it to! I'm sure I speak for others when I say I definitely got my daily step count in

rushing between talks in different sessions—without any exaggeration, it could take you a full 5–10 minutes to power-walk from one end of the convention centre to the other! That place was huge!

Along with specific ideas for methodology and research, ICE was a huge boost to my passion for entomology. To be with such an incredibly diverse and enthusiastic swarm of scientists for a week was an incredible experience. I am so grateful to ISH for the student travel grant that allowed me to make it to ICE 2016 from the other side of the world. Thank you to the people I met and conversed with—I hope to see you at ICE 2020 in Finland! ◦

Collecting Bees in Saint Vincent

By: Margarita Miklasevskaja* and Rafael Rodrigues Ferrari York University, Department of Biology, Toronto, Canada *margmik@gmail.com

The trip to St. Vincent was organized for the specific reason of collecting specimens of the bee species *Chilicola (Hylaeosoma) longiceps* Ashmead (Colletidae: Xeromelissinae) necessary for a revision of *Hylaeosoma*. Also, obtaining fresh bees would be essential for molecular work needed for estimating divergence times amongst the various lineages of the colletids. *Chilicola longiceps* has also been recorded in Chiapas and Jalisco (Mexico), however, samples from St. Vincent were preferred due to close geographical association to the only available fossil species of Colletidae, *C. gracilis* Michener and Poinar and *C. electrodominica* Engel, that will be used in dating the phylogeny and calibrating divergence times of the Colletidae lineage.

Chilicola longiceps was described by Ashmead (1900) from specimens found on leeward (Figure 1) and windward sides of the island. The most recent record of this bee dates to May of 1972, collected in the Majorca Mountains of the island by A. D.

Harrison. Since none of the records included specific locality information or floral associations, we expected that locating this tiny (4 mm long) bee would not be straightforward. When we arrived at Saint Vincent on May 10, 2016, seemingly at the end of the dry season with very few flowering plants remaining, our task proved to be even more challenging.



Figure 1: St. Vincent Landscape. Leeward side.

To do research or collect wildlife on the island, apart from permits, it is required to have an accompanying officer from the Ministry of Forestry. The director of the Ministry, Mr. Fitzgerald Providence, had arranged for Mr. Glenroy Gaymes to perform this duty. With his expert knowledge of the area, we were able to sample substantially more land cover than we could have hoped. Our collecting was done mostly around the circumferential highway of the island with occasional detours into the middle of the island towards the mountains (Fig. 2). We used sweep netting as our primary collecting method, while pan traps were set-up only in areas with high abundance and diversity of bees and flowers.

It came as a surprise when on day 1, we caught a female *C. longiceps* flying above a dry flowerless bush, with no flowers in its proximity. We came back to this site multiple times without success up until almost the end of our trip. However, some daisies started to bloom in the area after a long rain. This is where we found more *C. longiceps* foraging. Because there were so few of these bees around, we had to sit by a flower patch for extended periods of time

and “fish” for the bees (Fig. 3). Closer to the end of our trip we found another *C. longiceps* in Majorca Mountains, on the opposite side of the island.

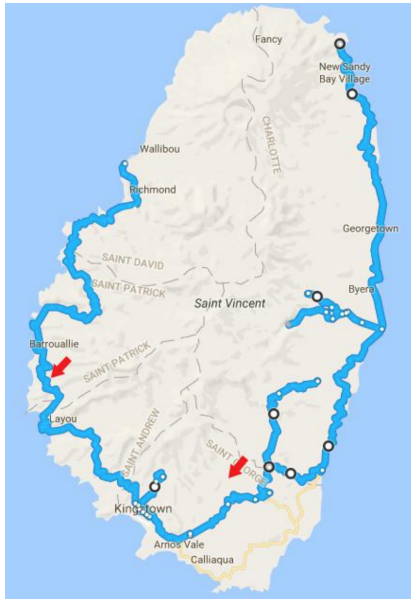


Figure 2: Collecting route is designated in blue. Red arrows point to localities where *C. longiceps* was caught.



Figure 3: Rafael fishing for *C. longiceps*.

Apart from collecting *C. longiceps*, we were also interested in updating the bee records for the island. Therefore, we spent a considerable part of our time looking for as many different bee species as possible. In total, we sampled approximately 20 species from 13 genera: COLLETIDAE – *C. longiceps*, *Hylaeus* (1 sp.); HALICTIDAE – *Lasioglossum* (at least 3 spp.), *Sphecodes* (1 sp.), *Augochlora* (at least 5 spp.), *Pseudaugochlora piscatoria* (Cockerell); MEGACHILIDAE – *Megachile lanata* (Fabricius), *M. minima* Ashmead; APIDAE – *Xylocopa caribea* Lepeletier, *Tripeolus rufotegularis* (Ashmead), *Exomalopsis*

similis Cresson, *E. vincentana* Cockerell, *Melissodes rufodentata* Smith, *Centris versicolor* (Fabricius), *Mesoplia azurea* (Lepeletier & Serville). The vast majority of the bees we caught, in terms of both abundance and diversity, were obtained through hand nets. Overall, pan trapping was remarkably unsuccessful.

We would like to express our gratitude to our supervisor, Dr. Laurence Packer, for making this trip possible. We would also like to thank Mr. Fitzgerald Providence for arranging the permits and Mr. Glenroy Gaymes for his tremendous help on the field.

Reference:

Ashmead, W. H. (1900). Report upon the Aculeate Hymenoptera of the Islands of St. Vincent and Grenada, with additions to the parasitic Hymenoptera and a list of the described Hymenoptera of the West Indies. *Transactions of the Entomological Society of London*, 2: 207–367. ◦

Taxonomy Live

By: Gavin Broad, *The Natural History Museum, London*; g.broad@nhm.ac.uk

When I give talks to the public, I’m often asked what it means to describe a species (second most popular question after “when does this talk end?”). A species description is a fairly esoteric concept and I find that most people more intuitively grasp the idea of differentiating species based on DNA differences than they do the writing of a textual description. With this in mind, I decided to try describing new species in a public arena with the help of volunteers and whoever is passing by. The idea was to try to engage passers-by in a real taxonomic project, i.e. one that involves real specimens and the development of a real publication. I first gave this a whirl at the Natural History Museum’s “Big Nature Day” in May 2015 and it was enough of a success that it’s worth trying again and

hopefully worth documenting here.

I’d previously sorted to morphospecies all available material of the ichneumonid genus *Scolomus*, from the NHM, American Entomological Institute, and the Canadian National Collection. *Scolomus* is a predominantly South American genus with only four described species but 17 or so undescribed species. So we had the opportunity to show people the described species and the undescribed species together with a draft identification key. “Taxonomy Live” took place in the Darwin Centre atrium (Fig. 1), a large space normally rather empty but bustling, mostly with families, on the Saturday of Big Nature Day. Andy Polaszek was drafted in to help, together with two volunteers for the day. We appropriated a stackshot imaging set-up (SLR with macro lens on automated racking, with images combined using Helicon Focus) with a large flat-screen and with minimal (ten minutes) training we were ready to go.

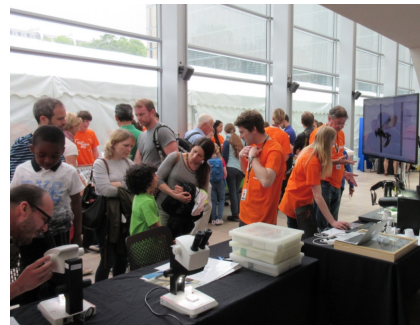


Figure 1. Live Taxonomy in the Natural History Museum’s Darwin Centre atrium at Big Nature Day.

Visitors are drawn to flashy equipment and large images of tiny insects so we had a constant stream of visitors. We could get people involved in different parts of the process. Visitors helped to take the photos by setting the upper and lower focal points, and setting up a nice image of the specimen that was comparable to other images. We could then compare morphospecies and look at differences. We photographed 14 species on the day, with many of those images being suitable for use in the eventual paper. Our keen volunteers

could then see how these species fitted into my work-in-progress identification key and suggest names for the undescribed species. I had some great suggestions and I'll probably use the name based on "ginger" for the species in Fig. 2. The young girl who suggested it was very pleased that the wasp matched her ginger hair so we looked up the Latin for "ginger" using Google translate.

On some levels, there is nothing very complicated about this sort of activity and it can be rolled out to all sorts of taxonomic projects taking place at the NHM and anywhere else. But it also demonstrates the complexity of some taxonomic work. Some people were amazed at the amount of work that goes into collecting assorted insects and working on these specimens to the point where you have a species concept. Most of these specimens had sat in collections for decades before getting their moment of stardom.



Figure 2. *Scolomus* 'zingiber'?

There are parts of the activity that need some improving; for example, I didn't note some names and email addresses when that would have been a great opportunity to let people know when the paper is published. We also borrowed a shell sorting exercise from the NHM's science educators, that involves asking people to group assorted shells into orders. This is a great exercise but we didn't have enough people to work on both areas.

If anybody does something similar then I'd love to hear about your experiences. ◦

Tracing the diversification of pimpliforme ichneumonids

By: *Seraina Klopstein, Naturhistorisches Museum Bern (WL), Switzerland; klopstein@nmbe.ch*

One and a half years ago, I had the pleasure to initiate what I consider my favourite project of all times (even though of course we never know what the future brings). It is on the evolution of the pimpliforme subfamilies of ichneumon wasps through time and combines morphology, palaeontology and molecular phylogenetics. We are currently a team of two working on it—PhD student Tamara Spasojevic and myself, at the Natural History Museum and the University of Bern. The project is financed through the Swiss National Science Foundation. And fortunately, we can fall back on a bunch of ISH experts of extant and fossil ichneumonids!

The Pimpliformes is an informal but probably natural grouping of seven to nine ichneumonid subfamilies—depending on the phylogenetic reconstruction. It includes parasitoids of Lepidoptera, Hymenoptera, Diptera and even Araneae, and while most species are ectoparasites and idiobionts, there have been several transitions to endoparasitism and koinobiosis. Compared to other groups of ichneumonids, there are reasonably good host records available, and the diversity of parasitoid strategies found in this group makes it an ideal system to study diversification patterns.

Not only the circumscription of the Pimpliformes is not entirely clear, but also the relationships among the constituent subfamilies and genera. Attempts at resolving the higher-level relationships among ichneumonids have to date been hindered by the high levels of homoplasy found in the group and by a lack of de-

cisive molecular datasets. Furthermore, there is no reliable information about the age of this group, as no molecular dating study has been conducted to date and the fossil record is only poorly studied.



Figure 1. *Xanthopimpla* sp.

We are now trying to push back a bit this frontier of ignorance in ichneumonid evolution. Applying molecular techniques ranging from Sanger sequencing and hybrid enrichment to transcriptomics, we hope to be able to obtain a well-resolved tree of the Pimpliformes. We are also compiling a morphological matrix and use it to include information from fossils, so that we can properly date the tree and thus learn about the timing and context of the evolution of these parasitoids.

The hardest part for now is working with fossil material. Ichneumonid subfamilies can already be difficult to identify if one has fresh, complete specimens at hand—imagine the challenges of working with incomplete compression fossils! Many diagnostic characters are usually simply not visible. But from time to time, one also gets surprised—as we did when we discovered a pimpline fossil with complete tarsal claws including basal lobes in the Messel pit in Germany! Or an undescribed representative of Labeninae from the same location—even though the group was assumed to be Gondwanan, as it nowadays only occurs in Australia and in the new world. Or that well-preserved fossil which looks conspicuously like the recent, tropical genus *Xanthopimpla* (Figure 1).

In order to get as complete a picture as possible on the radiation of the Pimpliformes, we need ac-

cess to material from all over the world. Our aim is to include as many genera as possible, and we would thus like to hereby launch a call for specimens—preferably fresh and with the permit to extract DNA from them. We are still missing the following genera: **Acaenitinae:** *Acaenitus*, *Cumatocinetus*, *Dimorphonyx*, *Eremocinetus*, *Hallocinetus*, *Hieroceryx*, *Leptacoenites*, *Notaulites*, *Paracollyria*, *Phalgea*, *Prosacron*, *Siphimedia*. **Collyriinae:** *Aubertiella*, *Bicurta*. **Diacritinae:** *Cressonia*. **Diplazontinae:** *Daschia*, *Ecotomocolax*, *Episemura*, *Eurytyloides*, *Extenuosodalis*, *Peritasis*, *Schachticraspedon*, *Syrphidepulo*. **Orthocentrinae:** *Atabulus*, *Chilocyrtus*, *Fennomacrus*, *Neoproclitus*, *Sphingozona*, *Tariqia*, *Terminator*. **Pimplinae:** *Afrephialtes*, *Alophopimpla*, *Alophosternum*, *Amazopimpla*, *Anastelgis*, *Clydonium*, *Eruga*, *Exestuberis*, *Inbioia*, *Lamnatiobia*, *Leptopimpla*, *Neotheronia*, *Odontopimpla*, *Pachymelos*, *Parvipimpla*, *Pterinopus*, *Strongylopsis*, *Ticapimpla*, *Umanella*, *Xanthepialtes*, *Xanthophenax*, *Zonopimpla*. **Poemeniinae:** *Dolichotrochanter*, *Ganodes*, *Guptella*. **Rhyssinae:** *Cyrtorhyssa*, *Lytarmes*, *Myllenyx*.

If you have access to any of these, please let me know by email: klopfstein@nmbe.ch. It would be great to improve our current taxon sampling and geographic coverage! And please check future issues of *Hamuli* for the latest discoveries and insights from this project. ◦

Missing: Necrophagous social wasps – where did they go?

By: *Thiago de Carvalho Moretti**, *Arício Xavier Linhares*, Department of Animal Biology, University of Campinas, Brazil; *tcmoretti@yahoo.com.br

[Note: This research was presented at the European Association for Forensic Entomology, in Budapest, Hungary, on 26–28 May, 2016.]

Although vertebrate carrion plays an important role in the nourishment of some social wasps, especially

Agelaia Lepeletier and *Angiopolybia* Araujo (Silveira *et al.* 2005), few studies on insects associated with vertebrate carcasses have dealt with these insects. We aim to elucidate the possible forensic importance of the epiponine wasp *Agelaia pallipes* (Hymenoptera, Vespidae, Polistinae). We are currently examining the behavioral dynamics and the relationships between this wasp and other insects regularly found on decomposing vertebrate carrion in Neotropical environments. Yet, this wasp, abundantly collected only about 10 years ago in rural and forest sites in São Paulo State (southeastern Brazil) (Moretti *et al.* 2011), is now difficult to find. One possible explanation for its absence at carrion baits is a reduction in its populations, possibly due to the exceptional dry season in São Paulo State in 2015. To determine whether species or families are declining is often difficult, especially with Vespinae, which are often prone to under-recording. Examination of published reports on the possible decline of social wasp populations and interviews with residents in both tropical and temperate zones revealed that the reduction of populations of some social wasp species is likely to be widespread. In addition to Brazil, social wasps are declining, inter alia, in northwestern Costa Rica, French Guiana, Cameroon and Great Britain. We provide some examples and possible causes for this phenomenon. The decline in the recorded presence of wasps requires further investigation, also from the forensic standpoint, having in mind that these insects, when utilizing vertebrate carrion, function as both predators and necrophages.

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The phylogeny of the Ichneumonoidea: interpretation of characters and proposal for a new family

By: *Donald L. J. Quicke*, Faculty of Science, Chulalongkorn University, Bangkok, Thailand

I am no longer going to be at the ICE in Orlando this coming September due to the USA Embassy in Bangkok refusing even to interview my girlfriend who was going to accompany me on holiday. I thank Andy Austin and Jose Fernandez-Triana for their wonderful efforts to secure me free registration and a contribution towards my travel there from Bangkok where I now live in retirement. I am delighted to hear that the allotted funds have been redistributed to much more deserving students. I was going to talk about my latest views on the evolution of the Ichneumonoidea and the likely pattern of transitions between different life history strategies. Anyway, I nevertheless still want to share my views with other, younger hymenopterists.

The Ichneumonoidea currently comprises two families. These are the extant Ichneumonidae including fossil ichneumonids down to and in-

cluding the genus *Tanychora*, and their sister group, the extant Braconidae including extant Apozyginae and fossil Eoichneumoninae (formerly treated as a separate family). In addition, it seems possible that the extinct Praeichneumonidae, known from the Lower Cretaceous of Mongolia and Transbaikalia, and which share long, multisegmented antennae, may be a stem group ichneumonoid. However, two extant groups currently assigned to the Braconidae warrant some further discussion, viz the Apozyginae which had also previously been given separate family status, and the Trachypetinae, an Australian endemic group of large bodied-wasps.

First let me discuss the endemic Chilean genus *Apozyx*, the only extant genus of Apozyginae which is known from very few specimens all collected in *Nothofagus/Araucaria* forest (Figs 1-4). This cyclostome braconid is unique among extant braconids in having fore wing vein 2m-cu present combined with an otherwise large 2nd submarginal fore wing cell similar to those of many braconids but unlike the ichneumonid areolet. Vein 2m-cu occurs atavistically in a small percentage of individuals in the putatively basal braconid subfamily Rhyssalinae (including the former Histeromerinae) as well as in the Cretaceous fossil genera of the Eoichneumoninae and the Cretaceous genus *Aenigmobracon* (Perrichot *et al.* 2009) and which may actually belong to the Apozyginae (Ortega-Blanco *et al.* 2011). Vein 2m-cu is also lost in a very few extant ichneumonids, most notably in the bizarre subfamily Hybrizontinae whose placement within the ichneumonid tree is also complicated by its highly deviant 28S rDNA sequence (Gillespie *et al.* 2005). The lack of vein 2m-cu led this group often to be placed as a separate family (Hybrizontidae = Paxylommatidae), or treated as a braconid (van Achterberg 1976) and probably was influential in its placement in morphological analyses suggesting braconid affiliation (Quicke *et al.* 1999, Per-

richot *et al.* 2009). However, based on careful consideration of DNA sequence data, it appears most likely to belong to the Ophioniformes group of ichneumonid subfamilies (Gillespie *et al.* 2005, Quicke *et al.* 2009, Quicke 2015).

The second, and by far the most important exception to the above are the Trachypetinae: I now suspect that these are not braconids in the strict sense and rather they should be dealt with as a separate family, the Trachypetidae. Sadly, *Trachypetus*, a genus with a single large species, *Trachypetus clavatus*, has not been collected for 60+ years. Much of its original habitat near Sydney airport has subsequently been built-over and it is most probably extinct (Andrew Austin, pers. Comm.). Nevertheless, Austin *et al.* (1993) showed it to be closely related to a small group of genera formerly called Cercobarconinae, from the Australian 'outback' - inhospitable terrain and their collection requires much planning. These wasps reach 3.5 cm wingspan, and key easily to Braconidae because they lack fore wing vein 2m-cu and have the 2nd and 3rd metasomal tergites fused.

When Trachypetinae are included in morphological phylogenetic analyses as if they were a braconid, they appear deeply derived (*e.g.*, van Achterberg 1984), and in formal analysis, they are recovered together with some of the braconids that [retain] hind wing vein 2CU1a, viz. Agathidinae, Meteorideinae, Sigalphinae (Quicke and van Achterberg 1993, van Achterberg and Quicke 1993). Hind wing vein 2CU1a is also present in the Acampsohelconinae which are probably not close to the Agathidinae+Sigalphinae, and indeed, the Meteorideinae probably represent another remote lineage (Sharanowski *et al.* 2011, Quicke 2015).

Rooting the whole of the ichneumonoid phylogeny is also problematic. Earlier notions that they formed the sister group to the Aculeata based almost entirely on their shared possession of ovipositor valvilli (inter-

nal flaps in the venom duct of the ovipositor or stinger). However, a large phylogenetic study (Sharkey *et al.* 2011) rejected this and instead presented evidence that the Ichneumonoidea were the sister group to the Proctotrupomorpha, which are generally morphologically very derived and often have reduced wing venation. Reference therefore has to be made to "Symphyta" to try to understand some character polarities. There is also much homoplasy in the critical characters for defining Braconidae, and fossil taxa display a range of character state combinations (Sharkey and Wahl 1992), and when phylogenetic analyses incorporating fossil ichneumonoids are carried out the resulting trees have either little resolution or suggest improbable relationships (Sharkey and Wahl 1992, Quicke *et al.* 1999, Perrichot *et al.* 2008). Unweighted parsimony analysis thus appears to fail in this case because of a combination of characters that are scoreable but likely also quite homoplastic together with the unavoidably poor taxon sampling of Cretaceous taxa (represented by rare and often incomplete fossils). Therefore it seems that more careful consideration of individual character systems is appropriate.

Characters

Two characters strike me as being of great importance for resolving the position of the Trachypetinae: molecular evidence and anterobasal hind wing venation. In addition, we need to consider retention of partially open fore wing costal cell, the loss of fore wing veins 2m-cu and (RS+M)a, the position of hind wing vein rs-m and the presence/absence of hind wing vein CU1b.

Molecular data and 28S rDNA base composition

The molecular data, albeit only for 28S rDNA and 16S rDNA, consistently place *Megalohelcon* as sister group to all remaining Braconidae (Belshaw *et al.* 2000, Dowton *et al.* 2002) and the same was found in the combined molecular, morphological

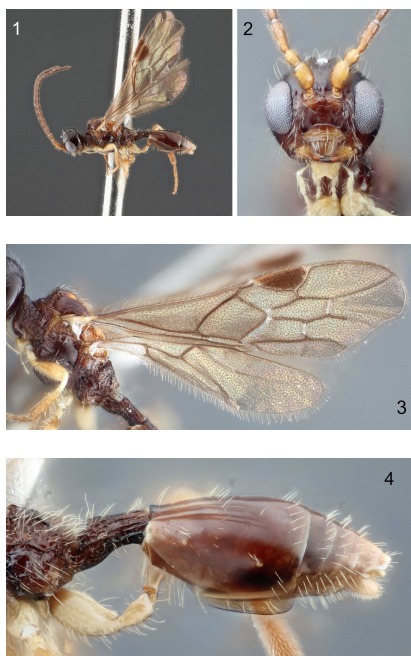
and palaeontological study of Quicke *et al.* 1999). Their 28S rDNA sequence is especially interesting since it is highly derived, with large insertions (Belshaw *et al.* 2000), but more importantly, it retains an ancestral base composition with a GC:AT ratio of >58:42 (ichneumonid-like) whereas in braconids it is <52:48. The second character I consider of great importance is the separation of hind wing vein SC+R from a long vein C very close to the wing base (character 15 of Quicke *et al.* 1999).

Hind wing vein rs-m/1r-m

In ichneumonids the hind wing vein rs-m is located distal to the origin of RS from SC+R, i.e. originates from RS, whereas in extant braconids its homologue (1r-m) is proximal, arising anteriorly directly from SC+R, except that it is nearly interstitial in *Apozyx*. Hybrizontines as noted by Sharkey and Wahl (1992) display the ichneumonid state, albeit that rs-m originates rather basally on RS. However, also only fossil eoichneumonine with hind wing venation preserved, *Cretobraconus mongolensis*, has it distinctly distal though not by far (see Fig. 5 in Basibuyuk *et al.* 1999). In Trachypetinae hind wing vein r-m is also located marginally distally as in Ichneumonidae (http://www2.nau.edu/sbugs-p/HIC/HICH001/HICH001099_d_ha_lg.jpg). Referring to “Symphyta” for enlightenment regarding polarity, it seems that a distal location of rs-m is plesiomorphic, and therefore a vein 1r-m arising basad as in most Braconidae is a derived state exclusive of Trachypetinae.

Loss of costal cell

The Ichneumonidae are largely characterised by the closure of the fore wing costal cell, with the anterior margin strengthened by a combined C+SC+R vein. However, a minute costal cell is present apically in Trachypetinae, and some Cretaceous fossil braconids such as *Archaeorhyssalus* (Engel and Wang 2016; see also Perrichot *et al.* 2009).



Figures 1-4. Male *Apozyx penyai* Mason, from Chile, a putatively relic member of the Braconidae. 1, Habitus, lateral view; 2, face frontal view; 3, wings; 4, metasoma, lateral view. (©The Natural History Museum, 2016. All rights reserved).

Loss of articulation between metasomal tergites 2 and 3

Most ichneumonids have the second and third metasomal segments somewhat flexibly joined, that is that there is a narrow zone of soft thin arthrodial membrane between their tergites. All extant braconids have the tergites strongly fused with the exception (always presumed to be a reversal) of the Aphidiinae, many of which utilise the flexibility in ovipositing with their metasoma thrust forward between their legs. However, impression fossils of eoichneumonines nearly always show that 2nd and 3rd tergites partially disarticulated indicative that they were only connected by arthrodial membrane (Basibuyuk *et al.* 1999). Similarly the Cretaceous braconids described by Belokobylskij (2012) and assigned to Protorhyssalinae are probably best considered as Braconidae incertae sedis until better preserved fossils are found (Engel and Wang 2016). Trachypetines, protorhyssalines and braconids other than Aphidiines have tergites 2 and 3 fused, though

whether this is synapomorphic or simply represents a convergent trend is, I think, uncertain.

Discussion

The Braconidae excluding Trachypetinae are therefore defined by three synapomorphies: (1) a major shift in 28S rDNA base composition away from being GC-rich; (2) having a long fused wing vein C+SC+R; (3) basal location of hind wing cross-vein 1r-m. Loss of fore wing vein 2m-cu, the principle character used to recognise them in keys, may have occurred independently in the Trachypetinae and the majority of extant species. Additionally, Trachypetinae preserve a remnant of a fore wing costal cell. I therefore propose that a separate family, Trachypetidae, is warranted for the endemic and enigmatic Australian group, defined by the autapomorphies of a mandibular sensory pit (Austin *et al.* 1993), retention of plesiomorphic 28S rDNA base composition, separation of hind wing veins C and SC+R. The position of hind wing vein r-m likely represents a transitional state on the way to the fully antefurcal position of other braconids, whereas the similar location in Hybrizontinae represents a convergence, along with loss of fore wing vein 2m-cu, quite probably these being adaptations associated with their hovering flight (Gómez-Durán and Achterberg 2011). I suggest the possession of hind wing vein 2CUa is plesiomorphic in the trachypetids, and was also retained by some early braconids, for example, in the Cretaceous fossils *Protorhyssalus*, *Aenigmobracon*, and *Maganobracon*, and although hind-wing venation is seldom preserved in impression fossils the vein is definitely present in the eoichneumonine, *Cretobraconus* (Basibuyuk *et al.* 1999, Perrichot *et al.* 2009). Hind wing vein 2CUa has presumably been lost, possibly on multiple occasions in the braconid and ichneumonid lineages. Presence of hind wing vein 2CUa in Agathidinae *et al.*, Meteorideinae, *etc.* (see above) most likely represents a *de novo* origin.

Trachypetids are not cyclostome

(they have no gap between the lower clypeal margin and mandibles) but in addition to most members of the cyclostome braconid clade (essentially excluding the derived Alysiinae and most Opiinae) several of the Cretaceous fossil braconids (Protorhyssalinae: Basibuyuk *et al.* 1999, Perrichot *et al.* 2009, Engel and Wang 2016) are clearly cyclostome, and therefore that may represent the ancestral condition for the family excluding trachypetines.

Unfortunately the biology of neither *Apozyx* nor of trachypetines is known. Trachypetines have short robust ovipositors and a strongly muscularised venom reservoir. Morphometric analysis of their ovipositor features suggests they are endoparasitoids (Belshaw *et al.* 2003), and from the venom reservoir morphology one might infer that they have need to inject a potent, perhaps paralyzing, venom quickly. Endoparasitism has evolved on numerous occasions in the Braconidae, and even in the Aphidiinae which are arguably one of the most basal lineages. Similarly it has evolved on multiple occasions within the Ichneumonidae, though the putatively most basal extant species (arguably Xoridinae or Labeninae) are ectophagous. Perhaps the only biological data that Cretaceous fossil ichneumonoids allow us to speculate is that they attacked weakly concealed hosts, their ovipositors being approximately as long as the metasoma or a little longer. The medium length ovipositor of *Apozyx* might indicate that it has retained an ancestral braconid, or even ichneumonoid, biology. Evolution of long ovipositors that permit utilisation of deeply-concealed hosts is therefore likely to be a derived feature in both braconids and ichneumonids, and similarly those ovipositor adaptations associated with boring through dense wood or steering mechanisms allowing them to be navigated through existing crevices or tunnels.

Conclusion

Making biological observations on and acquisition of fresh material for

sequencing and internal morphological investigation should be a priority for both *Apozyx* and more trachypetines.

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ISH members at the International Congress of Entomology (ICE) in Orlando. Photo by the Entomological Society of America <https://flic.kr/p/MppCyR>

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