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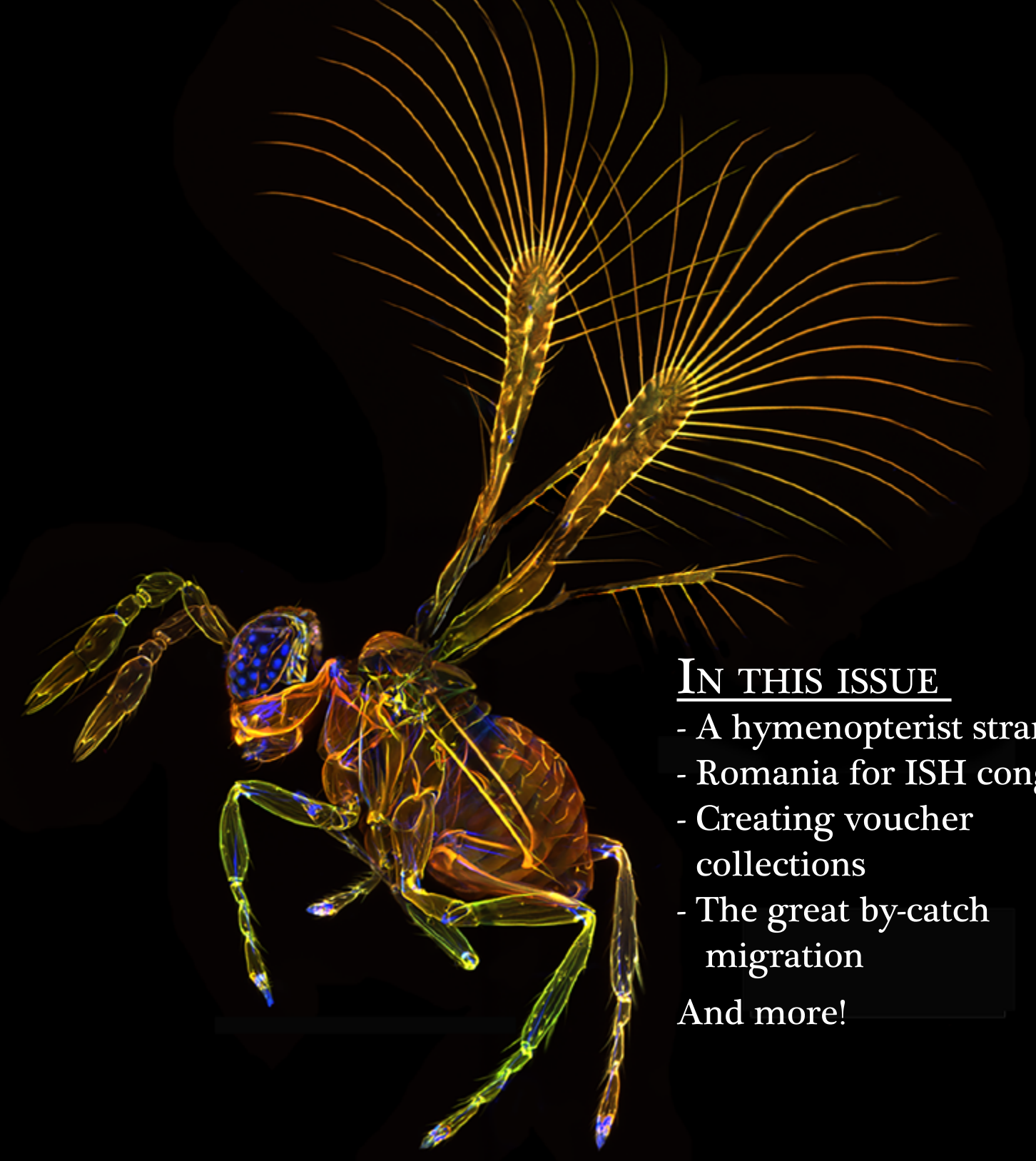
Hamuli

Newsletter of the International Society of Hymenopterists



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Cover photo by Andy Polaszek

From the Editor

Dear Hymenopterists,
My name is Carly Tribull – for those of you who don't know me, I'm currently an assistant professor at the State University of New York – Farmingdale (NY, USA) that studies Bethylidae and Dryinidae. I was asked to become the new editor of *Hamuli*, agreed, and had plans to get my first issue off the ground around mid-March. I was actually looking forward to spending my spring break lounging around in coffee shops working on the issue while visiting my family in San Francsico.

And then the world went very strange, and continues to be so during this age of lockdowns and uncertainty. The second half of my semester was spent moving my classes online and teaching my colleagues how to use our various distance learning systems. *Hamuli* was slowly chiseled away at, and has finally (finally!) reached you.

It's a pretty large issue, and I hope it brings you much needed entertainment and questions to ponder. My plan is to have our next issue out in September/October, and I will pester you for materials in the next few months.

For now, though, **it's a good time to check that your membership has not expired, and if it has, to renew!** You can do so by going to www.hymenopterists.org/membership.
Stay safe,
Carly Tribull, cmtribull@gmail.com

A Hymenopterist Stranded

Editor's note: As I began putting together my first issue of Hamuli, an ISH member pointed out that my former PhD advisor was "stranded" in Northern Australia due to Australia's Covid-19 shutdown during a field trip. I requested correspondance and he dutifully responded! The above picture is a day's collection of potter and paper wasps taken from Fogg Dam.

Northern Territory, 2020
James M. Carpenter, American Museum of Natural History, NY, USA (carpente@amnh.org)

I came to Darwin at the beginning of March, for a month of collecting - my eighth time in Australia, but first in the Northern Territory. I was accompanied by my wife, Amy Davidson, and guided about by Graham Brown, the thynnine specialist. And what a guide: he set up excursions into Kakadu, Litchfield, Nikmiluk and Elsey National Parks, as well as nature reserves like Cutta Cutta Caves, etc. The timing was designed to arrive towards the end of the Wet (rainy season) after the risk of cyclones had lessened. It was still pretty wet, with lots of road closures, but the really heavy rain did lessen as the month went on. And the collecting was great: more than 50 species of Vespidae, including a couple of rare pollen wasps (only the second time *Metaparagia borreriae* was collected), lots of potter wasps (16 genera, with who knows how many undescribed species of *Stenodyneriellus*), and several paper wasps (including nests of species in both *Polistes*

Graham Brown and I with Kakadu Park Rangers at Nourlangie. It was still the Wet season, as can be seen.

This old termite mound at the Bowali Visitor Center of Kakadu National Park had three species of potter wasps nesting in old burrows.

Amy Davidson showing off a species of the potter wasp genus Delta.

and *Ropalidia*). Amy did get charged by a water buffalo, but it only happened once.

So the plan worked wonderfully - and then the plan changed, thanks to Corona virus. By the time we were scheduled to fly back to New York, our flights were canceled, and rather than hazard an uncertain return route, we resolved to stay in Darwin - if you have heard about what is happening in New York right now, you must agree that Darwin is a better place to be. So we made arrangements to stay through April - but Qantas says they won't fly internationally until the end of May. We may be here for quite some time.

Boundary line between Howard Springs Nature Reserve and a shooting club (!). We found a male of the pollen wasp Metaparagia borreriae *here, the first time this species has been collected since the type series.*

So what to do, facing a situation I've never seen in more than 40 years of international fieldwork? The answer: the expedition continues. The provost of the American Museum agreed I might as well just keep collecting - the Museum is closed anyway. Our visas are good until June, the exchange rate favors us (Darwin is a LOT less expensive than New York City anyway), and all of our friends back home say we're better off here.

And thanks to the invaluable Graham Brown, the extended expedition has already paid off, with the discovery this week of the undescribed nest of *Ropalidia darwini* at the Territory Nature Park. A bizarre one it is, too, flat and hanging in the monsoon forest like a broad leaf. If we can avoid the ubiquitous salties (saltwater crocodiles) we will certainly come up much more, so lemonade all around.

Examining a splendid specimen of the potter wasp Abispa australiana.

Romania 2022 for the 10th Congress

Lucian Fusu, Mircea D. Mitroiu and Ovidiu A. Popovici

We are very excited to announce that the next quadrennial Conference will be held in Iaşi, Romania (‘Alexandru Ioan Cuza’ University). The last time the congress was organized in Europe was in 2010, after which it was held in Peru (2014) and Japan (2018). The congress will be held in mid-July 2022 in Iaşi, with more specific details announced at a later time. Iaşi is a beautiful city with about 300,000 inhabitants currently. Previously the city was the capital of the historical Moldova and for a short period of time the capital of Romania. Iaşi city has an international airport with 84 flights on 38 different routes from Iaşi International Airport (IASI), connecting IASI to 36 different cities in 15 different countries. Also, two daily flights are available from the Bucharest international airport in Romania, with numerous trains and buses from Bucharest to Iaşi.

The facilities at the Faculty of Biology of the ‘Alexandru Ioan Cuza’ University are available for the congress, including amphitheaters, laboratories, multimedia, and meeting facilities. The potential venue for the congress is the Mihai Eminescu hall of this university. The university hotels offer high standard accommodation conditions for modest prices. Student houses are also available for very low prices. Many 3–5 stars hotels can also be found within 10 to 30 minutes walking distance from the venue.

The area is excellent for collecting. The city is located at the limit of the Moldavian Plateau covered in oak and beech forests with glades and the Moldavian Plain, a forest-steppe region. The area has many natural protected and unprotected areas at very close distance from Iaşi (5-15 km). The Botanical Garden of Iaşi is 15 minutes from the congress venue, it is very large (89 hectares, about 1 km2) and with numerous wild areas retaining part of the original forest-steppe vegetation. Also, in the city and the surrounding area there are numerous tourist attractions, such as old churches, vineyards (e.g. Cotnari, Bucium, Adamachi), monasteries, and museums, including the oldest Natural History Museum in Romania. There are also several intriguing archaeological sites near the city that highlight the cultural history of the region, such as the Cucuteni-Trypillian culture, one of the oldest civilizations in Europe, renowned for the beautiful painted ceramics from about 4000 B.C. An interesting place near the city is the Repedea Hill, a famous geological site, which contains fossil shells from the Paratethys Sea. We also plan a one-day excursion during the congress to the ‘Bicaz Gorges Nature Reserve’ and/or the ‘Vanatori Neamt Natural Park’ were European bisons can be seen. The post-congress collecting trip will be organized either in the Carpathian Mountains or in the Danube Delta which is the second largest river delta in Europe (after the Volga Delta) and the best preserved on the continent.

We are thrilled to host the congress and look forward to all of our colleagues to visit and share their research in 2022.

Top: Faculty of Biology of the A.I. Cuza University in Iasi

Student Representative's Bulletin

Introduction, Social Media/Membership Directory Reminders, & Student/ECP Member Survey!

Hi everyone!

My name is Shelby Kilpatrick and I am honored to serve as your 2020-2022 ISH Student Representative. I am an Entomology Ph.D. candidate at the Pennsylvania State University. In 2017, I graduated with my B.S. in Entomology and Agricultural Leadership & Development (as a double major) from Texas A&M University. My current research projects include updating the checklist of bee species in Pennsylvania and investigating the evolutionary history of squash bees (see pg. 10 for some details – I'm currently requesting study specimens!).

As Student Representative, I am looking forward to engaging with y'all and representing students'/Early Career Professionals' (ECP) views on the Executive Board over the next two years. ISH currently has several social media outlets which can be used as a forum for discussion. If you're not already following/a member of these pages, please consider joining in:

Twitter

@Hymenopterists – the official ISH account, which I co-manage with Miles Zhang. We post information relevant to ISH and Hymenoptera in general.

@ISHstudents – this account is specific to ISH student/ECP news and updates!

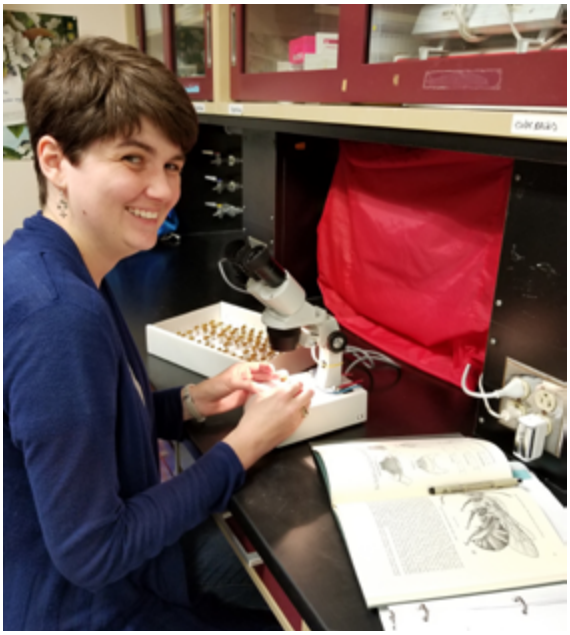
@HymenopteraJour – the official account for the Journal of Hymenoptera Research.

Facebook

International Society of Hymenopterists – a group for all ISH-related news and discussions.

Students.of.ISH – a public page specific to ISH student/ECP news and updates! Event invites have also been created here in the past.

Please also take a moment to verify that your information is complete and correct in the ISH Membership Directory.



I also plan to use the social media platforms to share information about what each of you are studying and publishing! Whenever you have a news item that you'd like to share, please e-mail it to me at sk_kilpatrick@verizon.net. Examples for posts include: research articles, blog posts, specimen/survey requests, funding/award applications, job opportunities, etc.

In order to learn more about the ISH student/ECP community as a whole, as well as obtain feedback about events and opportunities y'all would like to see from ISH this year, I've created a short survey. Please complete this survey by June 5, 2020. You're also welcome to e-mail me with suggestions anytime throughout the year. I am looking forward to collaborating with y'all to advance your ideas and perspectives! I'll share generalized results in the next issue of *Hamuli* as well as across our social media sites. The ideas and suggestions you provide may also be used as discussion starters.

Thank you again for your support!
Shelby Kilpatrick
2020-2022 ISH Student Representative

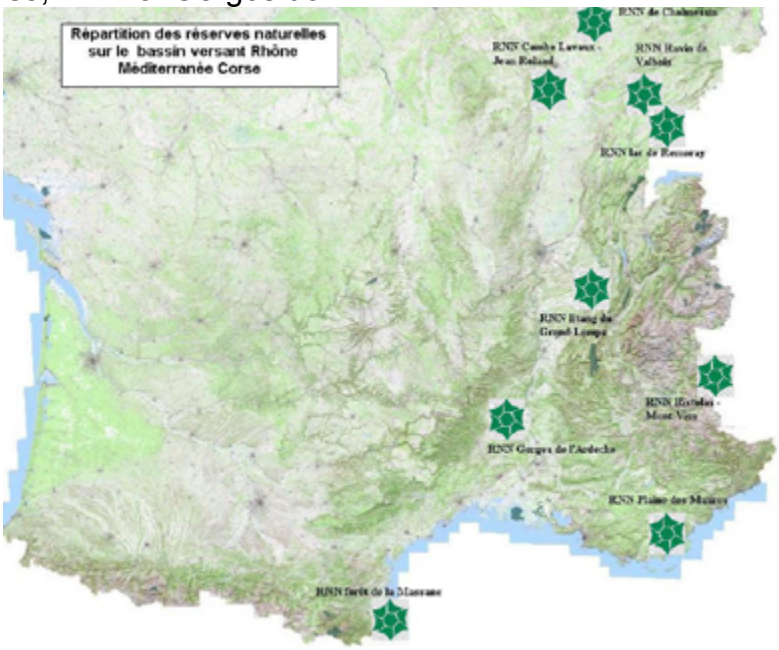
Hymenoptera from nine National Nature Reserves:

important sorted entomological material made available to entomologists and researchers.

Hadrien Gens (Association des Amis de la réserve naturelle du lac de Remoray (25), hadrien.gens@espaces-naturels.fr)

As part of the Réserve Naturelles de France (RNF) “Hymenoptera pollinators” program, the managers of nine National Nature Reserves spread across the Rhône Corridor have sorted their critical entomological data: NNR of Lac de Remoray, NNR of Ravin de Valbois, NNR of Combe Lavaux - Jean -Roland, NNR of Chalmessin, NNR of Tourbière du Grand Lemps, NNR Ristolas - Mont-Viso, NNR of Gorges de l’Ardèche, NNR of Plaine des Maures and NNR of Forêt de la Massane.

This entomological material gathers a large number of hymenopteran species, especially parasitica (terebrants) caught with Malaise traps (3 to 15 Malaise traps were set up in every Nature Reserve), polytraps, and coloured plates (one 24-hours’ session per month in every Nature Reserve in 2017).



Map of National Nature Reserves where specimens were collected

The sorting, performed in a broadly similar fashion in the different Nature Reserves, enabled the researchers to isolate specimens from the following taxa:
Symphyta (Ampulicidae, Cimbicidae, Orussidae, Pamphiliidae, Tenthredinidae) Ichneumonidae, Braconidae, Evaniidae, Gasteruptiidae, Stephanidae, Proctotrupidae, Heloridae, Diapriidae, Cynipidae, Figitidae, Platygastridae, Scelionidae, Ceraphronidae, Megaspilidae, Chalcidoidea (Aphelinidae, Chalcididae, Encyrtidae, Eucharitidae, Eulophidae, Eupelmidae, Eurytomidae, Leucospidae, Mymaridae, Perilampidae, Pteromalidae, Signiphoridae, Torymidae, Trichogrammatidae), Chrysididae, Bethylidae, Dryinidae, Sclerogibbidae, Embolemidae Formicidae, Mutilidae, Sapygidae, Scoliidae, Pompilidae, Tiphiidae, Vespidae, Apoïdea Sphéciformes (Crabronidae, Sphecidae).

Many families remain unknown, especially among parasitica. This initial work however enabled the discovery of many new species in France’s wildlife. To further develop the knowledge of these families and of these protected natural areas, this entomological data is made available to entomologists, taxonomists, researchers, systematists, geneticists, etc.

Editor’s Note: Hadrien says that the easiest way to access these specimens is to contact him directly via email at hadrien.gens@espaces-naturels.fr
Additionally, there is further information about the specimens in a French-language article.

The ghost in the cabinet, or: how I learned to stop worrying and love my vouchers

Bernardo F. Santos, National Museum of Natural History, DC, USA (santosbe@si.edu)

We've all been there: as a project nears completion, you may be proud of the work done and happy with the results, but chances are that a familiar sense of dread, long hidden and suppressed, occasionally creeps into your mind. "But the vouchers… the vouchers…". Or at least I like to think that this happens to everyone; it certainly did do me. While I think everybody agrees that keeping the voucher specimens organized is a laudable endeavor, it's one of those things that is easier said than done. There are multiple reasons for that.

When searching for fresh material for DNA extraction, we often sort specimens from bulk ethanol material such as Malaise trap samples, sometimes hundreds of them. In those moments, writing "CMSJ trap 4" in the labels sounds like a perfectly sound way of saving precious time while keeping track of the collecting information. Three years later, when the project is done and the manuscript is nearing submission, you look at those labels and think "What was CMSJ again? Who do I contact to get the full label data?". Now multiply this for 15 different sources of material and you have all the elements for a systematist's horror novel.

It may be that you couldn't really decide whether the best strategy was to pin up the specimens (better for morphological study) or to keep them in alcohol (allowing for re-extraction if needed). As a result, half of the specimens are pinned and the other half is in alcohol. And maybe the ones that did get pinned have a label with the code associated with the extraction (say, BFS3458) but not a genus and species name, so you can't really be sure of what is what without going back to your lab records or examining each specimen under the scope.

It may be that some of the specimens used in the project were from your collection, while others were sent to you as loan, or only as a leg for DNA extraction, or maybe a DNA extract of itself. And now you are not exactly sure of what exactly is at hand and what is not, since that information is not compiled in one single place.

And so it happens that, years into a big project, opening the drawers with your DNA vouchers fills you with an existential dread and a sense of shame. You tell yourself "I'll get to it eventually". But to make matters worse, there is not really a lot of incentive to do it, especially if you are an early career professional trying to get a job or tenure. Organizing your vouchers doesn't directly yield grants or publications, and "has a beautifully curated voucher collection" is not an item you put in your CV when applying for jobs. So the problem drags on.

This year I decided that I would make my voucher collection something of which to be proud. The push for this was a practical one: I used some research funds to hire a contractor to photograph the vouchers for the UCE phylogeny project I've

Voucher collection for the ichneumonid phylogenomic project. Note the empty unit trays indicating species for which voucher specimens are not available at the NMNH, i.e. that were sequenced from loaned legs or DNA extracts; "Male" tags indicating species only represented by male specimens; and a row of empty trays in the front border of the drawer, allowing room for expansion when new taxa are added to the dataset.

been conducting in collaboration with an amazing team of ichneumonologists. Photographing the vouchers will allow not only for the collection of shape data for geometric morphometrics, but also to cross-check IDs with other researchers and use the photos in eventual systematic revisions. But my voucher collection was in a state that only I could (sort of) understand; in order to have someone else going through the drawers and managing specimens, the organization had to be top-notch.

The goal of this article is not so much to brag about having fulfilled that goal, but mainly to share some tips I found useful and a motivational message to all researchers out there crushed by the weight of their disorganized voucher collections: it can be done, and it's worth it.

In fact, there isn't much mystery to this task, other than it's hard work and it takes time, time that is directly proportional to how messy the material was in the first place. But I do have some observations to make. First, I felt it helped immensely to put each specimen/taxon in a separately labeled unit tray. Fortunately, at the NMNH we had tiny unit trays that we use for type specimens that were perfect for the job. This method may require more space than cramming many specimens together in a single unit tray: each drawer can hold only 88 tiny-trays, which for my project meant that nine (!) drawers were necessary to accommodate all of the specimens. What I did then was to produce individual labels for each unit tray and organize the labeled trays into the drawers in alphabetical order (by subfamily and tribe) before adding the specimens. Notice that I did include labeled unit trays even for specimens that I didn't have with me, i.e. those sequenced from legs or DNA extracts. Although somewhat of a "waste of space", this practice allows me to quickly do a visual survey of a drawer and get a sense of which taxa are with other researchers.

I would then go through my list of sequenced taxa and check it against the specimens in the

Standardized photographs for Rhimphoctona sp. *The new voucher organization facilitated the generation of a virtual collection of phenotypic voucher in a seamless way.*

drawers, assigning a “status” to each one. Things like “OK”, “make labels”, “unavailable: specimen at NHM”, etc. I would then proceed to solve the issues that I could: making specimen labels, finding surrogate specimens for species that weren’t at hand, and finding female specimens for the species represented only by males. I put “Male” flags in the respective unit trays for all species represented only by males, because systematics of ichneumonids is mostly based on female specimens.

The organization I chose meant that moving or reorganizing specimens in the drawer takes a bit of work, since it necessitates readjusting the order of all (or most) trays in a drawer. In part because of this, it’s also a good idea to leave room for expansion in between the specimens rather than at the end. In my case, I did this by making a row of empty trays in the front part of the drawer, so one can simply add more specimens in the appropriate slots if the project grows, with little need tor shuffling around.

Making a point of producing complete labels for all specimens was also important, as we also photographed the labels for every voucher, and a photo of a scrap of paper with a handwritten “CMSJ trap 4” note is not very useful. Many of the ISH members reading this will recall having recently being bothered by me inquiring about the full label data for specimens borrowed many years ago. But I swear: I made a vow of, in the future, always recording full label data for specimens selected for DNA extraction immediately. Having the specimens all photographed was every bit as amazing as I expected. SI contractor Bekah Rogers did an excellent job of producing high-quality photographs while keeping all the files (over 50 GB of data!) organized. Now we have excellent documentation of the taxa included in this massive project, a virtual collection of phenotypic data that will be useful for years to come.

Finally, I must confess I was not expecting how much fun I would have in the whole process. Sure enough, we may often dread this kind of activity because it means we are not being “productive”, i.e. writing papers or grants, but working with specimens is what many of us have always liked to do in the first place. The point of being a systematist is organizing biological information, and finally having a well-curated voucher collection can be a source of great satisfaction. I for one am happy I did it.

Request for Squash Bees

Shelby Kilpatrick, Pennsylvania State University, PA, USA (sk_kilpatrick@verizon.net)

Howdy, ISH Members!

My name is Shelby Kilpatrick and I am an Entomology Ph.D. Candidate at the Pennsylvania State University, co-advised by Dr. Margarita López-Uribe and Dr. Heather Hines. My current research includes elucidating the evolutionary history of squash bees. Squash bees are currently classified as ~22 species in *Eucera* (*Peponapis*) and (*Xenoglossa*), the two genera having recently been sunk to subgeneric status by Dorchin et al. (2018b). Squash bees are distributed throughout the Americas. These bees are primarily collected on *Cucurbita* flowers in the early mornings; they are traditionally considered specialists on both wild and domesticated varieties of pumpkins and squash, but also visit other floral resources for nectar. *Peponapis* are approximately honey bee-sized, while most *Xenoglossa* are bumble bee-sized. Some images are available on Discover Life:

Peponapis: https://www.discoverlife.org/mp/20q?search=Peponapis
Xenoglossa: https://www.discoverlife.org/mp/20q?search=Xenoglossa

I am grateful to currently have specimens on loan from 8 institutional and personal collections. I also collected several species in 2018 as part of my own field work in the southwestern USA and throughout Mexico, where the greatest diversity of species occurs.

However, some of the species are uncommonly collected and thus "rarer" than others. I am writing to request specimens for semi-destructive morphological analyses (SEM imaging) at this time. In particular, I am searching for females of the following 12 species:

E. (P.) melonis (Friese, 1925) – a dark-colored, South American endemic.

E. (P.) parkeri (Ayala and Griswold, 2012) – this species is only known from the "Pacific slope of Costa Rica" and only 1 female (a paratype) to date (Ayala and Griswold 2012).

E. (P.) pacifica (Ayala and Griswold, 2012) – this species is known from Mexico and few female specimens to date (nearly all paratypes) (Ayala and Griswold 2012).

E. (P.) michelbacherorum (Hurd and Linsley, 1964) – this species is known from southern Arizona and north-western Mexico.

E. (P.) atratula Dalla Torre, 1896 – this species was formerly known by the specific epithet "atrata" (Dorchin et al. 2018a). It is known from Mexico and Guatemala.

E. (P.) apiculata (Cresson, 1878) – this species is known from Mexico to Costa Rica.

E. (P.) azteca (Hurd and Linsley, 1966) – this species is known from Mexico and Guatemala.

E. (P.) smith*i* (Hurd and Linsley, 1966) – this species is known from Mexico.

E. (P.) timberlakei (Hurd and Linsley, 1964) – this species is known from the southwestern USA (Arizona, California, Nevada, and New Mexico) and northwestern Mexico.

E. (X.) crassidentata (Cockerell, 1949) – females of this species have densely plumose scopae. This species was formerly classified within Peponapis; its size is more in line with those in that clade. It is known from the southwestern USA to Costa Rica.

E. (X.) mustelina (Fox, 1893) – this butterscotch-colored species is known at least from southern California and the Baja California Peninsula, Mexico, but is likely endemic to this region. This species is occasionally mis-identified as these similar-looking species: X. angustior (Cockerell, 1900) and X. patricia (Cockerell, 1896).

E. (X.) fulva (Smith, 1854) – one of the largest species in the subgenus, these bees have dense orange/gold setae on their thoraxes. They are found in Mexico.

Eucera (Cemolobus) ipomoeae (Robertson, 1891) – this subgenus is sister to the squash bee clade (Dorchin et al. 2018b). It occurs in the eastern USA and is a specialist on native Ipomoea (morning glories).

For non-destructive photography, I am looking for males of the following 4 species: *E. (P.) melonis, E. (P.) michelbacherorum, E. (P.) atratula, and E. (P.) limitaris (Cockerell, 1906).*

I am also seeking **any available** specimens of ***E. (X.) gabbii*** (Cresson, 1878) for both phylogenetic and morphological analysis. This is the other large species, but is dark-colored with two subspecies. The species is distributed from the southern edge of Arizona to Costa Rica.

I am also willing to sort and identify ***undetermined Peponapis*** and/or ***Xenoglossa*** specimens to the species-level, if you have them available to loan! Additionally, access to any specimen collecting event databases for species in these two subgenera would support further fieldwork and geographic studies.

I would be happy to discuss details and answer any questions you may have about my research, protocols, etc. Please e-mail me at sk_kilpatrick@verizon.net. Thank you for your consideration!

References

Ayala R, Griswold T (2012) Two new species of the bee genus *Peponapis,* with a key to the North and Central American species (Hymenoptera: Apidae: Eucerini). Revista Mexicana de Biodiversidad 83(2): 396–406. https://doi.org/10.22201/ib.20078706e.2012.2.1247

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Dorchin A, López-Uribe MM, Praz CJ, Griswold T, Danforth BN (2018b) Phylogeny, new generic-level classification, and historical biogeography of the *Eucera* complex (Hymenoptera: Apidae). Molecular Phylogenetics and Evolution 119: 81–92. https://doi.org/10.1016/j.ympev.2017.10.007

New talents on the study of Darwin Wasps

Marissa Sandoval is a new ISH student member that worked with me last summer in generating a UCE-based phylogeny for the fascinating and mysterious subfamily Labeninae. She was part of the prestigious and highly competitive Natural History Research Experiences, an REU program funded by NSF. NHRE also funded her to go to the ESA meeting last November, where she won an award for best undergraduate presentation for her session. I asked her to write a little snippet about her experience with the Smithsonian and working with Darwin wasps.

Bernardo F. Santos- National Museum of Natural History, DC, USA (santosbe@si.edu)

A Summer Spent Well: Systematics of Ichneumonids at the NMNH

This past summer, I had an incredible opportunity to do research with the guidance of Bernardo Santos and Sean Brady at the National Museum of Natural History through the NHRE program offered by the NSF. The goal was to create a phylogeny of a subfamily of ichneumonid wasps, Labeninae, using ultraconserved genomic elements from museum specimens. Members of Labeninae are almost exclusively found in the Neotropics and Australia, suggesting to researchers that this Gondwanan-like distribution may be a testament to how old the lineage is. We wanted to investigate the relationships among the genera in the subfamily, create a time-calibrated phylogeny, and compare the tree to that of the one based on morphology by Gauld.

This involved performing DNA extractions, library preparation, target enrichment, and sequencing from our specimens. Then came a period of learning how to analyze the data through various command line tutorials and bioinformatics textbook chapters. I've developed a whole new appreciation for data scientists from this part of the project. Through a combination of trial and error, googling, and help from Bernardo, I was able to generate a maximum likelihood tree which then was time-calibrated with an R package using fossil data. These results were presented via an academic poster at the end of summer along with the other NHRE interns, and the program also funded a trip to give a presentation at the Entomological Society of America conference in St. Louis this past fall!

Through this experience, my interest in systematics and collection-based research has been confirmed. My project was all I could've asked for—from spending quality time at the microscope with the wasps and the literature to working in the communal lab to an exposure of data analysis. I was able to write a description for an ichneumonid from the Greater Antilles, learn from all the scientists on the Hymenoptera floor of the NMNH, and engage with folks visiting the museum about the importance of entomological research and natural history at large. It had been a dream of mine to even see the NMNH in D.C. so working with the collections was unreal.

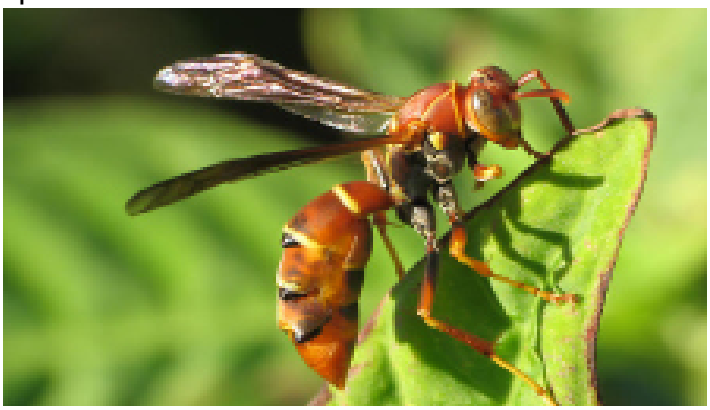
Marissa Sandoval
Entomology Club, University of California Berkeley 406 Wellman Hall, UC Berkeley, Berkeley CA – USA – 94704

Intern Marissa Sandoval examines specimens of Labeninae (Ichneumonidae) with research mentors Seán Brady and Bernardo Santos

Is there a geographic pattern in stylopsis?

Christopher K. Starr, Caura Village, Trinidad & Tobago, ckstarr@gmail.com

Stylopsis, or stylopization, is the phenomenon in which females of the order Stepsiptera (stylops) live as obligate endoparasites of various other insects, especially aculeate hymenoptera. The males fly, but are seldom noticed -- I am not aware of ever having seen one -- as they are very short-lived. The female typically lives in the abdomen of a wasp or bee and is commonly seen as protruding from intersegmental membranes. Even after she has died, her puparium leaves an unmistakable trace. Accordingly, it is relatively easy to know whether a wasp or bee (whether live or in a museum) was stylopized by the conspicuous distortion of the abdomen.



Polistes dorsalis*, with stylopsis by* Xenos*. Photo by Sean McCann.*

It is my working hypothesis, based on scattered observations, that stylopsis is much more prevalent in some parts of the world than others. It seems to be virtually absent in the areas that I know best (eastern North America, the Philippines, and northwestern South America), but examination of museum specimens from westernmost North America and Central Europe make a prima-facie case that it is much more prevalent in some other regions.

My purpose here is simply to open a discussion of this question. If the apparent geographic variation in rates of stylopsis is real, this will raise the question of why this should be so. The answer is far from obvious.

Member Photo Studio

Various ISH Members

Editor's note: I thought it would be nice to have a segment for photos submitted by members that they've taken during their travels and research. Feel free to submit yours in the future! Please note, all identifications were provided by the photographer.

From Rob Longair: Photo taken 20 August 2018 at the Queen's University Biological Station near Chaffey's Lock, Ontario, Canada. Polistes dominula *being disposed of by several ambush bugs on goldenrod.*

Also Rob Longair: I can't be sure of the species, probably Rhynchium marginellum*, Wechiau Community Hippo Sanctuary, Upper West Region, Ghana. Provisioning nest in beam of tourist accommodation*

Member Photo Studio

Miles Zhang (University of Florida, FL, USA. yuanmeng.zhang@gmail.com) - Here are two photos I took while working at Archbold Biological Station in FL, the bottom one is various sexual generation of oak galls, and the wasp (top) is the sexual generation of *Belonocnema quercusvirens*.

Member Photo Studio

Mike Huben (mike@huben.us) - Top left: New apterous *Decevania* (Evaniidae) from Papallacta pass in Ecuador. Will be named for Lubomir Masner. Top right: Unknown brachypterous cockroach that is likely to be the host of the *Decevania*. Can anybody help with the ID? Bottom: Collecting site in Papallacta pass in Ecuador, with a view of Volcan Antisana.

Member Photo Studio

Mike Huben (mike@huben.us) - Top: Tepui in Nangaritza, southern Ecuador. Bottom left: *Semaeomyia sp.* (Evaniidae) from top of Tepui. Bottom right: *Alobevania sp.* (Evaniidae) from top of Tepui.

Member Photo Studio

Denis Brothers (University of Kwazulu-Natal, South Africa, Brothers@ukzn.ac.za) - Here's a photo of an unusually metallic mutillid from Australia. *Aglaotilla submetallescens* is the type species of the genus, which is limited to the Australasian Region.

Comanche harvester ants

Ann B. Mayo, University of Nebraska-Lincoln, Lincoln, NE and Weatherford College, Weatherford, TX, USA. (amayo@wc.edu)

I continue to work on the ecology of the Comanche harvester ant, *Pogonomyrmex comanche*. Currently, I am working on the foraging behavior and ecology of this species and am crunching a huge data set consisting of video and experimental data. Here, I share with you a few photo examples of these behaviors.

Comanche will forage on a variety of seeds, plant parts, as well as insects and other items – different sizes, shapes, and textures – which may offer various challenges to harvesting, transporting, and getting the seeds into the nest.

Here, the forager has a particularly long piece of dried plant stem.

Here, the forager has found a pile of seeds in animal scat.

This photo shows a relatively simple jam at the nest entrance. More often there are many ants attempting to exit and enter the nest at the busiest times, including foragers carrying forage. How they negotiate this jam is matter of individual behaviors emerging as a goal for the colony.

Here, comanche is collecting some cookie bait. Note that the forager appears to be using her sting/gaster to help hold or perhaps to help manipulate the forage to get a good grip on it. I have recently observed this behavior with seeds as well in which the gaster is curled up to the ventral side of the thorax even more than this.

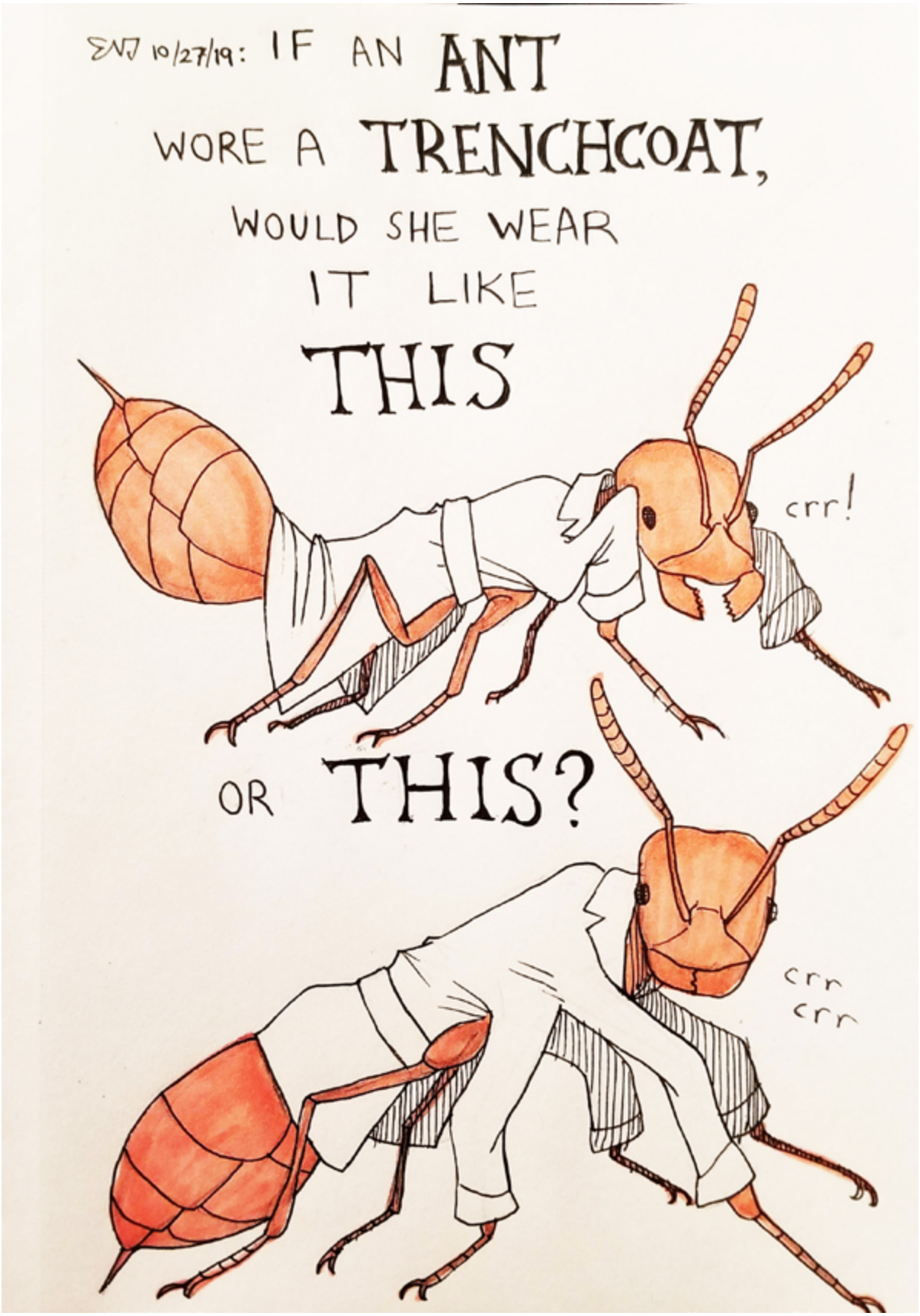
And finally, two photos of Comanche foragers attempting group retrieval. Comanche does not perform group retrieval very effectively or efficiently. Note that these ants may be pulling in different and even opposite directions. Commonly, foragers grab hold, pull for a few seconds, let go, and either leave or grab hold again, sometimes in another location.

Here is an example of group retrieval on a dead insect.

And finally, an example of group retrieval on a live caterpillar

Member Art by Elaine Tan

University of California, Santa Barbara, CA, USA (elntan.u@gmail.com)



Member Art by Elaine Tan

University of California, Santa Barbara, CA, USA (elntan.u@gmail.com)

Hymenoptera Research and Training in Oman, 2012-2020

Andy Polaszek, Natural History Museum, London, UK (A.Polaszek@nhm.ac.uk)

At least once a year since 2012, I have been visiting the Sultanate of Oman for fieldwork and training, and several Omani students and researchers have come to the NHM for collaborative research and training. My principal Omani partners are the Oman Botanic Garden (OBG), especially its Chief Scientist Dr Annette Patzelt; the Oman Ministry of Agriculture; the Natural History Museum in Muscat; and Sultan Qaboos University. Important collaborators have been Dr Mostafa Sharaf (King Saud University, Riyadh) and Dr Joe Monks (University of Nottingham, UK). Mostafa is the leading specialist on Middle East ants, Joe has recently completed his PhD on (mainly) bees of Oman, entitled "Pollination in the Middle East". Travelling in Oman with Joe and Mostafa, Mostafa tends to go his own way and do his own thing, using very specialised myrmecological techniques, and focussing on agricultural and otherwise disturbed habitats. Joe and I on the other hand look for wilder spots, where there is green vegetation, and especially flowers. We both target bees and other flying Hymenoptera with hand nets, while supplementing with yellow pan trapping, and a long term Malaise trap at the Botanic Garden. In addition I always use the "Noyes net", the long-handled, triangular-headed, sweep net fitted with a 4mm wire mesh to exclude larger material.

Top: Figure 1. Oman Botanic Garden staff during training at the NHM, September 2018, coinciding with a visit by Omani students from Nottingham University. L-R Asma Al-Jaradi, Shadiya Al-Rijeibi (OBG); Abdulhamid Al-Riyami (Nottingham); Ben Wright, Manager Anglo-Omani Soc.; Andy Polaszek; Prof. Ian Hardy, Tarik Almandhari (Nottingham)

Bottom: Figure 2. Collecting on the Salma Plateau in the Hajar Mountains, March 2019. Joe Monks 3rd from left, Andy Polaszek 3rd from right with Asma Al-Jaradi and Shadiya Al-Rijeibi far right, and other OBG staff on the left.

Our collecting has been very successful. Mostafa has led on the publication of 8 new ant species from Oman in the last 5 years (Sharaf et al., 2016, 2017, 2018; Sharaf & Aldawood, 2019). These include *Lepisiota omanensis* (fig. 3) originally discovered by Joe in the Hajar Mountains; *Anochetus annetteae* after Dr Patzelt of the OBG; and *Meranoplus mosalahi* after Mostafa's countryman, the Egyptian footballer. When the international newspapers got hold of the last story, Mostafa was the second most famous Egyptian on the planet (for about a day). Joe's individual sur-

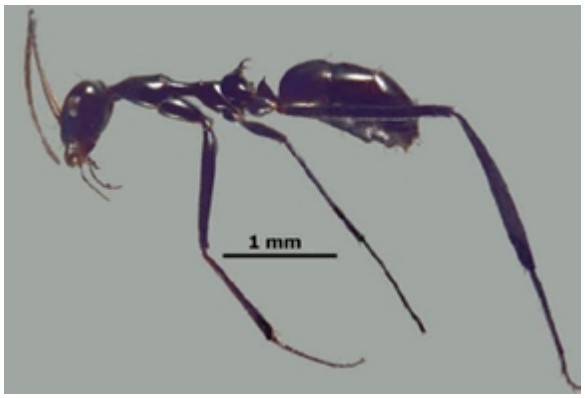


Figure 3. Lepisiota omanensis *Sharaf & Monks (Holotype) (photo AP)*

veys while working for Earthwatch recorded almost 300 insect species, of which 36 were new country records (Monks et al, 2019), and Joe and I have recently discovered two new bee species in the genus *Pseudapis*, which we are about to describe with Alain Pauly. There are almost certainly many more new bee species among our specimens, and we are currently working on a key (dichotomous and online, multi-entry) to all Arabian bee genera. Our friend and colleague Mr Ali Al-Jahdhami from the Oman Ministry of Environment and Climate Affairs has been an invaluable ally in the field, discovering several genera previously unrecorded from Oman. Ali recently collected two new species of the enigmatic philomidine genus *Vidlinus*, that we will describe soon with John Heraty, the specialist on this group.

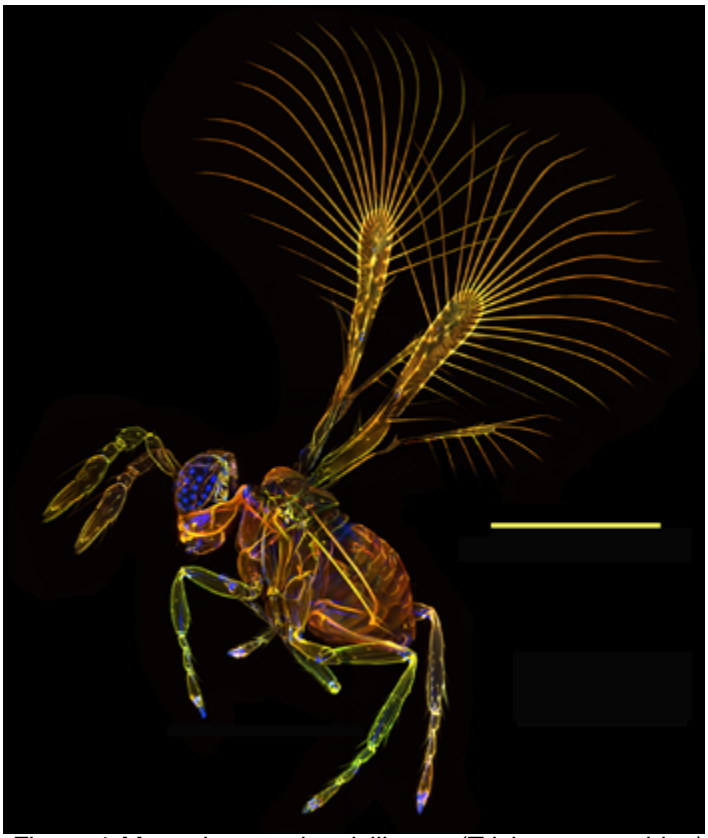


Figure 4. Megaphragma longiciliatum *(Trichogrammatidae) (Oman). Confocal laser microscopy. Yellow=strongly sclerotised cuticle; Blue=weakly sclerotised tissues (photo AP)*

Turning to other chalcids that I've been collecting in Oman, a large percentage are likely to be undescribed, and almost all will be new country records – the UCD currently records 20 chalcid species from Oman (Noyes, 2020). *Encarsia indigoferae* Polaszek and Manzari (2008) is very common in the greater Hajars region, especially in date palm plantations. These invariably irrigated plantations are isolated hotspots of insect biodiversity, providing critical reservoirs of, among others, beneficial species. One of these is the previously unrecorded trichogrammatid *Megaphragma longiciliatum* (fig. 4).

Date palm is arguably the most important crop in Oman, and is attacked by a major pest, the lesser date moth *Batrachedra amydraula*. In collaboration with an Omani PhD student at Nottingham University, his supervisor Prof. Ian Hardy, and others, we recently described a new species of the bethylid *Goniozus* (fig. 5) which is proving extremely effective in controlling the moth (Polaszek et al, 2019). Together with another Nottingham PhD student, we are describing a new *Telenomus* (fig. 6) that is an important control agent of the pomegranate pest *Deudorix (Virachola) livia*. Both of these studies are in collaboration with the Oman Ministry of Agriculture.

Figure 5. Goniozus omanensis *– parasitoid of the lesser date moth in Oman (photo AP)*

Figure 6. Telenomus sp. n. *– egg parasitoid of the pomegranate moth in Oman (photo Dawn Painter)*

Two female staff members of the Oman Botanic Garden spent two weeks at the NHM in 2018 learning Hymenoptera identification, and two female MSc students from Sultan Qaboos University spent a month divided between NHM and Cardiff University (with Dr Mike Wilson) in 2015.

Fieldwork is both rewarding and enjoyable in Oman. The roads are excellent, the infrastructure is good, and collecting and export permits are relatively easy to obtain. Road signs are almost always in both Arabic and English, even though occasionally something might be lost in translation (fig. 7). Overall Oman is by far the most pleasant country in which I've collected in the Peninsula, and I've collected in all Arabian countries except Yemen and Bahrain.

Figure 7. Helpful sign at Wadi Al Arbeein, Oman (photo AP)

Acknowledgements

I'd like to thank all the colleagues and friends mentioned above, and others acknowledged in the various papers cited. All of my visits to Oman have been fully funded by the Anglo-Omani Society, an organisation set up and funded by the late Sultan Qaboos bin Said.

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The Great By-Catch Migration

Carly Tribull, Farmingdale State College (SUNY), NY, USA (cmtribull@gmail.com)

For the past two summers, I have set Malaise traps on Long Island to collect the Bethylidae and Dryinidae I use in my phylogenetics research. While not the rarest wasps, these families are not exceedingly common either – in a full Malaise trap catch, I might have ten specimens, if I'm lucky.

So, I set up a lot of Malaise traps. I've been able to accumulate a new trap or two every year, and barring the occasional loss to an angry deer, I can reliably set 10-15 traps a season. I load them with 95% ethanol and exchange the catch for fresh collecting fluid every 10-14 days. In a three-month field season, that can add up to over sixty 500 ml jars.

I pick out my wasps, lovingly store them in micro-centrifuge tubes, and then stare despairingly at a summer's worth of Malaise trap by-catch and ponder how I can put the rest of the dead insects to use. So far, I have mostly relied on research interns creating their own survey projects or General Entomology students looking to grow their collections, but it's hardly made a dent in my stores. I imagine I am not the only hymenopterist with this by-catch problem and unless you have frequent visitors interested in hunting through your catches, I bet you have a shamefully stocked fridge too.

Ironically, I love perusing other entomologists' by-catch! Whenever I visit a school to give a talk or make stops on trips, I sift through by-catch. I have also relied on institutions that have the infrastructure and space to house by-catch for visiting researchers. For example, the Canadian National Collections easily provided 60% of the specimens I used in my dissertation and my two-week trip there had a much better ratio of specimens-per-dollar-spent-on-travel than any of my personal field collecting trips. And was I ever going to get a permit to do fieldwork in Madagascar as a graduate student? No. Did I always visit the California Academy of Sciences when I visited my family in San Francisco? Yes.

But still, visiting other entomologists' fridges or by-catch repository institutions requires travel funds. I thought that was problematic before Covid-19, but it certainly is now with my institute having shut down all travel fund applications. So, I recommend a solution – the Great By-catch Migration (GBM). The basic idea of the GBM is that our society maintains a database, accessible to members, of where our members collect and what taxa they're looking for. If an ISH member sees that someone on the GBM database has samples from a part of the world where they are looking for taxa, they contact that member through the listed email. Alternatively, if a member notices that someone on the database needs taxa they've noticed in their by-catch, they can reach out.

From there, it's up to the two parties to coordinate the details, which will probably differ from migration to migration. Is the holder of the by-catch willing to pick out specific taxa for the requester? If not, can the entire by-catch be sent to the requester and safely returned, or shipped to the next interested party? Who will pay for shipping? What about import/export laws between different countries? Does the sender want identified voucher specimens for their own collections? Most importantly, do both parties recognize that things can occasionally go terribly wrong with shipping specimens? There are a lot of variables, and it seems silly for me to lay down rules for what will likely be a new negotiation each time. Still, we can start by creating a database of field collecting locations and desired taxa, and start facilitating connections. You can do that here.

Alternatively, you can still ship your by-catch to whatever institution is willing to accept it. While

that still leaves the issue of travel funds unresolved, at least museums and national collections like the CNC have the infrastructure to sort and store by-catch more efficiently. In addition to storing by-catch, large collections are also actively trying to ensure that insect specimens don't languish unsorted for years. After I launched the GBM database, I was contacted by Nicole Fisher, who is a digitization manager at CSIRO and has been working on projects to address the "Insect Soup" issue.

In 2018, Nicole put together a working group to address the issue of all the "material sitting un-tapped, un-discovered, and un-databased in collections. With her permission, I've created a folder with some of the materials that were produced, including a publication called "Automated Image Analysis on Insect Soups" by Sun et al. 2016. Low-tech approaches to Insect Soups are still carried out – Fisher's working group also delved into methodologies (and associated questions) for taking pictures of Malaise trap catches and posting them online to make them available for entomologists to request as loans (see "Insect Soups.docx"). While not from CSIRO, you can see an example of Insect Soup photos here.

Regardless of whether you make your by-catch available through the GBM spreadsheet or send it on to an institution, I feel like we owe it to all the insects that end up in our Malaise trap jars. Or to the future graduate students who want to undertake taxonomic research with global representation on a relatively slim budget. With our next issue of *Hamuli*, I hope to gather your thoughts and report on transactions facilitated from the GBM and how your experiences went. Hopefully, we can start clearing out some fridges.

The next piece, "ByCatch and what to do about it" was written in response to the original advertisement of the GBM spreadsheet. As I wrote above, I would like to collect more responses, suggestions, and alternative ideas, so do send those to me at cmtribull@gmail.com when you have the chance.

Bycatch and what to do about it

Christopher K. Starr, Caura Village, Trinidad & Tobago
ckstarr@gmail.com

I'm glad to see that we are opening up a discussion about this problem. Unless the focus of a bulk-collecting effort is flying insects as a whole, the question of what to do with the mass of perfectly good material that the collectors don't plan to study is an acute one. One could simply select the object of one's specialty and discard everything else, but don't we all find this expedient rather cringe-worthy? Storing the mass of bycatch in a whole lot of jars in hopes that in time other specialists will want to look through it for goodies is a little better, but probably not much. Compiling a table of who would like to see what, as in the Great ByCatch Migration spreadsheet might work in some circumstances, but I don't see it as much of a step forward. My purpose here is to suggest a general solution to the problem, although I should mention that I have had only modest success implementing it so far.

With respect to Malaise trapping, among the broad array of usable specimens (i.e. excluding all those pesky moths that clutter the catch) there are just four significant fractions: a) aculeate hymenoptera, parasitic hymenoptera, beetles, and higher flies. Some taxa are usually present as minor elements, but the four main fractions have to be at the heart of any general solution.

If I were a museum curator with a Malaise trapping program, I would seek to establish a consortium of four specialists or clusters of specialists. I and/and or my technicians would make it our business to go through the catch and extract all aculeates that should be extracted. Let's imagine that my own research interests were only in the sphecoform wasps. I would take out not only the sphecoforms but all other aculeates that should be extracted. If any morphospecies was present in abundance, I would have no obligation to extract all of them, but none that were worth extract-

ing would be neglected.

That done, what remained would go off to someone else in the consortium, the specialist in parasitics, beetles or higher flies. She/he would do a similarly thorough job within her/his franchise before sending the remainder down the line. And so on. Anyone wishing to extract something from outside the four franchises (e.g. homopteran) would be free to do so. After the fourth extraction, whatever remained could be dumped with a clear conscience. There would certainly be no reason to keep it just in case a leafhopper specialist might want to wade through it.

The difficulty in all this is not the logistics of sorting and shipping. Rather, it is in identifying the other three franchise holders. As seen in the spreadsheet, few specialists have much interest in pulling out material outside of their particular narrow interests. It can only work if a) the collecting is done in such a juicy area that specialists are willing to pay the price of admission into the system (i.e.the burden of dealing with material outside one's specialty, and/or b) the franchise holder is a group of specialists, so that the price of admission is spread out.

Right now I am having to concentrate on other things, so that my Malaise program is on hold. However, when that time is passed I want to get back to trying to set up just such a consortium. I already have a cluster of coleopterists provisionally on board.

Do you need to renew your membership to the International Society of Hymenopterists? Know anyone that should join?

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Department of Entomology
University of Wisconsin-Madison
1630 Linden Drive, room 346
Madison, WI 53706, USA

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New book from a member: A History of Zinnias

Eric Grissell, Eugene, OR, USA, (egrissell@gmail.com)

A HISTORY OF ZINNIAS

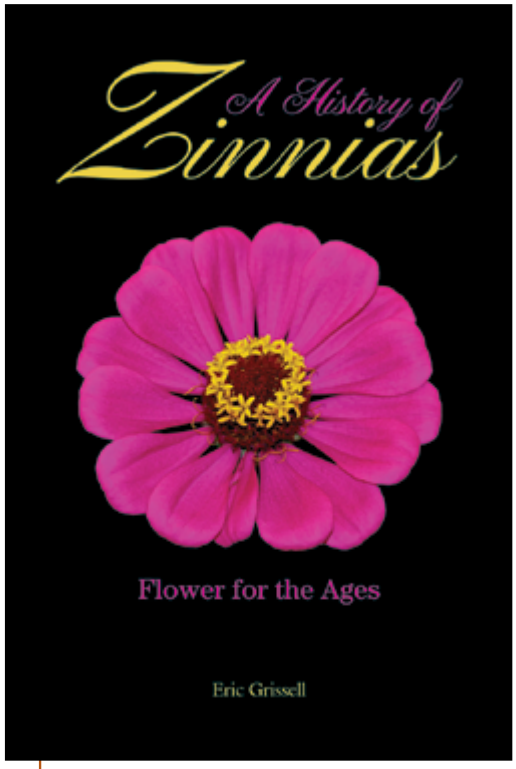
Flower for the Ages

Eric Grissell

A History of Zinnias brings forward the fascinating adventure of zinnias and the spirit of civilization. With colorful illustrations, this book is a cultural and horticultural history documenting the development of garden zinnias—one of the top ten garden annuals grown in the United States today.

The deep and exciting history of garden zinnias pieces together a tale involving Aztecs, Spanish conquistadors, people of faith, people of medicine, explorers, scientists, writers, botanists, painters, and gardeners. The trail leads from the halls of Moctezuma to a cliff-diving prime minister; from Handel, Mozart, and Rossini to Gilbert and Sullivan; from a little-known confession by Benjamin Franklin to a controversy raised by Charles Darwin; from Emily Dickinson, who writes of death and zinnias, to a twenty-year-old woman who writes of reanimated corpses; and from a scissor-wielding septuagenarian who painted with bits of paper to the "Black Grandma Moses" who painted zinnias and inspired the opera *Zinnias*.

Zinnias are far more than just a flower: They represent the constant exploration of humankind's quest for beauty and innovation.



REVIEWS

"A perfect book for those who love history, plants, the unraveling of mysteries, and a wry sense of humor. Through meticulous research, Eric Grissell debunks numerous tall tales about zinnias and gives readers the real story."

—**ELLEN DEAN,** curator, UC Davis Center for Plant Diversity

"Eric Grissell has managed to create a unique blend of science and history in this book. I'll never look at garden flowers the same way again."

—**ARTHUR TUCKER,** Emeritus Professor and Emeritus Director of DOV Herbarium, Delaware State University

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ERIC GRISSELL was born in Washington, DC, but spent his childhood in the San Francisco Bay Area. After obtaining a PhD in entomology from the University of California, Davis, he began work at the Florida Department of Agriculture and Consumer Services identifying wasps, bees, and ants of agricultural importance. He eventually became a research entomologist for the US Department of Agriculture's Systematic Entomology Laboratory, stationed at the Smithsonian National Museum of Natural History in Washington, DC. He retired after twenty-six years of service and moved first to Arizona and then to Eugene, Oregon. Although primarily trained as an entomologist, Grissell's second love is botany and horticulture. His first book of garden essays, entitled *Thyme on My Hands*, appeared in 1986, followed by *A Journal in Thyme* in 1994. Incorporating entomology, botany, and horticulture together, he published the award-winning *Insects and Gardens* in 2001 and *Bees, Wasps, and Ants* in 2010. Grissell has published over one hundred scientific papers on insects and a dozen garden essays for popular horticultural magazines.