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Hamuli

Newsletter of the International Society of Hymenopterists

In this issue ...

Digitally accessible taxonomic (Hymenoptera) knowledge

By: *Donat Agosti, Plazi, Bern, Switzerland*

While one can think of a taxonomic publication as one little stone in the mosaic depicting the diversity of life, in fact, it is the taxonomic treatment of each taxon included in the publication that is such a stone. From the very beginning of taxonomy starting with Linnaeus 1758 in zoology, these taxonomic treatments have been published in books including the entire known diversity. But soon thereafter, taxonomic treatments started appearing in ever more specific volumes coping with an ever smaller, more specific part of life.

The taxonomic treatments have always been part of a publication, and a part of the taxonomic hierarchy. They often include references to previous treatments of the same taxon, and with that, often implicit references to previous publications. Increasingly, figures, tables, gene sequences, references to the materials studied, and other related data have been added. The references are now becoming available as digital objects through campaigns such as iDigBio, DiSSCo and other widespread efforts of natural history collections around the world.

In a digital world, references represent links. These links allow us to follow the reference to its target, providing access to the respective content that itself can be semantically enhanced. This also allows machines to build different views of the data in a treatment, the data contained in a publication about a taxon, a collection and so forth. It enables us to understand the contribution of a single collector, of a collection or a journal to building the mosaic of life or in fact the catalogue of life.

The amount of available digital data and links in a publication could thus be termed as digitally accessible knowledge (DAK). Very pragmatically, DAK could be measured by defining various elements such as whether taxonomic names are tagged, or taxonomic treatments, citations of previous taxonomic treatments, bibliographic references, materials citations or specimen codes are present. DAK could also indicate whether a new name for a new or previously known species is available according to the Code.

One way to visualize the accessible data is by using the Global Biodiversity Information Facility (GBIF) tools. In the GBIF terminology, taxonomic publications can be understood as a collection—albeit small—of taxa with a list of materials citation or occurrences and some text about each taxon extracted from the treatment. This is not yet a quantitative measure but can serve as a qualitative illustration of how many data are present, and how they may be cited using their persistent identifier.

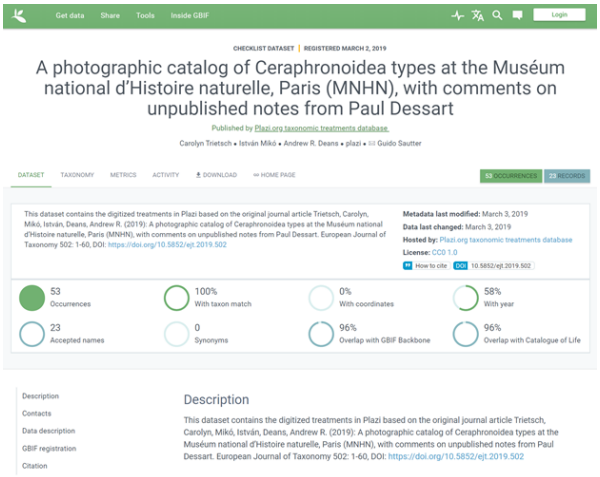


Figure 1. *The view of Trietsch et al. (2019) in the Global Biodiversity Information Facility. (link to data)*

A recently published article by Trietsch et al. (2019)

in the *European Journal of Taxonomy* is such an example (summary page: Figure 1; type specimens: Figure 2). It has been converted into a semantically enhanced document, its taxonomic treatments made citable by persistent identifiers in TreamentBank, its figures in the Biodiversity Literature Repository, and finally a Darwin Core Archive to GBIF where it may be accessed by searching for its DOI, or via a geographic or taxonomic search.

Each view in GBIF has a link to the taxonomic treatment, and from there, to the source article. In fact, this data extraction and conversion serves to promote the article by generating tens, sometimes hundreds, of links to the source article and complementing them with the data in the TreatmentBank and the Biodiversity Literature Repository.

The publication has links that are not yet embedded. Some of them are in supplementary files deposited in repositories by the authors. Others are not yet live at the respective institutions. For example, the specimen codes from the Muséum national d'Histoire naturelle in Paris cannot be linked yet because the digital objects have not been uploaded and made accessible.

This avenue also assures that every new described species is automatically updating the GBIF taxonomic backbone from where it is accessible immediately.

Because the conversion is automated, linking to external sources that are not standardized is very time consuming. This is also the case with the granularity of the tagging; the more structured a manuscript is, the more likely its elements are tagged and thus, the rate of errors minimized. Toward this goal, EJT has published guidelines on how materials citations should be published to assure their conversion.

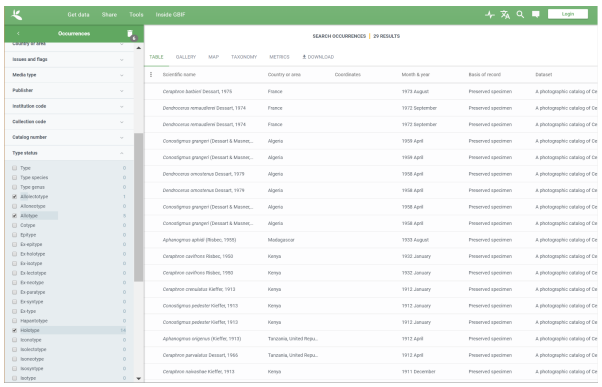


Figure 2. *The view of type specimens listed b Trietsch et al., 2019 in the Global Biodiversity Information Facility. (link to data)*

The data extraction is done using Plazi workflow and services. Tagging uses standards widely used in the biodiversity community, which enables easy import of data into GBIF. The cost of the extraction is covered by service fees and a grant from the Arcadia Fund to Plazi.

Alternative import of articles and treatments to GBIF happens via Plazi's collaboration with Pensoft where tagging is part of Pensoft's production workflow. This includes, among others, the *Journal of Hymenoptera Research* (see example `https://www.gbif.org/dataset/a0cef5e2-307d-41fd-9fd8-57f279ed65f1`) which has a lesser amount of DAK than the above mentioned work by Trietsch et al. because material citations are not tagged.

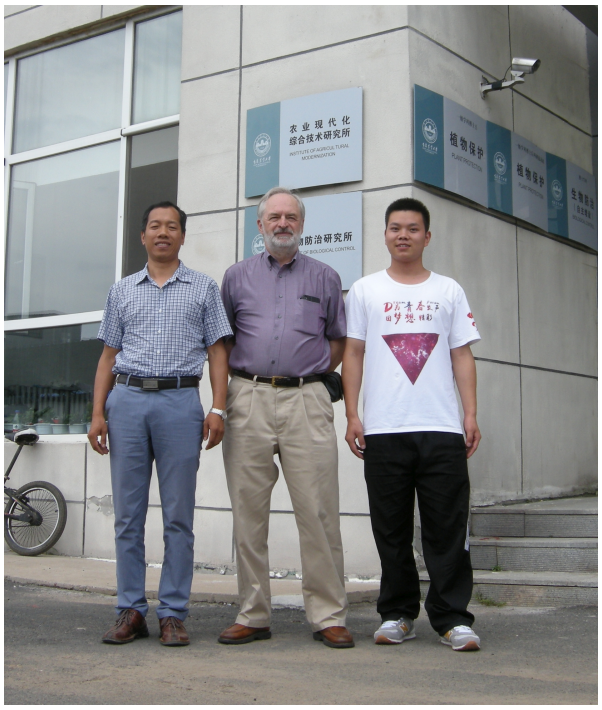
Individual authors can create more digitally accessible knowledge by publishing in journals with modern publishing workflows that are compatible with Plazi's data extraction process, or by convincing the editors of their journals of choice to follow one of the existing pathways of create their own. ○

Institute of Biological Control, Jilin Agricultural University, Changchun, China

By: *Gary A.P. Gibson, Honourary Research Associate, Canadian National Collection of Insects, Arachnids and Nematodes, Ottawa, Canada*

In July, 2018, just prior to the 9th Congress of the International Society of Hymenopterists in Japan, I was invited by Dr. Lian-Sheng Zang (lsz0415@163.com) to visit the Institute of Biological Control, Jilin Agricultural University, Changchun, China to collaborate with one of Dr. Zang's graduate students, Mr. Yong-Ming Chen (angusbio@126.com). Yong-Ming's Ph.D. research is investigating biocontrol of the Japanese giant silkworm, *Caligula japonica* Moore (Lepidoptera, Saturniidae), using egg parasitoids. The species is endemic to eastern Asia, including more than 20 provinces in China, with a host list of about 40 plant species in 30 genera and 20 families. However, in China its most serious economic effect is as a defoliator of walnut and chestnut trees, causing millions of dollars of damage annually. Part of Yong-Ming's research included setting out sentinel egg masses to survey for potential biological control agents of the pest. He was able to determine that he recovered two genera of Eupelmidae, *Anastatus* Motschulsky and *Mesocomys* Cameron, but my visit was to determine the number and identity of the species he has in culture. Answering the number of species was relatively easy—four species of *Anastatus* and two species of *Mesocomys*. However, neither genus has been comprehensively revised for China so providing reliable names is more of a problem. We are currently collaborating with Dr. Ling-Fei Peng (swizzleplf@hotmail.com), Biological Control Research Institute, Fujian Agriculture and Forestry University, Fuzhou, who is revising Chinese *Anastatus*, and I have undertaken a world revision of *Mesocomys* to provide more reliable names. Although the actual number of *Mesocomys* species in China remains unresolved, the two species in culture appear to be *M. albitarsis* (Ashmead) and *M. trabalae* Yao, Yang & Zhao. Yong-Ming's research suggests the latter species is the most promising for biocontrol of *C. caligula* and he released 200,000 specimens in a 40 ha walnut forest in Gansu Province as a field trial in 2018. Results are

yet to be evaluated, but if positive Yong-Ming will vastly ramp up production of this eupelmid for wider release across the province and China.



Left to right: Lian-Sheng Zang, Gary Gibson and Yong-Ming Chen at entrance of Institute of Biological Control, Jilin Agricultural University

While visiting the Institute I also had the opportunity to tour their *Trichogramma* factory, which is very impressive. Five species of *Trichogramma* (*T. dendrolimi* Matsumura, *T. japonicum* Ashmead, *T. leucaniae* Pang & Chen, *T. chilonis* Ishii and *T. ostriniae* Pang & Chen) are cultured using the intermediate hosts *Antheraea pernyi* Guérin-Méneville (Lep., Saturniidae) and *Corcyra cephalonica* (Stainton) (Lep., Pyralidae). The first three *Trichogramma* species are released, respectively, against the European corn borer, *Ostrinia nubilalis* (Hübner) and the striped rice stem borer *Chilo suppressalis* (Walker) (Lep., Crambidae), and the soybean pod borer *Leguminivora glycinivorella* Matsumura (Lep., Tortricidae). About 225,000 parasitoids are released per hectare for the corn borer, with an average of about 300,000 hectares treated annually since 2003. Approximately 450,000 parasitoids are released per hectare for both the rice and soybean borers, with about 50,000 hectares treated annually for the rice borer since 2014 and, starting just this year, 400 hectares for the soybean pod borer. You can do the math relative to the total number of *Trichogramma* reared each year. One of the more interesting aspects of the tour was examining the drone they use to drop biodegradable spherical balls made from corn starch, which contain the host eggs parasitized by the *Trichogramma*. Two different types of balls are used depending on dry field or paddy release, with those dropped over paddies designed to float with the exit for the emerging parasitoids above the surface of the water. Also maintained in culture are *Encarsia formosa* Gahan, *E. sophia* (Girault & Dodd) and *Eretmocerus hayati* Zolnerowich & Rose (Aphelinidae) for release against the greenhouse whitefly *Trialeurodes vaporariorum* (Hemiptera, Aleyrodidae), as well as *Chouioia cunea* Yang (Eulophidae) against the fall webworm, *Hyphantria cunea* (Drury) (Lep., Erebidae), and *Harmonia axyridis* (Pallas) (Coleoptera, Coccinellidae) against aphids.

If any of the research, taxa or mass rearing discussed above is of interest to you then please email the relevant individual. ○

The (Unpublished) Works of Paul Dessart

By: *Carolyn Trietsch, Frost Entomological Museum, Penn State, University Park, PA USA*

This year, we got an early Christmas gift from Theo Peeters, a hymenopterist working on parasitoids in the Netherlands. He sent us an unpublished manuscript from Paul Dessart, a taxonomist who did most of the work on Ceraphronoidea between 1962 to 2001. Theo had received the manuscript while requesting other papers from a researcher at the Royal Belgian Institute of Natural Sciences in Brussels, where Dessart worked.

Paul Dessart revolutionized the way Ceraphronoidea was studied by using male genitalia characters to differentiate species, and by publishing detailed illustrations of specimens showing key characters for identification. His work has had a huge influence on the way that we now study Ceraphronoidea. I feel like most of the work I've been doing has been tracing Dessart's path through Ceraphronoidea. I've written about this in the past (published in *Hamuli* 8(2): 5–6) and I actually have a manuscript in press right now that includes some of Dessart's unpublished species notes that I found at the Natural History Museum in Paris.

The unpublished Dessart manuscript Theo sent us is titled "Historique illustre des Ceraphronidae (Hymenoptera)". Dessart provides year-by-year summaries and descriptions of everyone who worked on Ceraphronoidea, going all the way back to Jurine and Panzer in the early 1800s! One of my favorite parts is that he divides the history of Ceraphronoidea into pre-Kieffer and post-Kieffer periods (J.J. Kieffer did extensive work on the group in the early 1900s, though not always with the best results. I translated a key where one character to differentiate species was essentially "tip of abdomen open" and "tip of abdomen closed").

Theo specified that it was an unfinished manuscript, but it's pretty darn extensive at 289 pages long, complete with illustrations and cover images of major publications. We would definitely need someone fluent in French to

help us review it before it can be published, but I would hate to see something that Dessart put this much work into get lost forever.

Have any of our readers ever published the work of past researchers posthumously before? We would love to hear your stories and advice. ○

Potential model organism (parasitoid wasp) looking for a new home

By: *Robert W. Matthews, Department of Entomology, University of Georgia, Athens, GA 30606 rwmatthews@gmail.com*

Melittobia (Eulophidae) are classic Hamiltonian species—gregariously developing, strongly female-biased sex ratio, sib-mating—easily maintained on a once-monthly reculture regime (Matthews et al., 2009). In nature *Melittobia* parasitize a variety of solitary wasps and bees; in the laboratory, they thrive on pupae of a factitious host, *Sarcophaga bullata*, available from biological supply houses (e.g., Carolina Biological). For many years I have continuously maintained cultures of 6 species of *Melittobia*, with some species duplicated from diverse geographical localities (e.g., Japan, Ukraine, Australia). Cultures require minimal space and do well at room temperatures or in an incubator; some have been maintained for more than 150 generations. Each culture yields 200–300 individual wasps per generation (30 days). Adults display inter- and intra-sexual dimorphism (eyeless, flightless males; short- and long-winged females) and have interesting sexual/courtship behavior. *Melittobia digitata*, also called the "WOWBug", has been promoted for teaching science inquiry in pre-college science curricula (Matthews et al. 1996). For capturing student interest, it is hard to top a little insect that hops and plays possum, produces several hundred offspring (95% of them female), and has blind males who cannibalize their brothers and mate with their sisters!

Melittobia digitata*, male (left), female (right)*

As I am now retired, I am looking to identify someone interested in taking over and continuing these wasp cultures, preferably someone who might use *Melittobia* in a comparative research program in biology, genetics, and/or in science curriculum development.

Please contact me for further information at rwmatthews@gmail.com. ○

References:

- Matthews, R.W., Koball, T.R., Flage, L.R., and E.J. Pyle. 1996. *WOWBUGS: New Life for Life Science*. Riverview Press, Athens, GA. 318 pp. ISBN 1888499-06-0.
- Matthews, R.W., Gonzalez, J.M., Matthews, J.R., and L.D. Deyrup. 2009. Biology of the parasitoid *Melittobia* (Hymenoptera: Eulophidae). *Annu. Rev. Entomol*. 2009, 251–66. DOI: 10.1146/annurev.ento.54.110807.090440

Congress Report: Huayan Chen

By: *Huayan Chen, Department of Entomology, The Ohio State University, Columbus, OH, USA*

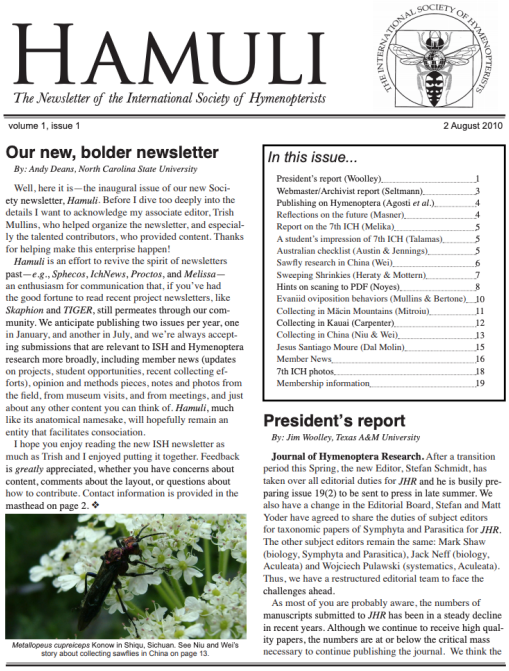
When applying for the 9th ISH student travel award, applicants needed to state how the award would enhance his/her research. My presentation was focusing on the cryptic diversity of the egg parasitoid *Telenomus podisi* Ashmead, which is an important natural enemy of many phytophagous Pentatomidae species. So my statement emphasized the importance of *T. podisi* in biological control and the importance of networking with other hymenopterists to myself. But from the very first day of the congress in Matsuyama, I knew I would get much more than I expected.

My oral presentation was kind of about phylogeography of *T. podisi* but was assigned in the phylogenomic section for unknown reasons. Although my talk didn't fit the theme of the section very well, I got very valuable feedback after the talk and during coffee breaks. Dr. Andy Polaszek offered to help in morphological examination of the specimens I have studied. Dr. Matt Buffington proposed to use Ultra Conserved Elements (UCEs) to investigate species delimitation of *T. podisi*. When I am writing this report, about 120 DNA samples of our *T. podisi* project are waiting for UCE analysis in Matt's lab. Sometimes things can go very unexpected! This was my second time attending an ISH congress, but I was still so impressed by the supportiveness of Society members.

Other than the support and collaboration I got for my research, attending the conference itself was enjoyable. It was a great opportunity to see how well-known hymenopterists have been working on interesting projects and how they present their research. I was amazed by the many kinds of approaches they are applying and their clear and sometimes entertaining delivery. I still remember Andy's joke about the black whitefly.

I would like to thank ISH for awarding me one of the travel awards, which gave me the opportunity to attend this great congress and to share my research with the community. Thanks also go to the organizers of the

meetings for their excellent work in organizing such a successful meeting with high quality talks, posters, wonderful foods and cultural displays. I already look forward to attending the next congress. ○



HAMULI

The Newsletter of the International Society of Hymenopterists

volume 1, issue 1 — 2 August 2010

Our new, bolder newsletter

By: Andy Deans, North Carolina State University

Well, here it is—the inaugural issue of our new Society newsletter, *Hamuli*. Before I dive too deeply into the details I want to acknowledge my associate editor, Trish Mullins, who helped organize the newsletter, and especially the talented contributors, who provided content. Thanks for helping make this enterprise happen!

Hamuli is an effort to revive the spirit of newsletters past—*e.g.*, *Sphecos*, *IchNews*, *Proctos*, and *Melissa*—an enthusiasm for communication that, if you've had the good fortune to read recent project newsletters, like *Skaphion* and *TIGER*, still permeates through our community. We anticipate publishing two issues per year, one in January, and another in July, and we're always accepting submissions that are relevant to ISH and Hymenoptera research more broadly, including member news (updates on projects, student opportunities, recent collecting efforts), opinion and methods pieces, notes and photos from the field, from museum visits, and from meetings, and just about any other content you can think of. *Hamuli*, much like its anatomical namesake, will hopefully remain an entity that facilitates consociation.

I hope you enjoy reading the new ISH newsletter as much as Trish and I enjoyed putting it together. Feedback is *greatly* appreciated, whether you have concerns about content, comments about the layout, or questions about how to contribute. Contact information is provided in the masthead on page 2. ❖

Metallopeus cupreiceps Konow in Shiqu, Sichuan. See Niu and Wei's story about collecting sawflies in China on page 13.

In this issue...

President's report

By: Jim Woolley, Texas A&M University

Journal of Hymenoptera Research. After a transition period this Spring, the new Editor, Stefan Schmidt, has taken over all editorial duties for *JHR* and he is busily preparing issue 19(2) to be sent to press in late summer. We also have a change in the Editorial Board, Stefan and Matt Yoder have agreed to share the duties of subject editors for taxonomic papers of Symphyta and Parasitica for *JHR*. The other subject editors remain the same: Mark Shaw (biology, Symphyta and Parasitica), Jack Neff (biology, Aculeata) and Wojciech Pulawski (systematics, Aculeata). Thus, we have a restructured editorial team to face the challenges ahead.

As most of you are probably aware, the numbers of manuscripts submitted to *JHR* has been in a steady decline in recent years. Although we continue to receive high quality papers, the numbers are at or below the critical mass necessary to continue publishing the journal. We think the

Hamuli *volume 1, issue 1*

Passing the *Hamuli* baton

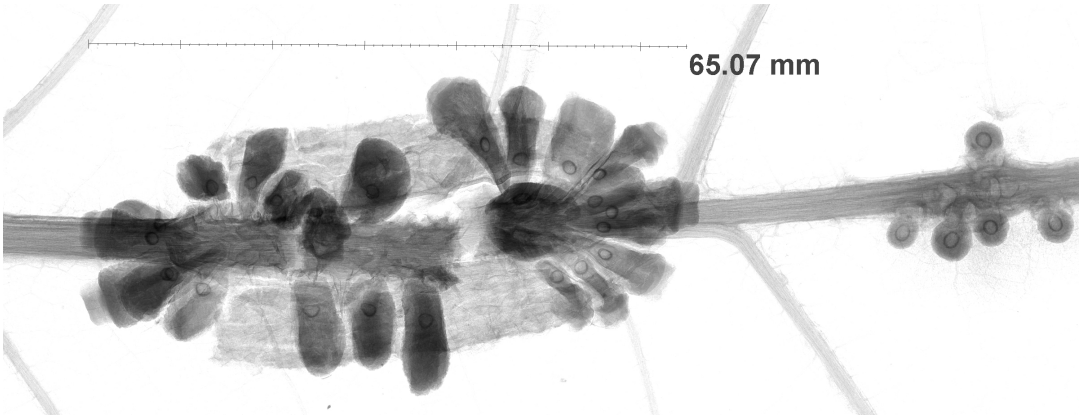
By: *Andrew R. Deans, Frost Entomological Museum, Penn State, University Park, PA USA*

Ten years ago, while serving as secretary of ISH, I decided to resurrect and formalize our Society newsletter. The result was *Hamuli*, which I hoped would facilitate fellowship and closer association between hymenopterists, much like the various newsletters that preceded it. Content has waxed and waned with field seasons, professional meetings, and other activities, but overall this newsletter has been a joy to put together and share. Now I must pass the torch to a new editor, to be named (hopefully!) in the next issue—my last as editor, at least for now. If you would like to be considered please send me an email. I will gladly make sure there is a smooth transition between volumes. ○

Who's that hymenopterist?

Can you name this hymenopterist?
The year was 1962, and the photo was contributed by Lubo Masner. Find the answer on the bottom of the last page.

Parting shot



Dryocosmus deciduus *(Beutenmüller, 1913) galls on* Quercus. *Can we use X-rays to better understand gall architecture? Image by Nathan Derstine.*

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Answer: Who is that hymenopterist on page 5? G.E.J. Nixon, in front of entrance to Natural History Museum, London. Nixon published on Braconidae, especially Old World *Apanteles*, and wrote the volumes on Diapriidae: Belytinae (1957) and Diapriinae (1980) in the *Handbook for the identification of British Insects* series. Thanks to Lubo for sharing this photo!