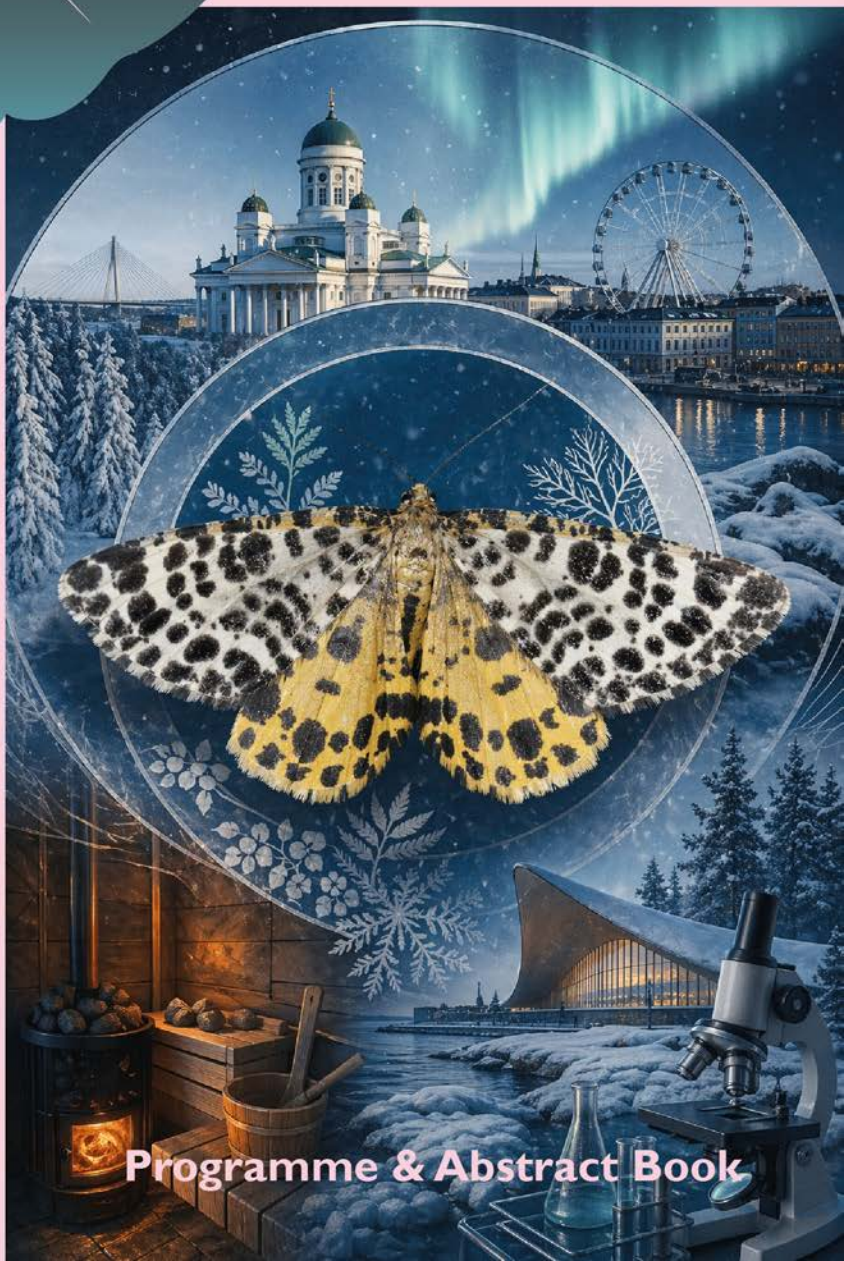
Forum Herbulot

# XIII INTERNATIONAL CONGRESS OF FORUM HERBULOT

29 June - 2 July 2026

Espoo, Finland



## Programme & Abstract Book

# PROGRAMME AND

# ABSTRACT BOOK

## XIII International congress of Forum Herbulot

29 June - 2 July 2026
Espoo, Finland

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# ABSTRACT BOOK

## XIII International congress of Forum Herbulot

29 June - 2 July 2026
Espoo, Finland

**ORGANISED BY**
Forum Herbulot
Finnish Museum of Natural History, University of Helsinki, Finland
State Museum of Natural History, Stuttgart, Germany

**ORGANISING COMMITTEE**
Pasi Sihvonen, Maria Heikkilä, Mikael Englund, Kyung Min Lee, Elena Kochanova & Hossein Rajaei

**Sponsored by**
Federation of Finnish Learned Societies, Lepidopterological Society of Finland, Pentti Tuomikoski fund, Entolight Systems, Tibiale Ltd, Entomological Society of Finland

**EDITORS & DESIGNERS**
Hossein Rajaei & Pasi Sihvonen

**VENUE**
Hotel Lepolampi, Kivilammentie 1, 02820 Espoo, Finland
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**HOMEPAGES**
http://www.herbulot.de/
https://geometroidea.smns-bw.org/

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**COVER PHOTO**
*Arichanna melanaria* (Linnaeus, 1758) is a widespread Eurasian species that is genetically fairly uniform but locally adapted. In northern Europe it is active both day and night, overwinters as a caterpillar, and inhabits wetlands. In central Europe it is nocturnal and overwinters as an egg, while in South Korea it is common in mountainous areas. The caterpillar is oligophagous on *Vaccinium uliginosum* and *Rhododendron*. The species will probably be observed during the congress.

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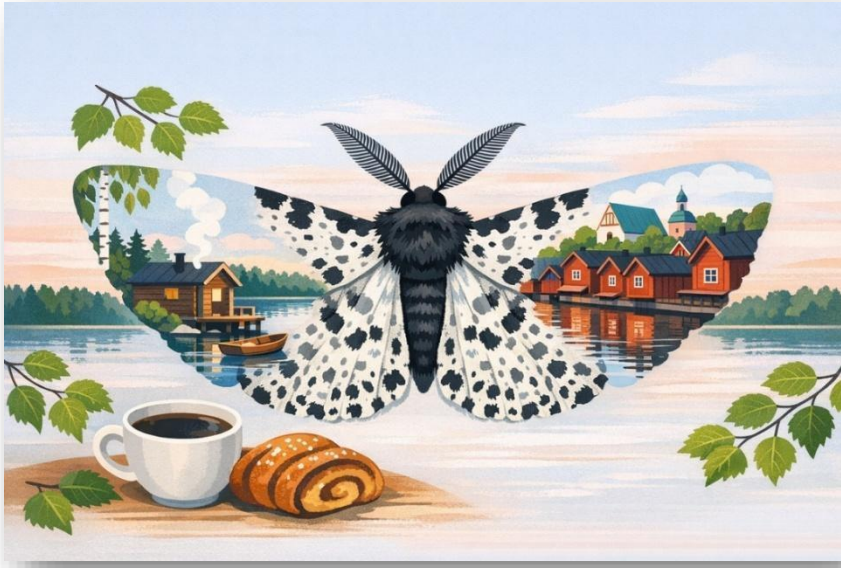

## PROGRAMME, short glance

**Sunday, 28.6.2026**
Arrival, accommodation, light trapping

**Monday, 29.6.2026**
Opening & welcome message
Presentations
Sauna, dinner, light trapping

**Tuesday, 30.6.2026**
Presentations
Sauna, dinner, light trapping

**Wednesday, 1.7.2026**
Visit to the Haltia Nature Centre in Nuuksio National Park, Espoo
Visit to the Finnish Museum of Natural History, Helsinki
Visit to the Entomological store Tibiale, Helsinki
Dinner, sauna, light trapping

**Thursday, 2.7.2026**
Presentations
Closure
Gala dinner, sauna, light trapping

**Friday, 3.7.2026**
Departure

| Sunday, 28.6.2026 | |
|---|---|
| | Arrival (rooms are available from 15.00 onwards) |
| The hotel restaurant is open and food is available | |
| 17:00- | Setting up traps for moth collecting |

| Monday, 29.6.2026 | |
|---|---|
| Note: Only presenting author is given here (full list of authors are available on the abstract pages) | |
| 06:00-09:00 | BREAKFAST |
| 09:40-10:00 | Pasi Sihvonen and Organizing Committee<br>Welcome Message, acknowledgments and overview of congress |
| 10:00-10:10 | Lepolampi staff<br>Practicalities |
| 10:10-10:50 | Sille Holm (PLENARY LECTURE)<br>Tracing hostplant specialisation in declining tropical forests |
| 10:50-11:20 | BREAK |
| 11:20-11:40 | Axel Hausmann<br>Lepidoptera collected during Forum Herbulot in South Africa and identified via DNA barcoding |
| 11:40-12:00 | Feza Can<br>Contribution to the knowledge of the Geometridae (Lepidoptera) in north-eastern Türkiye |
| 12.00–12.20 | Anne Duplouy<br>The hidden microbial diversity associated with Lepidoptera |
| 12:30-14:00 | LUNCH, PREPARING SPECIMENS & NETWORKING |
| 14:00-14:20 | Paola Ancajima Georgette<br>A little-explored synapomorphy in Lepidoptera: the epiphyses and their variations in Sphingidae |
| 14:20-14:40 | Gyula Laszlo<br>Integrative taxonomic revision of the genus *Rhodophthitus* Butler, 1880 (Lepidoptera, Geometridae, Ennominae) |
| 14:40-15:00 | Mikael Englund<br>Quantitative image analysis in geometrid taxonomy |
| 15:00-15:40 | COFFEE / TEA BREAK |
| 15:40-16:00 | Markus Rantala<br>Comparison of different LED light systems and how they attract geometrid moths |
| 16.00–16.30 | Pasi Sihvonen<br>Overview of Finnish Lepidoptera: diversity, conservation, and research |
| 16:30-18:00 | Sauna for women |
| 18:00-19:00 | BUFFET DINNER |
| 19:00-20:30 | Sauna for men<br>Setting up traps for moth collecting |

| Tuesday, 30.6.2026 | |
|---|---|
| 06:00-09:00 | BREAKFAST |
| 09:00-10:00 | PREPARING SPECIMENS |
| 10:00-10:40 | Pritha Dey (Plenary Lecture)<br>Traits and Tactics: How moth traits influence their ecology |
| 10:40-11:00 | Giada Zucco<br>Plantations of the non-native *Pseudotsuga menziesii* as surrogate of *Abies alba* forests for Geometrids in Southern Italy |
| 11:00-11:20 | Hermann Staude<br>The Lisima Wilderness Project, exploring geometrid moths in the highlands of Angola |
| 11:20-11:40 | COFFEE / TEA BREAK |
| 11:40-12:00 | Chang-Gyu Park<br>Different responses of moths to environmental changes- a review at the family or subfamily levels |
| 12:00-12:20 | Anssi Vähätalo<br>Defining the seasonal window of artificial light at night impacts on moths using 1.4 million records across Northern Europe |
| 12:30-13:45 | LUNCH & PREPARING SPECIMENS & NETWORKING |
| 13:45-14:00 | **CONFERENCE PHOTO** |
| 14:00-14:20 | Simeão Souza Moraes<br>Unveiling cryptic diversity: integrative taxonomy discovers eight new species of *Eois* moths and exposes biodiversity shortfalls in a Neotropical region |
| 14:20-14:40 | Wendy Zhang<br>How can curiosity change the way we see insects? Creative approaches to insect outreach |
| 14.40–15.20 | **SURPRISE!** |
| 15:20-15:50 | COFFEE BREAK |
| 15.50–16.10 | Reima Leinonen<br>The Lepidopterological Society of Finland |
| 16.10–16.30 | Ida-Maria Huikkonen<br>Finnish moth monitoring scheme – national results regarding Geometroidea |
| 16:30-18:00 | Sauna for women |
| 18:00-19:00 | BUFFET DINNER |
| 19:00-20:30 | Sauna for men<br>Setting up traps for moth collecting |

| Wednesday, 1.7.2026 Excursion day | |
|---|---|
| 06:00-09:00 | Breakfast |
| 09:50 | Get together at parking lot |
| 10:00 | Bus leaves |
| 10:15-11:15 | Visiting Haltia Nature Center https://haltia.com/<br>Nuuksiontie 84, 02820 Espoo |
| 12:00-13:00 | Lunch at Finnish Museum of Natural History |
| 13:00-15:00 | Visit to the collections<br>Visit to the public exhibition |
| 15:00-15:30 | Coffee break |
| 15:30 | Bus leaves |
| 16:00 | Visiting Helsinki Cathedral and National Library |
| 17:00 | Bus leaves |
| 17.30 | Visiting Entomological Store Tibiale https://www.tibiale.fi/ |
| 18:30 | Bus leaves |
| 19.00 | Arrival at Lepolampi Hotel |
| 19:00-20:00 | Buffet Dinner |
| | Setting up traps for moth collecting |

| Thursday, 2.7.2026 | |
|---|---|
| 06:00-09:00 | Breakfast |
| 09:40-10:20 | Marianne Espeland (Plenary Lecture)<br>High-throughput sequencing and museomics: A new era for Lepidoptera systematics |
| 10:20-10:40 | Da-Hee Jin<br>A Phylogenetic Study of Korean Epipleminae (Lepidoptera: Uraniidae) |
| 10:40-11:20 | Coffee break |
| 11:20-12:20 | Elena Kochanova and Kyung Min Lee<br>Workshop: The hitchhiker's guide to phylogeny: a practical workshop of DNA barcodes analysis |
| 12:30-13:40 | Lunch & Preparing specimens & Networking |
| 13.40–14.00 | Paola Ancajima Georgette<br>Filling gaps on the biodiversity knowledge in the genus *Agylla* Walker, 1854 (Lithosiini, Arctiinae, Erebidae) |
| 14.00–14.20 | Leo Vähätalo<br>101 new species of Coleophora (Gelechioidea: Coleophoridae) to Georgia (Caucasus) – what about Geometridae? |
| 14.20–14.40 | Claude Tautel<br>Redefining Desmobathrinae and Epidesmiinae on a morphological basis (Geometridae) |
| 14:40-15:20 | Coffee break |

| | |
|---|---|
| 15.20–16.00 | Leidys Murillo Ramos (PLENARY LECTURE)<br>The structure of geometrid moth diversity |
| 16.00–16.20 | Robyn Crowther<br>Unlocking a Global Resource: Digitising the NHMUK Geometridae Collection through DiSSCo UK |
| 16.20–16.40 | Hossein Rajaei<br>The second edition of the world catalogue of the Geometrid moths is now online |
| 16.40–17.00 | Final words and plans for Forum Herbulot 2028 |
| (16:00-18:00 | Sauna for women) |
| (18:00-20:00 | Sauna for men) |
| 19:00 | GALA DINNER |

| **Friday, 3.7.2026** | |
|---|---|
| 06:00-09:00 | BREAKFAST |
| 12:00 | CHECK-OUT |

## THINGS TO DO AND SEE FOR ACCOMPANYING PERSONS

The Organizing Committee will not arrange a program for accompanying persons. The congress venue is close to Helsinki and the capital region, it is accessible by public transport, and it is safe wonder around anywhere in Finland. We encourage the accompanying persons to get together and plan their own activities.

Potential places to see include the city center of Helsinki, including the Market place (see photo), Helsinki cathedral (Evangelical Lutheran church), Uspenski cathedral (Orthodox church), numerous art exhibitions (e.g. Ateneum Art Museum, Museum of Contemporary Art Kiasma, Amos Rex Art Museum), shopping (e.g. Kamppi shopping centre, Aleksanterinkatu and nearby shopping streets, Stockmann department store, Old Market Hall (Kauppahalli), flea markets), or World Heritage Site Suomenlinna, a sea fortress accessible by ferry from the Market place.

Kauppatori (Market place) is a vivid place in the city center of Helsinki, filled with a variety of local delicacies, handcraft and season's specialities such as berries and fish. Uspenski Cathedral is visible in the background.


FINLAND
Forum Herbulot XIII

## TRACING HOSTPLANT SPECIALISATION IN DECLINING TROPICAL FORESTS

***Sille Holm***
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**Abstract**. For the past fifteen years, I have had the privilege of studying tropical Lepidoptera in some of the world's most biodiverse yet vulnerable ecosystems in the Afrotropical forests of Uganda and the Neotropical Atlantic forests of Brazil. These experiences have offered insights into the ecological and social complexity of tropical forest ecosystems, the drivers behind forest decline, and the ongoing restoration efforts. This work has brought moments of profound wonder and scientific inspiration, but also deep helplessness as a biologist witnessing biodiversity loss first-hand. I will offer a humble personal perspective on how each of us can continue the fight for biodiversity. Secondly, I will present current advances from the SPECTRO project, which investigates the causes and consequences of higher hostplant specialisation in tropical butterflies. We aim to evaluate whether the perceived higher specialisation in the tropics holds true or is partly an artefact of data scarcity. By identifying host-associated gene modules, we assess whether tropical species have more specialised "tools" than their temperate relatives. In parallel, we are compiling data on the fundamental and realised host repertoires (Braga and Janz 2021) of tropical Nymphalini and Melitaeini species. Finally, I will introduce plans for the project GHost. Building on previous (Holm et al. 2018; Holm et al. 2019) and ongoing work, GHost aims to map geometrid moth host repertoires and study the level of specialization in the tropical vs temperate regions. Both SPECTRO and GHost forecast the future of the species in the face of continued tropical forest loss.

**Keywords.** plant herbivore co-evolution, host-plant specificity, diet breadth.

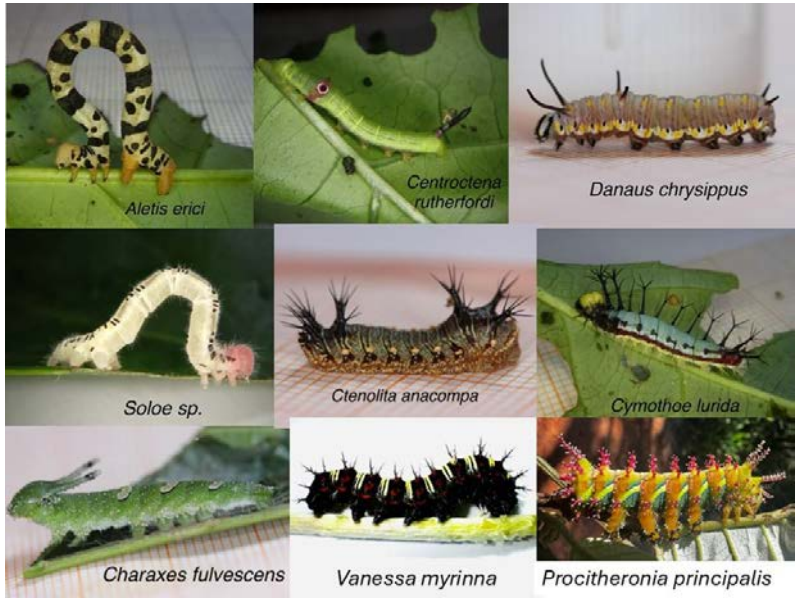
**References.**

Braga, M.P. and Janz, N. 2021. Host repertoires and changing insect–plant interactions. Ecological Entomology, 46: 1241-1253.

Holm, S., Javoiš, J., Molleman, F., Davis, R.B., Õunap, E., Roininen, H. and Tammaru, T. 2019. No Indication of High Host-Plant Specificity in Afrotropical Geometrid Moths. Journal of Insect Science, 19 (3): 1–16.

→

Holm, S., Javoiš, J., Õunap, E., Davis, R.B., Kaasik, A., Molleman, F., Tasane, T. and Tammaru, T. 2018. Reproductive behaviour indicates specificity in resource use: phylogenetic examples from temperate and tropical insects. Oikos, 127: 1113-1124.




The colourful world of caterpillars: Caterpillars have received far less attention than adult butterflies and moths, a knowledge gap that is especially pronounced for tropical species. Yet knowledge on caterpillars and their hostplants is essential for understanding species ecology and continuing the fight to conserve these species.

## LEPIDOPTERA COLLECTED DURING FORUM HERBULOT IN SOUTH AFRICA AND IDENTIFIED VIA DNA BARCODING

***Axel Hausmann*[1] & Hermann S. Staude[2]**
[1] *SNSB – Bavarian State Collection of Zoology;* [2] National Geographic Okavango Wilderness Project, Wild Bird Trust, South Africa
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**Abstract:** During two conferences of Forum Herbulot, in the years of 2012 (Mogale's Gate Biodiversity Centre) and 2025 (Conclave Country Lodge), some 9000 moths were collected by the authors. In 2012 some additional samples were obtained from Malaise traps. Altogether, tissues from 4969 moths were submitted to DNA barcoding. The best-represented groups were Erebidae (20%), Geometridae (17%), Noctuidae (11%) and Crambidae (6%). We obtained 4894 successful sequences (98.5%), belonging to 1221 genetic clusters (barcode index numbers; BINs = proxy for species numbers). Based on the reference library on BOLD, we were able to identify 'ad hoc' 656 BINs (54%) to a Linnean species name. When considering also some sequenced moths from other Forum Herbulot collectings in Tasmania, Chile and Honduras (strongly biased towards Geometridae), a total of 6291 sequences and 1722 BINs is resulting for these five conference collectings. As a "spin-off" of South African Forum Herbulot, the authors performed together three additional collection tours in South Africa (2013; 2017; 2019/2020; each one for 5-7 days only). From all five South African collecting tours 10220 lepidopteran specimens were submitted to DNA barcoding, resulting in 2829 South African BINs.

**Keywords** DNA barcoding, South Africa, Forum Herbulot, Lepidoptera, fauna exploration.

## CONTRIBUTION TO THE KNOWLEDGE OF THE GEOMETRIDAE (LEPIDOPTERA) IN NORTH-EASTERN TÜRKIYE

***Feza Can*[1] *& Serdar Akar*[2]**
*[1] Hatay Mustafa Kemal University, Faculty of Agriculture, Department of Plant Protection, Hatay, Türkiye; [2] B. Gerdelli No: 256 Süloğlu, Edirne, Türkiye*
*E-Mail: fezacan@mku.edu.tr*

**Abstract.** Some studies have been conducted to determine the Geometridae species in the central and western Black Sea region of Türkiye; however, the eastern part, except for some of the provinces included in the present study, was analysed by Can (2008). The aim of this study is to contribute to the knowledge of the flight periods and distribution areas of Geometridae species occurring in habitats with different geographical characteristics in north-eastern Türkiye, a region that has previously been insufficiently studied. The species were recorded using light traps during fieldwork conducted in July 2025, and some were collected by netting. So far, a total of 58 species have been identified. The study area covers the Eastern Black Sea and Çoruh basins, ranging from the humid coastal zones along the Black Sea to mountainous habitats reaching up to 3050 m in elevation. Samples were collected from six different provinces (Trabzon, Artvin, Rize, Giresun, Bayburt, and Gümüşhane) at altitudes ranging from sea level to 2491 m above sea level. Although the region has not been thoroughly investigated, it plays an important role in understanding the distribution patterns of species in the Caucasus, the Black Sea region, and north-eastern Asia. The results indicate high biodiversity influenced by different biogeographical regions. For a considerable number of species, the records represent an extension of their previously known distribution range in Asia Minor.

**Keywords.** Faunistic, Türkiye, Black Sea, Geometridae, Minor Asia.

**Reference.**

Can, F., 2008. The Geometrid Moths (Lepidoptera) from the Middle and Eastern Black Sea Regions of Turkey. Turkish Journal of Zoology 32, 351-358.

## THE HIDDEN MICROBIAL DIVERSITY ASSOCIATED WITH LEPIDOPTERA

***Anne Duplouy*[1], *Victoria Twort* [2], *Pasi Sihvonen*[2] & *Mikael Englund*[2]**
[1]*Faculty of Biological and Environmental Sciences, University of Helsinki, Finland;*
[2]*Finnish Museum of Natural History, University of Helsinki, Finland*
*E-Mail: anne.duplouy@helsinki.fi*

**Abstract.** Maternally inherited bacterial symbionts promote their own transmission through various manipulations of their hosts' life-histories. These microscopic organisms however often go undetected, and their effects on the host ecology and evolution remain ignored. We show that already available data, ranging from whole genome sequencing projects to species rarity point score systems, can offer easy to access preliminary evidence for hidden symbiotic infections with diverse endosymbionts, such as the widespread bacteria *Wolbachia* and *Spiroplasma*.

**Keywords**. Ecology, evolution insect symbiosis*, Spiroplasma*, *Wolbachia*.

## A LITTLE-EXPLORED SYNAPOMORPHY IN LEPIDOPTERA: THE EPIPHYSES AND THEIR VARIATIONS IN SPHINGIDAE

***Georgette Paola Ancajima*[1] & Marcelo Duarte[2]**
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**Abstract.** The presence of epiphysis is a synapomorphy for Lepidoptera, with secondary losses in some lineages. Whether present or reduced, it is located on the inner surface of each foretibia. This articulated structure is covered with cuticular protuberances called acanthae. The main function of the epiphyses is to keep the antennae clean. The epiphyses vary in shape, size, and insertion point on the foretibia among families, genera, species and even between sexes. These variations could be phylogenetically informative but are rarely used by taxonomists, mainly because of the very few detailed descriptions of this structure available in the literature. Hawkmoths (Sphingidae) have well-developed epiphyses with stiff spines on the margin of the tibial inner surface but varying in shape, size and other features. Here, we describe the variation of the epiphyses and discuss the importance of these structures for the understanding of the evolution of lepidopteran epiphyses, using as examples some species of Sphingidae.

**Keywords**. Antennal cleaner, Sexual dimorphism, Shape.

**References.**

Ancajima, G. P.. Duarte, M. 2023. Morphological variation of the epiphyses in some Ambulycini hawkmoths (Lepidoptera, Sphingidae, Smerinthinae). *Zoologischer Anzeiger*, 304, 1–9. https://doi.org/10.1016/j.jcz.2023.02.003

Ancajima, G. P.; Eloi, I., Duarte, M. 2025. Sexual dimorphism and allometric patterns in hawkmoth epiphyses (Lepidoptera: Sphingidae). *Scientific Reports*, 15,11405. https://doi.org/10.1038/s41598-025-86837-8

Philpott, A. 1924. The tibial strigil of the Lepidoptera. *Transactions and Proceedings of the Royal Society of New Zealand*, 55, 215–224. https://paperspast.natlib.govt.nz/periodicals/TPRSNZ1924-55.2.10.1.15

## INTEGRATIVE TAXONOMIC REVISION OF THE GENUS *RHODOPHTHITUS* BUTLER, 1880 (LEPIDOPTERA, GEOMETRIDAE, ENNOMINAE)

***Gyula M. László*[1] & Axel Hausmann[2]**

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**Abstract.** This study presents an integrative taxonomic revision of the Afrotropical ennomine genus *Rhodophthitus* Butler, 1880. Combined morphological evidence and Maximum Likelihood analysis of COI-5P DNA barcodes show that *Rhodophthitus* is restricted to two Madagascan endemics, *R. formosus* and *R. betsileanus*. All mainland African species previously assigned to the genus are reassigned based on clear phylogenetic and diagnostic morphological differences. The genus *Nothabraxas* Warren, 1897, is reinstated and expanded to include 11 previously described species, alongside 12 newly recognized species-group taxa. Two additional genera are established: *Proutabraxas* gen. nov., comprising two species formerly placed in *Rhodophthitus*; and *Rhodochanna* gen. nov., which includes two reclassified species and three newly described taxa. Together, these results substantially restructure the taxonomy of this lineage, clarify long-standing misplacements, and highlight previously unrecognized diversity within the Afrotropical Ennominae.

**Keywords.** Afrotropics, cryptic taxa, DNA barcode, new taxa.

**References.**

Butler, A.G. 1880. On a collection of Lepidoptera from Madagascar with descriptions of new genera and species. *Annals and Magazine of Natural History*, (5) 5(28), 333–344.

Prout, L.B. 1915. New genera and species of African Geometridae. *Novitates Zoologicae*, 22, 311–385.

Warren, W. 1897. New genera and species of moths from the Old-World regions in the Tring Museum. *Novitates Zoologicae*, 4, 12–130.

## QUANTITATIVE IMAGE ANALYSIS IN GEOMETRID TAXONOMY

***Mikael Englund[1]; George Hancock[2], Elina Laiho[1]; Johanna Mappes[3]; Pasi Sihvonen[1]; Max Söderholm[1]; Alpo Turunen[4] & Kyung Min Lee[1]***

*[1]Zoology Unit, Finnish Museum of Natural History, University of Helsinki, Helsinki, Finland;*
*[2]Centre for Ecology & Conservation, University of Exeter, Penryn, United Kingdom;*
*[3]Organismal and Evolutionary Biology Research Programme, Faculty of Biological and Environmental Sciences, University of Helsinki, Helsinki, Finland;*
*[4]Biodiversity Information Facility, Finnish Museum of Natural History, University of Helsinki, Finland.*
*E-Mail: mikael.englund@helsinki.fi*

**Abstract.** The shoulder stripe moth *Earophila badiata* (Denis & Schiffermüller, 1775) has recently colonized southern Finland, bridging a formerly unoccupied zone between the southwestern population (*E. badiata ssp. badiata*) and the eastern population (*E. badiata ssp. fennokarelica*). To clarify the origin of the colonizers and assess potential hybridization, we first undertook a comprehensive revision of the *E. badiata* species group across the Palearctic region. We analysed 111 specimens using an integrative approach combining quantitative wing image analysis, genitalia morphology including micro-CT imaging, and mtCOI phylogeny. Material comprised the *E. badiata* species group, including *E. badiata* subspecific taxa ssp. *badiata*, ssp. *fennokarelica,* and ssp*. tellensis*, and specific taxa *E. kolomietsi* and *E. pseudobadiata*. Wing image analyses revealed pronounced sexual dimorphism but only weak divergence between the two Finnish subspecies. Scale loss significantly affected forewing appearance. Comparisons of genitalia showed no consistent diagnostic differences among the subspecies or the closely related taxa. Molecular analyses supported monophyly of the *E. badiata* group and revealed shallow genetic divergence (≤0.63%) among ssp. *badiata*, ssp. *fennokarelica*, and *E. kolomietsi*. Overall, our results do not support species- or subspecies-level distinctions among the examined Eurasian taxa. We conclude (Englund et al. 2026) that the recognized subspecies likely represent geographic morphotypes rather than distinct taxonomic entities. Accordingly, we treat *E. badiata* as a single variable species and propose synonymizing *E. badiata* ssp. *fennokarelica*, *E. kolomietsi*, and *E. pseudobadiata* with *E. badiata*. Our results render the original research questions unanswered, since we could not confirm any consistent criteria for delimiting the taxon *E. badiata* taxon *fennokarelica* from the nominate form of *E. badiata*.

→

**Keywords**. Quantitative image analysis, integrative taxonomy, taxa delimitation, wing pattern variation, population genetics.

**References**.

Englund M, Hancock G, Laiho E, Mappes J, Sihvonen P, Söderholm M, Turunen A, Lee KM. 2026. Quantitative image analysis applied to revise the taxonomy of the Palearctic *Earophila badiata* species group (Lepidoptera: Geometridae: Larentiinae). PeerJ 14:e20620. https://doi.org/10.7717/peerj.20620

## COMPARISON OF DIFFERENT LED LIGHT SYSTEMS AND HOW THEY ATTRACT GEOMETRID MOTHS

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**Abstract.** Light sources with a high proportion of ultraviolet (UV) radiation are known to attract a greater number of insect individuals and more taxa than other light sources. Recently, LED lights have become increasingly common in insect collecting due to their attractive capacity, and because the lights are durable, light to carry, and consume less energy than other light sources. In this presentation I will cover the technical details of LED lights developed by EntoLight Systems https://www.entolight.fi/ including Twincolor and Multicolor models. I will share insights on how to use LED lights in general to maximize their attractiveness and provide practical advice on LED light collecting. The presentation also summarises the results from my experimental work comparing the attractiveness of family Geometridae and other nocturnal Lepidoptera families to LED light sources.

LED lights developed by EntoLight Systems. Left: Multicolor (5V 7W). Right: Twincolor trap.

**Keywords**. EntoLight Systems, UV radiation, LED light, Geometridae, nocturnal Lepidoptera.

## OVERVIEW OF FINNISH LEPIDOPTERA: DIVERSITY, CONSERVATION, AND RESEARCH

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**Abstract.** The presentation provides an overview of Finnish Lepidoptera, which currently includes 2,695 species, of which approximately 2,300 are considered established residents (FinBIF 2025). This fauna is among the best studied in the world: for the majority of species life history, phenology, distribution, and abundance are known, extensive literature and online sources cover the fauna and DNA barcodes are available for all species. The largest families in terms of species richness are Noctuidae (441 species), Tortricidae (417), and Geometridae (332). In total, the fauna is classified into 69 families. More than 90% of the Lepidoptera fauna (2,362 taxa in 2019) has been assessed using the IUCN Red List Categories and Criteria. In that assessment, 716 species (30.3%) were classified as threatened or near threatened (Nupponen et al. 2019). The most important causes of population declines include the overgrowth of open habitats, the reduction of fire-affected areas and other early successional habitats, large population fluctuations and weather conditions, construction, and, increasingly, climate change. The presentation will also cover the zoogeography of Finnish Lepidoptera and illustrate examples of different habitat types and notable species, particularly geometrid moths. In addition, it will discuss the reasons why the fauna is so well known, highlighting the importance of citizen scientists, long-term monitoring programs, data curation (notably the Finnish Biodiversity Info Facility https://laji.fi/), and gives examples of Lepidoptera research led by Finnish researchers.

**Keywords** Lepidoptera, fauna, overview, Finland.

**References.**

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## TRAITS AND TACTICS: HOW MOTH TRAITS INFLUENCE THEIR ECOLOGY

***Pritha Dey[1], Rohini Balakrishnan[2], Max Söderholm[3] & Pasi Sihvonen[3]***
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**Abstract.** Trait-based approaches provide a powerful framework for understanding how ecological interactions and environmental gradients shape community structure and evolutionary responses. Here, we integrate morphological, functional, and sensory traits to examine how species interactions and environmental variation influence biodiversity patterns. Along a 1500 m elevational gradient in the western Himalayas, 697 specimens representing 120 geometrid species were analyzed to assess species diversity, turnover, and traits associated with thermoregulation and flight performance. Although species diversity declined with elevation and turnover was pronounced, assemblage-level traits linked to thermal sensitivity (body size) and flight capability (wing loading and manoeuvrability) remained consistent. The absence of significant niche differentiation suggests functional redundancy across elevations, where species with similar ecological roles replace one another, maintaining stable trait distributions despite compositional shifts. These findings demonstrate how trait-based analyses can reveal underlying functional stability that is not apparent from species richness patterns alone. To further explore how traits mediate ecological interactions, predator–prey dynamics were examined through a three-year dietary analysis of the lesser false vampire bat alongside seasonal sampling of moth communities in the Western Ghats. Selective predation was evident: larger moths with lower flight manoeuvrability, particularly members of Hepialidae and Sphingidae were disproportionately consumed, especially during the wet season. Extending the trait-based framework to sensory ecology, micro-CT imaging of 19 geometrid species revealed that diurnal moths possessed relatively larger tympanal organs than nocturnal species, challenging assumptions about bat-driven selection. Tympanal size showed no clear scaling with body size, and ansa morphology exhibited limited divergence, suggesting functional constraints in auditory evolution. Together, these studies highlight how trait-based approaches can uncover the mechanisms linking environmental gradients, species interactions, and sensory evolution, offering predictive insights into moth community resilience under environmental change.

**Keywords.** Morphology, prey-predator interaction, community ecology.

## PLANTATIONS OF THE NON-NATIVE *PSEUDOTSUGA MENZIESII* AS SURROGATE OF *ABIES ALBA* FORESTS FOR GEOMETRIDS IN SOUTHERN ITALY

***Giada Zucco[1], Carlo Di Marco[2], Lorenzo Di Marco[2], Sara La Cava[3] & Stefano Scalercio[2]***
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**Abstract.** Reforestation has long been used to restore degraded mountain landscapes across the Mediterranean region. In many areas, this process has relied on non-native conifers, raising concerns about their ecological consequences, particularly for forest biodiversity and ecosystem functioning. Lepidoptera, such as Geometridae, are sensitive indicators of forest structure and composition, and can provide insights into the ecological outcomes of reforestation practices. This study explores whether plantations of non-native *Pseudotsuga menziesii* in the Aspromonte National Park (southern Italy) may support moth assemblages comparable to those in native *Abies alba* forests. Geometrid communities were sampled using light traps in silver fir stands, Douglas fir plantations, and pine forests. Community patterns were analysed through non-metric multidimensional scaling (NMDS) and species-level association tests, considering both the entire assemblage and the subset of species trophically associated with conifers. The analyses indicate a differentiation of moth assemblages according to forest type. When the entire community is considered, Douglas fir stands occupy an intermediate position between silver fir and pine forests. When analyses are restricted to conifer-feeding species, assemblages in Douglas fir appear more similar to those of native silver fir. However, some fir-associated species are absent or less represented, suggesting only partial functional equivalence. These findings suggest that Douglas fir can maintain a substantial portion of moth assemblages linked to native fir forests, although it does not fully replicate their ecological role, and should be considered a great compromise for reforestation practices. Evaluating whether introduced tree species can support native faunal communities is therefore essential for informing forest management strategies.

**Keywords.** conifers, moths, community ecology, reforestation.

## THE LISIMA WILDERNESS PROJECT, EXPLORING GEOMETRID MOTHS IN THE HIGHLANDS OF ANGOLA

***Hermann S. Staude*[1], *Reinier F. Terblanche*[2] & *Rob W. Taylor*[1]**
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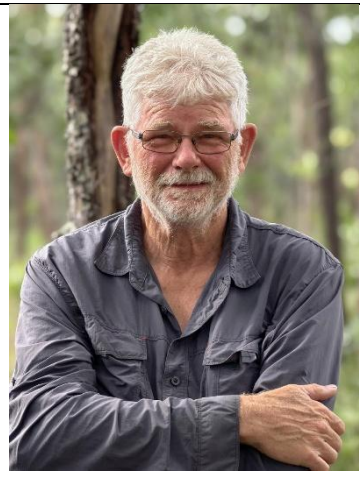
*E-mail: staudehermann@gmail.com*



**Abstract.** The National Geographic Okavango Wilderness Project, together with The Wilderness Project, aims to document the biodiversity of Lisima Lya Mwono, the eastern Angolan plateau, a critical catchment for several major rivers and a recently designated Ramsar Wetland of International Importance—the first in Angola (Miceli 2026). Despite its ecological significance, the region has remained largely understudied because decades of war and its remoteness have limited scientific access. We present some results and first impressions from two expeditions to the area recording the diversity of Geometridae (October/November 2024 and February 2026). We found elements of both Congolese tropical and Cape fynbos temperate geometrid fauna intermixed with typical Miombo woodland fauna. First impressions indicate a remarkable β-diversity over short distances, especially across the northern (Congo catchment) and southern (Okavango and Zambezi catchment) watersheds. Through rearing from larvae, found in the wild, we thus far recorded host associations for 25 geometrid species feeding on 19 plant species belonging to 13 plant families. Eight of these reared geometrids seem to be undescribed. Of the 19 host plant species, 10 can be regarded as typical to Miombo, five typical to Cape fynbos and four typical to Congolese forests. The 2024 survey yielded 155 geometrid species, 11 probably undescribed (23 Sterrhinae; three Larentiinae; 39 Geometrinae; one Desmobathrinae; 89 Ennominae). The results from the 2026 survey are not yet available.

**Keywords.** Angola, Biodiversity, Geometridae, Biogeography, Ecology.

**Reference.**

Miceli S., 2026. Angola Designates First Ever Wetland of International Importance. https://share.google/JR4aOuWyLHMeTxo6Q

## DIFFERENT RESPONSES OF MOTHS TO ENVIRONMENTAL CHANGES - A REVIEW AT THE FAMILY OR SUBFAMILY LEVELS

***Chang-Gyu Park* & *Sei-Woong Choi***
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**Abstract.** We investigated how different moth taxa respond to environmental disturbances such as logging and wildfire during forest regrowth in southern Korea. Moth assemblages varied significantly among forest types, with four taxa—Erebinae, Ennominae, Noctuidae, and Bryophilinae—showing particularly strong differences. Although overall species richness within major moth families is broadly comparable at a global scale, responses at the family and subfamily levels differed markedly depending on forest type and disturbance history. Geometridae richness was highest in mature forests, consistent with their strong association with structurally complex vegetation and sensitivity to habitat disturbance. In contrast, Erebidae and Noctuidae richness peaked in early post-logging stages, likely reflecting the high proportion of generalist species within these groups that can exploit a wide range of vegetation types. Bryophilinae (Noctuidae) were nearly absent from early-stage plantations but were abundant in mature forests, a pattern consistent with their ecological traits, as larvae of many species primarily feed on lichens and algal substrates. Our findings highlight the potential of diverse moth families and subfamilies as indicator groups for assessing environmental change and forest succession dynamics.

**Keywords**. Ecology, Family, Disturbance, Plantation.

**References.**

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## DEFINING THE SEASONAL WINDOW OF ARTIFICIAL LIGHT AT NIGHT IMPACTS ON MOTHS USING 1.4 MILLION RECORDS ACROSS NORTHERN EUROPE

***Anssi V. Vähätalo*[1], *Anna Suuronen*[2] *& Ida-Maria Huikkonen*[3]**
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**Abstract.** Artificial light at night (ALAN) attracts moths and disrupts essential behaviors such as pollination and reproduction (Jägerbrand & Bouroussis 2021). These impacts can be mitigated through adaptive outdoor lighting strategies, including part-night lighting, dimming profiles, and seasonal summer shutdowns at northern latitudes (Jägerbrand & Bouroussis 2021). We assessed the seasonal timing of ALAN impacts on moths and identified when mitigation measures are most needed across latitudes 59–69°N. We analyzed 1.4 million records of 10 million moths collected with standardized light traps at 291 sites in the Finnish Moth Monitoring Scheme during 1993–2024 (Huikkonen et al. 2024). Seasonal vulnerability to ALAN was quantified as the mean number of specimens per trap per night (CPUE) for each day of year. The ALAN impact season was defined by the 1st and 99th percentiles of the cumulative CPUE distribution. In the southernmost latitude band (59–61°N), the impact season extended from early April to early November. Season length decreased progressively northwards and was approximately two months shorter in the northernmost band (67–69°N). Southern bands exhibited two abundance peaks, in spring and late summer, whereas the spring peak was negligible in the north, where a single peak occurred later in the season. Our results indicate that in northernmost regions, light pollution impacts are low before mid-summer, supporting an extended summer lighting break followed by part-night lighting until mid-September. In southern regions, mitigation should begin earlier in spring and extend into late autumn to effectively reduce ecological impacts.

**Keywords.** Conservation, light pollution, phenology.

**References.**

Huikkonen, I.-M., Pöyry, J., Korhonen, P., Leinonen, R. & Suuronen, A. 2024. The Finnish moth monitoring scheme of 30 years (1993−2022). Suomen ympäristökeskuksen raportteja 26, 124 p.

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TUESDAY, 14:00-14:20

## UNVEILING CRYPTIC DIVERSITY: INTEGRATIVE TAXONOMY DISCOVERS EIGHT NEW SPECIES OF *EOIS* MOTHS AND EXPOSES BIODIVERSITY SHORTFALLS IN A NEOTROPICAL REGION

***Simeão Moraes*[1], Patrícia Machado[1], Mariana Stanton[2], Georgette Paola Ancajima[1], Lydia Yamaguchi[3], Luiza Magaldi[1], Massuo Kato[2] & André Freitas[1]**

*[1]Universidade Estadual de Campinas, Brazil, [2]Universidade de São Paulo, Brazil [3]Nutabes, Instituto de Pesquisas Tecnológica, Brazil*

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**Abstract**. The Neotropical moth genus *Eois* Hübner (Geometridae: Larentiinae) comprises 257 valid species but has never been comprehensively revised, and the true diversity is likely underestimated. Previous studies show that wing polymorphism in several nominal taxa often hides cryptic species, a pattern also revealed by COI data, host plant records, and genitalia morphology. Among these, the *Eois russearia* complex stands out for including the genus type species, characterized by a yellow wing background with reddish bands, although the type specimen is reportedly lost. In this study, we investigated the *E. russearia* complex using an integrative taxonomy approach. We employed the ASAP (Assemble Species by Automatic Partitioning) species delimitation method on COI sequences to generate primary species hypotheses. These molecular clusters were subsequently tested and corroborated with independent evidence from comparative morphology (male and female genitalia, wing pattern), host plant associations, and geographic distribution. This approach revealed eight distinct lineages, which we describe as new species: *Eois iemanja* sp. nov., *Eois nanan* sp. nov., *Eois ibeji* sp. nov., *Eois oxumare* sp. nov., *Eois logunede* sp. nov., *Eois orumila* sp. nov., *Eois iroco* sp. nov., and *Eois stantonae* sp. nov. Our findings show that cryptic lineages can co-occur in sympatry across lowland biomes such as the Amazon and Pantanal, driven by specialized host-plant interactions. This study highlights how the lack of morphological, ecological, and distributional data collectively underestimates Neotropical biodiversity. By integrating multiple lines of evidence, we demonstrate that integrative taxonomy is crucial not only for uncovering cryptic diversity but also for providing a robust foundation for ecological studies and conservation policies in hyperdiverse groups. →

**Keywords.** biodiversity shortfalls, integrative taxonomy, morphology, host-plant, species delimitation.

**References.**

Brehm, G., Bodner, F., Strutzenberger, P., Hünefeld, F. & Fiedler, K. 2011. Neotropical *Eois* (Lepidoptera: Geometridae): checklist, biogeography, diversity and description patterns. Ann. Entomol. Soc. Am. 104, 1091–1107.

Hortal, J. et al. 2015. Seven shortfalls that beset large-scale knowledge of biodiversity. Annu. Rev. Ecol. Evol. Syst. 46, 523–549.

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## HOW CAN CURIOSITY CHANGE THE WAY WE SEE INSECTS? CREATIVE APPROACHES TO INSECT OUTREACH

***Wendy Zhang***
*Singapore*
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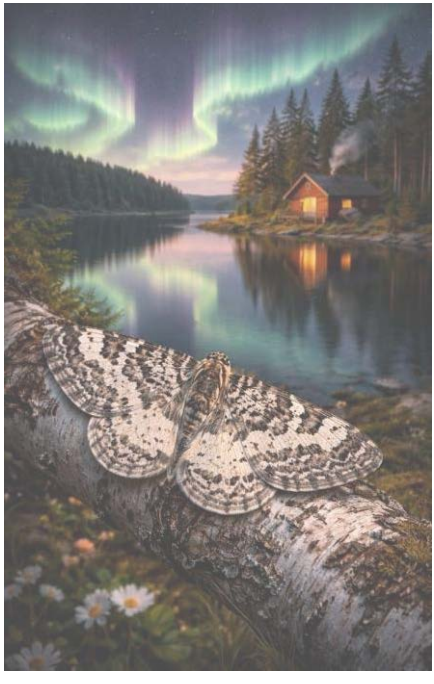
**Abstract.** Wendy Zhang is a Singapore-based artist and researcher whose work focuses on fostering active learning in insect outreach. This talk explores how active learning and creative engagement can shift public perceptions of insects from disgust and indifference to interest and appreciation. Drawing from outreach programmes across workshops, exhibitions, and public platforms, it examines how art, cultural narratives, and hands-on approaches can make insect-related topics more accessible and engaging.

**Keywords.** Insects, art, public engagement, science communication.

TUESDAY, 14:40–15:20

## SURPRISE!

**Abstract**. Forum Herbulot XIII includes an interactive, participatory session for all participants, including accompanying persons. There is no need to prepare anything in advance, just have an open mind for different kind of activity.



## THE LEPIDOPTEROLOGICAL SOCIETY OF FINLAND

***Reima Leinonen***
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**Abstract**. The Lepidopterological Society of Finland is the largest entomological society in Finland, with nearly 1,000 members. Established in 1955, its main objectives are to increase overall knowledge of Finnish Lepidoptera and to promote their conservation. Society brings together both professional and citizen scientists who share an interest in Lepidoptera, forming a kind of continuous network through which information flows in both directions. As a result, the Finnish lepidopteran fauna—including the Microlepidoptera—is among the best known in the world. The society also coordinates, or serves as a key partner in, several monitoring programmes in Finland, such as the National Butterfly Recording Scheme in Finland (NAFI), the Monitoring of Arctic Lepidoptera in northernmost Finland (Tunturiperhosseuranta), and the Finnish moth monitoring scheme (Nocturna). Through these programmes, voluntary work produces valuable data for scientific studies, giving Lepidoptera an important role in multidisciplinary research. In the field of conservation, the society's Conservation Committee acts as an official expert group for the Finnish Ministry of the Environment. In this role, the committee prepares the lepidopteran section of the Finnish Red List and provides various forms of advice to environmental authorities. In addition, the committee conducts its own research on endangered species. For many years, one of Society's main activities has been the brokerage of entomological supplies. Starting with only a few items, the range has expanded considerably. Most recently, the society—together with the Entomological Society of Finland—established a company, Tibiale Ltd., which offers a wide range of supplies needed for entomological studies. Members also have access to a library with a large collection of lepidopterological literature. To support these services, the society maintains its own office in Helsinki.

**Keywords.** non-profit organization, overview, objectives.

## FINNISH MOTH MONITORING SCHEME – NATIONAL RESULTS REGARDING GEOMETROIDEA

***Ida-Maria Huikkonen*[1], Juha Pöyry[2] & Anna Suuronen[3]**
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**Abstract.** The Finnish moth monitoring scheme (Nocturna) has been operating since 1993 and has produced a remarkable dataset of the macromoth fauna (Lepidoptera, Heterocera) in Finland (Huikkonen et al. 2024). The monitoring scheme relies largely on the work of volunteer skilled amateur lepidopterists, making the scale and precision of the monitoring scheme possible. In this talk I will explore the geometrid moth data produced by the monitoring scheme. Abundance trends in general as well as for individual species of geometrid moths will be presented. Additionally, I will present examples of species from different groups delineated by species traits and distributions. These include species with typically southern and northern distributions that have expanded and contracted their ranges, respectively, as well as some species with particular nutritional preferences that have experienced changes in abundance. These examples are used to highlight the larger-scale changes detected in the Finnish moth fauna during more than 30 years of monitoring.

**Keywords**. Abundance, Geometridae, indicator, monitoring, trend.

**References.**

Huikkonen, I., Pöyry, J., Korhonen, P., Leinonen, R. & Suuronen, A. 2024. The Finnish moth monitoring scheme of 30 years (1993–2022). Reports of the Finnish Environment Institute 26/2024.

## HIGH-THROUGHPUT SEQUENCING AND MUSEOMICS: A NEW ERA FOR LEPIDOPTERA SYSTEMATICS

***Marianne Espeland***
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**Abstract**. During the last few years there has been a rampant development in molecular techniques and consequently, Lepidoptera phylogeny. Most molecular phylogenies produced not even ten years ago were usually based on no more than a handful of genes, and dried museum material was very difficult to include due to the often low quantity and quality of DNA. Recently, dataset sizes have increased dramatically and phylogenies based on hundreds or thousands of genes are now becoming the norm. Furthermore, including museum material is now easier than ever since current methods are less sensitive to DNA quality and quantity. I will here give an overview over past and current methods and provide several examples on what can currently be done in Lepidoptera phylogenomics.

**Keywords.** Phylogenomics, high throughput sequencing.

## A PHYLOGENETIC STUDY OF KOREAN EPIPLEMINAE (LEPIDOPTERA: URANIIDAE)

***Da-Hee Jin*[1] & *Sei-Woong Choi*[1]**
[1]*Mokpo National University, Mokpo, South Korea*
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**Abstract.** Epipleminae is a subfamily of the family Uraniidae, comprising more than 600 species in approximately 70 genera worldwide. However, the species diversity of this group is relatively low in the temperate regions of the Northern Hemisphere. In East Asia, including Korea, taxonomic studies on this subfamily remain insufficient, and the monophyly and phylogenetic relationships among its taxa have not yet been clearly resolved. This study aims to re-examine the taxonomic framework of Epipleminae occurring in Korea by integrating morphological and molecular data. A total of 12 species recorded from Korea were examined, and comparative morphological analyses were conducted based on external morphology and genital structures. In addition, phylogenetic analyses were performed using mitochondrial COI and nuclear gene sequences under the Maximum Likelihood (ML) framework to clarify the phylogenetic positions of Korean populations and their interspecific relationships. This study is expected to provide fundamental taxonomic data on Korean Epipleminae and to contribute to future research on the phylogeny and evolution of the subfamily.

**Keywords**. Epipleminae, Phylogenetics, Integrative taxonomy.

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## THE HITCHHIKER'S GUIDE TO PHYLOGENY: A PRACTICAL WORKSHOP OF DNA BARCODES ANALYSIS

***Elena Kochanova[1] & Kyung Min Lee[2]***
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**Abstract.** At this workshop, we will present a practical demonstration illustrating how DNA barcode data can be analysed using commonly used phylogenetic tools. The session will guide participants through a basic analytical workflow, beginning with the retrieval of publicly available sequences and all related information from the BOLD Systems (Ratnasingham et al. 2024). Using the sequences, we will first generate a test neighbour-joining (NJ) tree within the BOLD Workbench to provide a rapid overview of sequence relationships. The same dataset will be analysed using a more robust maximum likelihood (ML) phylogenetic approach implemented in IQ-TREE (Trifinopoulos et al. 2016), which is more suitable for publication-quality analyses. Finally, genetic distances, both intra- and interspecific variation among sequences, will be calculated using MEGA X program (Kumar et al. 2018). This demonstration aims to provide a clear and accessible introduction to the phylogenetic analysis of DNA barcode datasets that can be applied in taxonomy, biodiversity, and evolutionary studies.

**Keywords.** DNA barcodes, BOLD Systems, Phylogenetic analysis, IQ-Tree, MEGA.

**References**.

Ratnasingham et al. 2024. "BOLD v4: A centralized bioinformatics platform for DNA-based biodiversity data." DNA barcoding: methods and protocols. New York, NY: Springer US. 403-441.

Trifinopoulos, Jana, et al. 2016. "W-IQ-TREE: a fast online phylogenetic tool for maximum likelihood analysis." Nucleic acids research 44.W1: W232-W235.

Kumar et al. 2018. "MEGA X: molecular evolutionary genetics analysis across computing platforms." Molecular biology and evolution 35.6: 1547-1549.

## FILLING GAPS ON THE BIODIVERSITY KNOWLEDGE IN THE GENUS *AGYLLA* WALKER, 1854 (LITHOSIINI, ARCTIINAE, EREBIDAE)

***Georgette Paola Ancajima*** [1], ***Luíza de Moraes Magaldi*** [1], ***Simeão de Souza Moraes*** [1]
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**Abstract.** Moths represent 75-85% of Lepidoptera diversity of Lepidoptera, but they are less studied than butterflies. One of the groups of moths with ecological importance are the Lithosiini, called lichen moths due they consume/sequester chemical compounds from lichens. This group has 3,150 described species, 105 of which are included in *Agylla*, one of the most speciose genera and is distributed mainly in the Neotropical region. The phylogenetic relationships between *Agylla* species have not yet been explored and the few studies on the tribe have highlighted taxonomic (Linnean shortfall), phylogenetic (Darwinian shortfall) and biogeographic (Wallacean shortfall) gaps. In this context, our work aims to fill these gaps using an integrative approach connecting taxonomy, molecular and biogeographical data. In this study, a catalog by *Agylla* is presented comprising 105 species with information on type locality, institutions where the types are deposited, and occurrence data by country and biogeographical areas. Also, we present the first phylogenetic hypothesis for the genus using molecular markers (13 markers) with 100 species of Lithosiini, including 65 species of *Agylla*. New occurrence records are presented for species of this genus, totaling 4,000 records so far. Our results corroborate that *Agylla* is not a monophyletic group, being divided into four clades. Additionally, species from other genera were allocated among *Agylla* species. We present hypotheses about phylogenetic relationships and possible taxonomic and nomenclatural changes in the genus *Agylla*, and we also discuss morphological characteristics in different species.

**Keywords.** phylogenetics, diversity, mitochondrial and nuclear DNA, knowledge shortfalls.

## 101 NEW SPECIES OF *COLEOPHORA* (GELECHIOIDEA: COLEOPHORIDAE) TO GEORGIA (CAUCASUS) – WHAT ABOUT GEOMETRIDAE?

***Leo Vähätalo*[1], *Jukka Tabell*[2], *Maka Murvanidze*[3] & *Anssi Vähätalo*[4]**
*[1]Finnish Museum of Natural History, University of Helsinki, Finland; [2]Independent Researcher, Finland; [3]Tbilisi State University, Georgia; [4]Department of Forest Sciences, University of Helsinki, Finland; Department of Biological and Environmental Science, University of Jyväskylä, Finland*
*E-mail: leo.vahatalo@helsinki.fi*

**Abstract.** Coleophoridae (Gelechioidea) is a globally widespread family of small moths, comprising over 1550 species. The majority of known species are distributed throughout the Palearctic region, particularly in arid environments of Europe and Central Asia. Despite being situated between these regions, surprisingly few coleophorids have been reported from the Caucasus ecoregion, which is a biodiversity hotspot. From Georgia, a country comprising a myriad of diverse biotopes, only 13 species were known until 2023, when the total number was increased to 32. To investigate the true number of species, several excursions to Georgia were conducted between 2019 and 2024. Locations were chosen to represent various biotopes from all cardinal directions, particularly arid ones. Sampling was conducted with portable battery powered LED-traps and manually. The results revealed an unprecedented richness of coleophorids: by employing integrative methods, combining both morphology and DNA barcoding, over a hundred morphospecies were discovered. Species-level identifications comprised 101 new *Coleophora* species to Georgia, ten of which are being described as new to science, supported by morphology and/or DNA barcodes. Approximately 30 additional species require identification and further study. Our results thus present a 289% increase in the known Coleophoridae of Georgia, highlighting the extent of undiscovered microlepidopteran diversity in Georgia, a pattern likely applicable to much of the Caucasus region. Although Macrolepidoptera are generally better studied than Microlepidoptera, our results raise the question: if over a hundred new species of *Coleophora* can be found in just a few years in Georgia, how many Macrolepidoptera, including Geometridae, are left undiscovered throughout the entire Caucasus?

→

**Keywords.** Caucasus, biodiversity hotspot, Coleophoridae, new species, hidden diversity.

**References.**

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*Coleophora chalcogrammella* Zeller, 1839, male, photo Leo Vähätalo.

## REDEFINING DESMOBATHRINAE AND EPIDESMIINAE ON A MORPHOLOGICAL BASIS (GEOMETRIDAE)

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**Abstract.** Desmobathrinae and two recently proposed subfamilies, the Epidesmiinae and Eumeleinae, include a number of genera long held in the Oenochrominae but with slender-bodied imagines (unlike the stout-bodied ones of true Oenochrominae). Holloway (1996) drew attention to a few imaginal characters enabling the Desmobathrinae to be defined and he compiled a preliminary list of 22 desmobathrine genera (worldwide, but with the inclusion of *Eumelea* within this subfamily). In the Geometrid moths of the world (Scoble 1999), 20 genera were placed in the Desmobathrinae (still with *Eumelea* included) while many slender-bodied moths were provisionally retained in the Oenochrominae. Thanks to several recent molecular phylogenetic studies by Murillo-Ramos and her colleagues (2023), a better knowledge of the subfamily Desmobathrinae is now available (composition, main lineages, and tentative characterisation). After a careful re-examination of various morphological characters and the study of new imaginal characters, we can now add an Indomalayan genus to the Epidesmiinae and include approximately 40 genera in the Desmobathrinae. The geographical distribution of these two subfamilies is clarified and the known hostplants of the latter are reviewed.

**Keywords.** Systematic, Sub-families, Geometridae, Epidesmiinae, Desmobathrinae.

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## THE STRUCTURE OF GEOMETRID MOTH DIVERSITY

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**Abstract.** Understanding species diversification begins with understanding the structure of diversity itself. Geometridae moths constitute an ideal model system for examining how diversity is structured across phylogeny, space and time. Although our knowledge of this family remains taxonomically fragmented, geometrids have successfully colonized all major biogeographical regions except the polar zones (Ghanavi et al., 2025). Despite their remarkable diversity, however, the mechanisms underlying their rapid diversification remain poorly understood. Species richness in Geometridae is highly concentrated in tropical regions, unevenly distributed across the phylogeny, ranging from monotypic clades to genera comprising thousands of species, and from old to relatively young radiations (Brehm et al., 2019; Murillo-Ramos et al., 2019). Recent efforts to assemble a global phylogenetic framework now allow these spatial and temporal patterns to be examined within a unified evolutionary context. In this talk, I present an overview of how the global phylogeny of Geometridae has been assembled and how it serves as a backbone for interpreting large-scale patterns of diversity and biogeography. By providing a global picture of their phylogenetic structure with global distributional data, this synthesis highlights the large-scale structure of the family, gaps, opportunities and provides a comparative framework for future studies of macroevolutionary patterns and classification. I complement this global view with selected case-studies illustrating the possibilities emerging from our long-term effort to compile phylogenomic data across the family.

**Keywords**. Systematics, diversification, biogeography, richness, evolutionary patterns.
**References**.

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## UNLOCKING A GLOBAL RESOURCE: DIGITISING THE NHMUK GEOMETRIDAE COLLECTION THROUGH DISSCO UK

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**Abstract.** The Natural History Museum, London (NHMUK) holds one of the world's largest and most scientifically significant Geometroidea collections, remarkable for its temporal and geographic breadth as well as its exceptional type richness. With over 15,000 Geometridae types alone, this collection represents an unparalleled resource for species discovery, taxonomy, ecology, and conservation research. Demand for access remains consistently high: between April 2022 and March 2025, 844 Geometroidea specimens were loaned to researchers, while visiting scientists spent approximately 137 days working directly with the collection. Unlocking this material through large-scale digitisation will substantially increase accessibility and expand its research impact. As part of DiSSCo UK, NHMUK is undertaking the digitisation of the entire Geometridae collection. DiSSCo (Distributed System of Scientific Collections) aims to transform how natural science collections are accessed and used by creating a unified, standards-driven digital infrastructure across UK institutions. Within this framework, the Geometridae digitisation project is generating high quality specimen images and metadata, enabling global, open access to a dataset of immense scientific value. This presentation will outline the work required to prepare the collection for digitisation, provide an update on progress to date, and demonstrate how researchers can access and use the emerging digital resource. By increasing accessibility, we aim to support and stimulate future research across the Geometridae community.

**Keywords.** Digitisation, Collections based research, Accessibility, Data mobilization.

## THE SECOND EDITION OF THE WORLD CATALOGUE OF THE GEOMETRID MOTHS IS NOW ONLINE

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**Abstract.** The online catalogue of Geometroidea, initially developed as a taxonomic resource for Geometridae (Rajaei et al. 2022) and hosted on the Forum Herbulot platform (geometroidea.smns-bw.org), has undergone a major revision and expansion. A second, comprehensively updated edition of the World Catalogue of Geometrid moths is now available online, incorporating close to thousand taxonomic changes and 487 additional taxa. These updates are the result of an extensive review process, during which numerous issues reported by users—such as overlooked taxa, nomenclatural inconsistencies, duplicate entries, and unresolved synonymies—have been carefully evaluated and corrected. The revised version further enhances the scope of the resource by covering all subfamilies within Geometridae and by integrating enriched datasets. Key information from earlier foundational works (Scoble 1999), including precise type localities, depository details, and full bibliographic references have been reintroduced and standardized. In addition, preliminary tribus classifications have been added and a range of new search functionalities has been implemented, both within the online catalogue and across the Forum Herbulot website, significantly improving accessibility and usability for the scientific community. Finally, the catalogue is now linked to the Geometridae Mundi project, which provides images for nearly half of all known geometrid moth species, representing a major step forward in combining taxonomic and visual data within a single platform. This presentation reviews the main advances of the new version and outlines future directions for this continuously developing resource. →

**Keywords.** Database, taxonomy, Geometridae, online resource.

**References.**

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## Mid-congress excursion (1.7.2026)

**I. The Finnish Nature Centre Haltia** (https://haltia.com/en/) is an ecological exhibition and event center located in Espoo, serving as the main gateway to Nuuksio National Park. Opened in 2013, it attracts around 200,000 visitors annually and acts as a hub for nature tourism and environmental education. The center showcases Finland's diverse landscapes through immersive and interactive exhibitions, including seasonal and thematic displays. It offers guided tours, events, and direct access to hiking trails leading into surrounding forests and lakes. Haltia also hosts a Nature School, providing educational programs for students and visitors of all ages. The building, designed by Rainer Mahlamäki, is a notable example of sustainable wooden architecture. Constructed mainly from cross-laminated timber, it blends harmoniously into the natural landscape. Its design draws inspiration from Finnish folklore and the surrounding environment. The center integrates eco-friendly technologies such as geothermal heating, solar energy, and a green roof. Facilities include a restaurant focused on local organic food, a nature shop, and rental services for outdoor activities. Operated by Metsähallitus, Haltia serves as a model for sustainable development and nature conservation. (Address: Nuuksiontie 84, 02820 Espoo).

## Mid-congress excursion (1.7.2026)

**II. The Finnish Museum of Natural History (LUOMUS)** (https://www.helsinki.fi/en/luomus) is part of the University of Helsinki, is a leading research institution and public museum in Helsinki. Located near Parliament House, it is a major destination for biodiversity education and scientific outreach. The museum presents Finnish and global nature through extensive dioramas, thematic exhibitions, and displays on evolution and skeletal biology. Its collections comprise more than 14 million specimens, covering zoology, botany, mycology, minerals, and fossils. LUOMUS plays a central role in taxonomic research, conservation science, and long-term biodiversity monitoring. It also maintains two botanical gardens with diverse living plant collections for research and public education. The exhibitions are designed to engage a wide audience, from families to specialists. The institution actively contributes to international scientific collaboration and data sharing. It serves as Finland's national repository for natural history collections. (Address: Pohjoinen Rautatiekatu 13, 00100 Helsinki).

## Mid-congress excursion (1.7.2026)

**III. Tibiale Ltd.** (https://www.tibiale.fi/) supplies high-quality equipment and accessories for insect research and collecting. Its products are aimed at both beginners and professional entomologists. The selection includes insect nets, pins, preparation tools, and storage boxes. The company also offers UV lamps and specialized field and laboratory equipment. Tibiale is known for providing reliable and field-tested materials. In addition to equipment, it publishes entomological literature. It also distributes insect-related books from other publishers. The company is owned by the Lepidopterological Society of Finland and the Entomological Society of Finland. Tibiale supports both amateur and professional research communities. (Address: Lämmittäjänkatu 2 A, 00810 Helsinki).

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## SPONSORS

The Organizing Committee wishes to thank and acknowledge the sponsors of Forum Herbulot 2026 (listed below). The support allowed successful organization of the congress.

**The Federation of Finnish Learned Societies**, established in 1899, is a national co-operative body for learned societies in Finland. It contributes to the co-operation between learned societies, supports and develops scholarly communication and publishing, and promotes awareness and usage of research results. The Federation distributes state subsidies allocated by the Ministry of Education and Science for scholarly publishing and for organising international conferences and national seminars. https://tsv.fi

**The Lepidopterological Society of Finland** is the largest entomological society in Finland, with nearly 1,000 members. Established in 1955, its main objectives are to increase overall knowledge of Finnish Lepidoptera and to promote their conservation. The society also coordinates, or serves as a key partner in, several monitoring programs in Finland and the society's Conservation Committee acts as an official expert group for the Finnish Ministry of the Environment. The Society publishes the journal Baptria, which is issued in four issues per year. http://www.perhostutkijainseura.fi/

**Pentti Tuomikoski fund** for networking is one of the University of Helsinki Funds. It supports the work of the Finnish Museum of Natural History by covering the costs of networking and collaboration of the museum's researchers via travel grants, conference attendance, inviting an international guest to the Museum, or field work.

**Entolight Systems** is a Finnish company designing and manufacturing next-generation insect monitoring equipment for scientific field research as well as for professional and amateur use across Europe. It develops innovative, reliable, and energy-efficient solutions that support accurate and effective insect monitoring. The products include low-voltage (DC) LED UV light solutions, power bank solutions, and both immobilizing and live-capture research traps, as well as a comprehensive range of compatible accessories designed to meet the needs of researchers and citizen scientists. www.entolight.fi

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**The Entomological Society of Finland** brings together insect enthusiasts and researchers in Finland, aiming to promote understanding, research and protection of Finnish insects. The society's scope also includes arachnids and millipedes. The society organizes monthly meetings and excursions during spring and summer. The society was founded in 1919 in Helsinki and is the oldest and second largest entomological society in Finland. https://www.hyonteisseura.fi/

## VENUE AND PUBLIC TRANSPORTATION

**Congress venue: Hotel Lepolampi**
Address: Kivilammentie 1, 02820 Espoo
Reception: +358 (0)10 324 4840;
Sales: E-mail: sales(at)lepolampi.fi,
+358 (0) 10 324 4855 (weekdays from 9:00 to 15:45)

**Restaurant opening hours**

- Breakfast 6:00-9:00
- Home-cooked buffet and à la carte menu are open Mon – Thu from 5:00 PM to 8:30 PM

**Reception opening hours**

- Mon 9:00-21:00
- Tue-Thu 6:00-21:00
- Fri 6:00-12:00
- On Saturdays and Sundays, restaurant and reception are closed except for events.

**Directions**
The hotel is located near Espoo city centre (12 km), Helsinki (30 km) and Helsinki-Vantaa Airport (33 km).

The hotel can be reached by public transportation. Espoon keskus can be reached by train or by bus. Bus # 243 runs from Espoon keskus to the hotel. You can travel the entire journey using ABCD ticket (valid for 90 minutes, cost 5 €). See bus schedules in the Route Guide.
Taxi from Helsinki-Vantaa Airport is about 80–90 €, and taxi from Espoon keskus is about 40 €.

There are plenty of parking spaces in the hotel yard, also for larger vehicles.

*Angerona prunaria* (Linnaeus, 1758) is the sole species of the monotypic genus *Angerona* Duponchel, 1829. Commonly known as the orange moth, it is a relatively large and conspicuous geometer moth with a wingspan of 35–45 mm, occasionally reaching 56 mm, and with males typically smaller, but more brightly colored than females. The species is highly variable. Widely distributed across Europe and into Asia, it inhabits open woodlands, gardens, and parks.
The caterpillars are twig-mimicking and polyphagous, feeding on a wide range of trees and shrubs, and overwinter before pupating in spring. Adults are mostly active from late May to August and are frequently attracted to light.
We are quite optimistic that you may see this species during the congress.