

# Program - 2nd International Symposium on the Elateroidea

## October 9<sup>th</sup>, 2021

**09:00 Eastern Daylight Time; 15:00 Central European Summer Time; 23:00 Canberra**

	<b>Oral presentations</b>
09:00 EST 15:00 CEST 23:00 Canberra	<p style="text-align: center;"><b>Squish beetles in Australia: Introduction to Chapter of Cantharidae of Australian Beetle Book Project (Coleoptera: Elateroidea)</b></p> <p style="text-align: center;">Yun Hsiao Australian National Insect Collection, CSIRO, &amp; Division of Ecology and Evolution, Research School of Biology, Australian National University Yun.Hsiao@csiro.au, Yun.Hsiao@anu.edu.au</p>
9:30 am EST 15:30 CEST 23:30 Canberra	<p style="text-align: center;"><b>Anchored Phylogenomics of Elateridae: some outgroups did not act as expected!</b></p> <p style="text-align: center;">Hume B. Douglas <sup>1*</sup>, Robin Kundrata <sup>2</sup>, Adam J. Brunke <sup>1</sup>, Julie T. Chapados <sup>1</sup>, Robin Richter <sup>1</sup>, Karine Savard <sup>1</sup>, Duane McKenna<sup>3</sup> and Jeremy R. Dettman <sup>1</sup></p> <p><sup>1</sup>Agriculture and Agri-Food Canada, 960 Carling Avenue, Ottawa, Ontario, K1A 0C6, Canada; adam.brunke@canada.ca (A.J.B.), julie.chapados@canada.ca (J.T.C.), jackson.eyres@canada.ca (J.E.), robin.richter@canada.ca (R.R.), karine.savard@canada.ca (K.S.), jeremy.dettman@canada.ca (J.R.D.)</p> <p><sup>2</sup>Department of Zoology, Faculty of Science, Palacky University, 17. listopadu 50, 771 46 Olomouc, Czech Republic; robin.kundrata@upol.cz</p> <p><sup>3</sup>Department of Biological Sciences, Center for Biodiversity Research, University of Memphis, Memphis Tennessee, USA; dmckenna@memphis.edu</p> <p><b>Abstract</b></p> <p>Click-beetles (Coleoptera: Elateridae) are an abundant, diverse, and economically important beetle family that includes bioluminescent species. To date, molecular phylogenies have sampled relatively few taxa and genes, incompletely resolving subfamily level relationships. We present a novel probe set for anchored hybrid enrichment of 2260 single-copy orthologous genes in Elateroidea. Using these probes, we undertook the largest phylogenomic study of Elateroidea to date (99 Elateroidea, including 86 Elateridae, plus 5 non-elateroid outgroups). We sequenced specimens from 88 taxa to test the monophyly of families, subfamilies, and tribes. Maximum likelihood and coalescent phylogenetic analyses produced well-resolved topologies. Notably, the included non-elaterid bioluminescent families (Lampyridae + Phengodidae + Rhagophthalmidae) form a clade within the otherwise monophyletic Elateridae, and Sinopyrophoridae may not warrant recognition as a family. All analyses recovered the elaterid subfamilies Elaterinae, Agrypninae, Cardiophorinae, Negastriinae, Pityobiinae, and Tetralobinae as monophyletic. Our results were conflicting on whether the hypnoidines are sister to Dendrometrinae or Cardiophorinae + Negastriinae. Moreover, we show that fossils with the</p>

	<p>eucnemid-type frons and elongate cylindrical shape may belong to Eucnemidae, Elateridae: Thylacosterninae, ancestral hard-bodied cantharoids or related extinct groups. Proposed taxonomic changes include recognition of Plastocerini as a tribe in Dendrometrinae and Hypnoidinae <i>stat. nov.</i> as a subfamily within Elateridae.</p>
<p>10:00 am EST 16:00 CEST 00:00 Canberra</p>	<p style="text-align: center;"><b>Maurice Pic: life, works, collections and present state of access</b> Robert Constantin Independent researcher. Saint-Lô, France, rconstantin50@gmail.com</p>
<p>10:30 am EST 16:30 CEST 00:30 Canberra</p>	<p style="text-align: center;"><b>DNA barcoding and collections-based life stage associations reveals a hidden diversity in the Puerto Rican bank paedomorphic Lycidae (Coleoptera, Elateroidea, Leptolycini)</b> Vinicius S. Ferreira<sup>1, 2*</sup> and Michael A. Ivie<sup>2</sup></p> <p><sup>1</sup> Natural History Museum of Denmark, Zoological Museum, University of Copenhagen, Universitetsparken 15, 2100 Copenhagen, Denmark. (Current address)</p> <p><sup>2</sup> Montana Entomology Collection, Marsh Labs, Montana State University, Room 5, 1911 W. Lincoln Street, Bozeman, MT 59717, USA. *E-mail: vinicius.sfb@gmail.com</p> <p><b>Abstract</b></p> <p>The Leptolycini are a group of Lycidae endemic to the West Indies. Leptolycini adult females have been hypothesized to be extreme paedomorphic (i.e., larviform), however, females and larvae of the group are currently unknown. In this study we provide for the first time DNA barcoding life stages associations based on partial cytochrome c oxidase subunit 1 (COI) of winged males and immature stages of specimens from Puerto Rico, altogether with collections-based associations of Leptolycini immatures and one extreme paedomorphic female from the Virgin Islands. To carry out these life-stage associations we prepared an in-depth review of the Leptolycini fauna of the Puerto Rican bank (Puerto Rico and Virgin Islands). We provided morphological diagnosis of the larvae and female found, diagnostic redescriptions of the already described adult males and full descriptions of the new ones. Discussions on the taxonomy, nomenclature and intraspecific variation of many taxa are also provided, and several new taxa and taxonomic arrangements are proposed. The larvae of <i>Leptolycus</i>, <i>Cessator</i> and new Leptolycini genus are described for the first time, and larvae diagnosis of many species are given. The first female of a Leptolycini is diagnosed and illustrated. An updated key to the adults and immature forms of Leptolycini from the Puerto Rican bank and a discussion on the importance of scientific collections in biodiversity studies is also provided.</p> <p style="text-align: center;"><b>Keywords:</b> COI, Cantharoidea, Neotropical region, neoteny, West Indies.</p>
<p>11:00 am EST 17:00 CEST 01:00 Canberra</p>	<p style="text-align: center;"><b>On the neglected genus <i>Pachymesia</i> (Cantharidae): diversity, morphology and insights on their distribution and natural history</b> Gabriel Biffi Museu de Zoologia da Universidade de São Paulo, biffigabriel@gmail.com</p>

**Abstract**

The neotropical Silinae comprise over 700 described species, mostly included in three heterogeneous genera, but also in numerous small genera. Specimens of these small genera are usually rare in collections, and the biology, behaviour, phenology or distribution records of the species are scarce or completely unknown. Two of these genera are *Pachymesia* Westwood and *Incisosilis* Pic, with 2 and 4 species, respectively, distributed in the Atlantic Forest of Brazil. Both genera are characterised by a pale-yellow coloration and typical spindle-like antennae in males. Nearly all the specimens retrieved from collections were unidentified or labelled as *Pachymesia incisa* Westwood, even for remarkably different species. The preliminary study of the specimens showed a morphological similarity between both genera and a great number of potential new species. A taxonomic revision is being conducted to assess the diversity of *Pachymesia*, henceforth considered as a senior synonym of *Incisosilis*. So far, 15 species are recognised as valid, 8 of which are described as new. The revision also addresses questions regarding the distribution and natural history of the species, like the contrasting abundance of specimens of one species and scarcity of others, on the morphology of the remarkably complex sexually dimorphic structures and their putative role in a reversed courtship displayed by some Silinae, and the broad geographic distribution of the genus throughout the Atlantic Forest, suggesting an even higher number of yet undescribed species. This presentation is also an invitation to colleagues to contribute to this revision with additional specimens under their care or any biological information about the species.

**Keywords:** biology; distribution; reversed courtship; revision; soldier beetle; taxonomy.

11:30 am EST  
17:30 CEST  
01:30 Canberra

**Luminescent organs in *Photinus* genus (Coleoptera: Lampyridae)**

Santiago Zaragoza-Caballero\*, Cisteil X. Pérez-Hernández  
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**Abstract**

Within the Lampyridae family (of *Lampyrus*=luminous), there are genera with luminescent organs present in the last abdominal segments. The area covered by those structures varies among genera. The emission of cold light in the family — which exhibits high variability of intensities and frequencies—has been associated with sexual attraction, which mainly occurs at dusk and nights during the summer. The ability to emit light is universal for larvae of the family. However, there are genera and species without luminescent organs during the adult stage, and mate-searching happens during the day through communication by pheromones. In *Photinus* genus, both mate-searching behavior have been recognized: in diurnal species, their eyes are reduced, the antennae are more developed, they have no luminescent organs —their abdominal segments can be totally black or partially yellowish tegument or slightly transparent—, and sexual communication is

	<p>mediated by pheromones; whereas in nocturnal species, sexual communication is mediated by light signaling, and light-producing organs are shown as a small medial spot in the surface of the sternite 5, or as two reduced stains in the 5-6 sternites, or occupy the whole surface of that sternites—even reaching sternite 7—. In other species, the prolongation of sternites 5-6 is much more evident and with a wider luminescent surface. In this talk, the presence and size variability of light-producing organs among Photinus species will be discussed.</p>
<p>12:00 pm EST 18:00 CEST 02:00 Canberra</p>	<p><b>Latest updates on railroad worms (Coleoptera: Phengodidae) phylogeny and classification</b></p> <p>André Roza-Phengodidae</p> <p>Laboratório de Entomologia, Departamento de Zoologia, Instituto de Biologia, Universidade Federal do Rio de Janeiro, Rio de Janeiro, Brazil; Programa de Pós-graduação em Zoologia, Museu Nacional, Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ, Brazil</p> <p><b>Abstract</b></p> <p>Railroad worm beetles (Coleoptera: Phengodidae) are a moderately diverse group of Elateroids, with around 300 species in 40 genera. They have a disjunct distribution, with one subfamily in the Asia minor and Levant, and three subfamilies in the Americas. The group presents two interesting features: bioluminescence, present on all life stages but more distinct on larvae and females; and paedomorphic females, which resemble larvae in almost everything, including the presence of stemmata instead of compound eyes. The family has a complicated history concerning its taxonomy, classification, and phylogeny. The American subfamilies still need phylogenetic support, and all analysis of the group failed to present a well resolved phylogenetic framework or to be taxonomic representative. Recent advances in the family taxonomy, with the discovery of new genera and several new species, were recently achieved. To tackle the problem regarding the group classification and phylogeny, we present in this talk the most comprehensive phylogenetic analysis of the group, with representatives of more than 90% of the family genera and more than 190 characters regarding the morphological diversity of its males. We believe that the results presented here will help build a more robust and stable classification of Phengodidae.</p>
<p>12:30 pm EST 18:30 CEST 02:30 Canberra</p>	<p><b>Click beetles (Coleoptera: Elateridae) associated with roselle (<i>Hibiscus sabdariffa</i> L.) crops in a Coastal area in Southeastern Mexico – A first approach to the diversity of the group</b></p> <p>Jesús A. Cruz-López<sup>1*</sup>, Erick O. Martínez-Luque<sup>2</sup>, Luis A. Gálvez-Marroquín<sup>1</sup>, Fantino D. Hernández-Santos<sup>3</sup>, Rosa I. Figueroa-Rodríguez<sup>4</sup>, Fernando Olvera-Avenidaño<sup>5</sup>, Cristian D. Árias-Reyes<sup>6</sup></p> <p><sup>1</sup>Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias (INIFAP), Centro de Investigación Regional Pacífico Sur (CIRPAS), Campo Experimental Valles Centrales de Oaxaca. Melchor Ocampo #7, Santo Domingo Barrio Bajo, Villa de Etla, Oaxaca México, C.P. 68200.</p>

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### Abstract

One of the major problems during the development of an integrated soil pest management plan, is the lack of a framework to identify the species assemblages found in areas of concern. Wireworms, the larval stage of click beetles, are one of the most important soil-inhabiting pests across North America, impacting mainly maize and potatoes. Larvae feed on seeds, neck, roots and belowground plant organs causing mortality in plants. Biology of the most relevant species is well known (*e.g.*, *Agriotes* spp.), however, these kinds of studies are scarce in Mexico. Only *Agriotes* sp., is mentioned as responsible for root damage in agricultural reports, but studies reporting systematic sampling coupled with detailed taxonomic work, are null in the country. Roselle (*Hibiscus sabdariffa* L.) is an important crop in Mexico, its leaves and calyx are used to extract juice for highly demanded fresh drink. During a comparative study of roselle in Southeastern, Mexico, we detected plants with typical symptoms of root rot; however, after a detailed examination, we found wireworms damaging them, being the first record of wireworms feeding on roselle. Larvae fit with the *sputator* species group of *Agriotes*, but specific determination is only possible examining adults. For the last, an entomological survey was conducted to collect adults of Elateridae associated with this crop. During 11 sampling nights using a black light trap, we collected 12 species. We report preliminary observations of elaterids ecology during the rainy season, as well as ecology of larvae and their relationships with rain levels.

13:00 pm EST  
17:00 CEST  
03:00 Canberra

### Evaluating firefly extinction risk: initial IUCN Red List Assessments for North America

Anna Walker

Species Survival Officer for Invertebrates at the New Mexico BioPark Society