



## PREFACE: Proceedings of the XIV International Symposium of Neuropterology

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### ABSTRACT

The XIV International Symposium of Neuropterology (ISN) was held online, between May 23<sup>rd</sup> and 27<sup>th</sup> of 2022, with the Universidade Federal de Lavras, Minas Gerais, Brazil as responsible for the event. This event was carried out for and by researchers with interest in any aspects of biology, systematics, taxonomy, natural history, evolution, and applied studies on the insects of the superorder Neuropterida (Neuroptera, Megaloptera and Raphidioptera). This was the first meeting organized by a South American country, and the first one held online. A total of 141 participants from 24 countries attended the meeting, which was considered the largest number of registered participants among all the versions of the ISN and resulted in 10 keynote lectures (including the Opening Lecture), 21 oral presentations, and 17 poster presentations. The papers in this volume are representative of the lectures, oral presentations, and posters presented at the meeting. We dedicate these proceedings to the memory of the Professor and entomologist Dr. César Carvalho, who was directly responsible for bringing this meeting to Brazil, but unfortunately passed away in September 2018.

### Organizing and support committees

The organizing committee of the XIV ISN (Figures 1, 2) was composed by the president Dr. Brígida Souza, from Universidade Federal de Lavras, Lavras, Minas Gerais, Brazil; Dr. Caleb C. Martins, from Centro de Estudos Superiores de Caxias, Universidade Estadual do Maranhão, Caxias, Maranhão, Brazil (then Universidad Nacional Autónoma de México, México); Dr. Renato J. P. Machado, from Universidade Federal do Paraná, Curitiba, Paraná, Brazil; and Dr. Stephan M. Carvalho, Universidade Federal de Lavras, Lavras, Minas Gerais, Brazil. During the event, a support committee was formed by the graduate students Leon G. M. Tavares and Phillip A. Schuster, from Universidade Federal do Paraná.

### Conference

Originally the XIV ISN would take place in person at the Universidade Federal de Lavras. However, due to the COVID-19 Pandemic and aiming to preserve the health of participants, the event took place online on a platform built by the contracted company HBA Tecnologia, which helped in the reception and orientation of the participants, and the technical aspects of the meeting.

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### Scientific program


The final program included 10 keynote lectures (including opening lecture), all of them performed by invitation, 21 oral presentations, and 17 poster presentations. These presentations included any aspects of biology, systematics, taxonomy, natural history, evolution, and applied studies on Neuropterida (Neuroptera, Megaloptera, and Raphidioptera). The abstract book was shared with all the participants and can be accessed and downloaded free of charge via the first author's researchgate profile ([https://www.researchgate.net/publication/363823214\\_Abstract\\_Book\\_of\\_VIV\\_ISN](https://www.researchgate.net/publication/363823214_Abstract_Book_of_VIV_ISN)).

All keynote lectures, oral and poster presentations are listed below in order of presentation, followed by the authors (between parentheses); the author who did the presentation is in italic.

#### Keynote lectures

1. History of Neuropterology at UFLA (*Dr. Maria Fernanda Homes Villalba Peñaflor*)
2. Official opening lecture: Unveiling diversity and evolution of Neuropterida using integrative approaches (*Dr. Xingyue Liu*)

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**Figure 1.** Logo of XIV International Symposium of Neuropterology represented by *Albardia furcata* van der Weele, 1903 (Neuroptera, Myrmeleontidae, Ascalaphinae). ©Caleb C. Martins.



**Figure 2.** Scientific Committee of XIV International Symposium of Neuropterology on the first organizational meeting. 1-Dr. Stephan Malfitano Carvalho; 2-Dr. Caleb Califre Martins; 3-Dr. Brígida Souza (President); 4-Dr. Renato Jose Pires Machado.

3. Green Lacewings in the Integrated Pest Management (*Dr. Carlos Eduardo S. Bezerra*)
4. The amazing neuropterid fossil diversity of the Crato Formation (*Dr. Caleb C. Martins*)
5. The controversy of the Raptorial Mantispodea (Insecta: Neuroptera): insights from comparative morphology of the extant Mantispidae and Rhachiberothidae (*Dr. Adrian Ardila-Camacho*)
6. Diversity of the extant Neuroptera in Brazil (*Dr. Renato J. P. Machado*)
7. The Lacewing Digital Library: overview, metrics, tips, and future (*Dr. John D. Oswald*)
8. Neotropical Chrysopids with emphasis in Brazilian Entomofauna: A synopsis about principal genera (*Dr. Francisco J. Sosa*)
9. Origin and diversification of the gonarcus, with an overview of the groundplan of the neuropterid terminalia (*Dr. Atilano Contreras-Ramos*)
10. The larvae of Neuroptera: reconstructing the origin of strange morphologies and unusual life histories (*Dr. Davide Badano*)

#### Oral presentations

1. Species- and sex specificity of semiochemicals for green lacewings (Neuroptera: Chrysopidae) (*Sándor Koczor, Ferenc Szentkirályi, Miklós Tóth*)
2. Diversity of Neuroptera in an altitudinal gradient of the Tacaná Volcano, southern Mexico (*Rodolfo J. Cancino-López, Claudia E. Moreno, Atilano Contreras-Ramos*)
3. Use of *Chrysoperla externa* in the integrated management of *Bemisia tabaci* on watermelon (*Carlos E. S. Bezerra, Brígida Souza, Elton L. Araujo, Ewerton M. Costa*)
4. Palaeodiversity and early evolution of the lacewing superfamily Myrmeleontoidea (*Xiumei Lu*)
5. Phylogeography of the Oriental dobsonfly, *Neoneuromus ignobilis* Navás, suggests Pleistocene allopatric isolation and glacial dispersal shaping its wide distribution (*Aili Lin, Lijun Cao, Shujun Wei, Kingyue Liu*)
6. Unraveling the evolutionary history of the snakefly family Inocelliidae (Insecta: Raphidioptera) through integrative phylogenetics (*Rongrong Shen, Horst Aspöck, Ulrike Aspöck, John Plant, Yuting Dai, Xingyue Liu*)

7. Taxonomical revision and first phylogeny of *Climacia* McLachlan, 1869 (Neuroptera: Sisyridae), with new species and identification key (*Alice C. Assmar*, Renato J. P. Machado, Adolfo R. Calor)
8. Taxonomy of *Chloronia* Banks (Megaloptera: Corydalidae) from Brazil: a new species, checklist, and an updated identification key (Gleison R. Desidério, *Pedro H. M. Constancio*, Neusa Hamada)
9. Systematic study of Oriental Dendroleontinae and Nemoleontinae (Neuroptera: Myrmeleontidae) (*Yuchen Zheng*, Xingyue Liu)
10. Neuropterida (Insecta: Megaloptera, Raphidioptera, Neuroptera) of Pakistan (*Muhammad A. Hassan*, Xingyue Liu)
11. Taxonomy of the antlion tribe Myrmeleontini (Neuroptera: Myrmeleontidae) of Taiwan (*Yu-Hsiu Lin*, Hui-Yun Tseng)
12. Distribution, richness and inventory status of the family Myrmeleontidae in the Iberian Peninsula and Balearic Islands using scientific and citizen databases (*Fernando Acevedo Ramos*, Diego G. Tapetado, Victor J. Monserrat, José F. Gomez)
13. Systematic of the genus *Ascalorphne* Banks, 1915 (Insecta: Neuroptera: Myrmeleontidae: Ascalaphinae) (*Phillip Alves Schuster*, Renato J. P. Machado)
14. Phylogeny of Chrysopidae in the age of Omics (*Yuyu Wang*, Xingyue Liu, Ding Yang)
15. Note on the Neuroptera of the Republic of São Tomé e Príncipe (Insecta, Neuroptera) (*André Prost*)
16. Sisyphus work of antlion larvae: preliminary results (*Vesna Klokočovnik*, Janja Borštnar)
17. Taxonomic notes about *Ilyobius nubilus* (Navás, 1933) (Megaloptera: Sialidae) with male and larva description (*Gabriela C. Mendes*, J. M. C. do Nascimento, Lívia M. Fusari, Neusa Hamada)
18. The Neotropical antlion genus *Ameromyia* Banks, 1913 (Neuroptera: Myrmeleontidae), systematics and redefinition under a phylogenetic approach (*Leon G. M. Tavares*, Renato J. P. Machado, Adolfo R. Calor)
19. Diverse functions of egg covering materials in Megaloptera (*Pei Yu*, Fumio Hayashi)
20. Contribution to understanding the evolution of holometaboly: transformation of internal structures during the metamorphosis in the green lacewing *Chrysopa pallens* (Neuroptera: Chrysopidae) (*Chenjing Zhao*, Yuchen Ang, Mengging Wang, Xingyue Liu, Ding Yang)
21. Small, but oh my! Effects of miniaturization on the head morphology in Coniopterygidae (*Susanne Randolf*, Dominique Zimmermann)
5. Survival: The dilemma of the trophic relationship between *Chrysoperla externa* and *Planococcus citri* associated with rose bushes (*Marília M. P. Carvalho*, Maisa M. Moreira, Daniel A. Vieira, Maria E. F. Souza, Marvin M. P. Hernandez, Brígida Souza)
6. Life-history traits of the brown lacewing *Micromus angulatus* on two aphid species (*Paraskevi Ntalia*, George Broufas, Felix Wäckers, Apostolos Pekas, Maria L. Pappas)
7. Survival of *Chrysoperla externa* (Hagen) (Neuroptera: Chrysopidae) larvae fed on extrafloral nectar of *Senna cernua* (*Pedro I. Silveira*, Mathias M. Abrão, Gabriel C. da Luz, Eduardo T. Filho, Madelaine Venzon)
8. Diversity and temporal variation of brown lacewings (Neuroptera, Hemerobiidae) from areas of Atlantic rainforest in southeastern Brazil (Rogéria I. R. Lara, *Nelson W. Perito*)
9. The genus *Climaciella* Enderlein, 1910 (Neuroptera: Mantispidae) in French Guiana (*Adrian Ardila-Camacho*, Shaun L. Winterton, Atilano Contreras-Ramos)
10. Behavior of two antlion species in the context of different environmental conditions (*Eva Veler*, Vesna Klokočovnik)
11. Antlion larvae: Spontaneous sand tossing in function of predation (*Jan Podlesnik*, Vesna Klokočovnik, Vincent Lorent)
12. A taxonomic synopsis for the Brazilian species of the dobsonfly genus *Chloronia* Banks, 1908 (Megaloptera) (*Katia Justi*, Ângelo Parise Pinto)
13. New species of *Paranthaclisis* Banks and new records of antlions (Neuroptera, Myrmeleontidae) from Peninsula of Baja California, Mexico (*Yesenia Marquez-López*, Caleb C. Martins, Atilano Contreras-Ramos)
14. Checklists of Italian Neuropterida through the last three decades (*Agostino Letardi*)
15. Biodiversity of Neuropterida in North Macedonia (*Dušan Devetak*, Vesna Klokočovnik, Jan Podlesnik)
16. The revival of the British Isles Lacewing and Allies Recording Scheme (*James E. Jepson*, Colin Plant)
17. Hemerobiidae from Deceit Island (55°51'41"S 67°08'31"W): the Southernmost Neuroptera in the Americas (*Eduardo I. Faúndez*, Mariom A. Carvajal)

## Participants

A total of 141 participants from 24 countries from Asia, Europe, and North, Central, and South America attended the meeting. There is an important lag of participants from different world regions, especially Africa and Australia. Brazil led the number of participants with 64.

The list of participants is provided below in alphabetic order of family names.

## Poster presentations

1. Predatory capacity and intraguild interaction between *Chrysoperla externa* and *Cryptolaemus montrouzieri* against *Planococcus citri* associated to rose crop (*Flávia F. de Paula*, Carlos E. S. Bezerra, Ana L. V. Sousa, Brígida Souza)
2. Biocontrol potential of the green lacewings *Chrysoperla agilis* and *C. mutata* against pests in pepper (*Galini Koutsoula*, Athanasia Stamkopoulou, Apostolos Pekas, Felix Wäckers, George Broufas, Maria L. Pappas)
3. Interactions between *Chrysoperla externa* and *Rhodobium porosum* in associations with rose bushes: impact on predatory activity (Laodicéia L. Pereira, Emannel da C. Alves, Marvin Pec, Brígida Souza)
4. Predatory capacity and intraguild interaction between aphidophagous predators on the control of rose aphids (*Luiza A. G. Tamashiro*, Laodicéia L. Pereira, Luiz P. S. Pereira, Carlos E. S. Bezerra, Ana L. V. de Sousa, Alessandra de C. Silva, Brígida Souza)
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