

METALEPTEA

THE NEWSLETTER OF THE



ORTHOPTERISTS' SOCIETY

President's Message

By **ALEXANDRE V. LATCHININSKY**

President

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Dear fellow Orthopterists, dear friends,

The spring progresses in the Northern Hemisphere, and the Orthoptera season is unfolding. It's time to plan collecting trips or, in the case of pest species, management operations! In fact, in many areas of Caucasus and Central Asia anti-locust treatments are in full vigor. It looks like 2018 will be quite a locust year.

I am happy to report that the preparations for the 13th International Congress of Orthopterology, which will take place in Agadir, Morocco, on March 24-28, 2019 have made a substantial progress. The Congress website

<http://www.ico2019morocco.com/> is operational now; please visit it for all sorts of information about this exciting event. The Congress program contains a plethora of scientific activities (see [page 2](#)). Also, there is an intriguing Locust Opera performance planned! You can find more information about the Opera in the regional representative's report on [page 20](#). Once again, I would like to thank all members of the Organizing Committee (President Prof. Amina Idrissi) for their hard work preparing our next Congress, which, by the way will be held on the African continent for the first time in the history of our Society. In this issue the results of the competition for the 2018 Theodore J.



Cohn Research Grants are announced (see [page 3](#)). Congratulations to all the young orthopterist awardees! Also, you'll find scientific reports of previously awarded Ted Cohn grants.

On April 12-14, 2018, a Global Locust Initiative (GLI) was launched from Arizona State University in Tempe, AZ. The event attracted participants from all continents except Antarctica. Participants had the opportunity to meet and network with a diverse set of global stakeholders, share their research through talks and posters, engage early with an up and coming initiative, and help shape the future direction of this new initiative through workshop and synthesis discussions. To learn more about this exciting event please see [page 4](#).

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VII Brazilian Symposium of Orthoptera

By PEDRO G. B. SOUZA-DIAS, NEUCIR SZINWELSKI, and MARCOS FIANCO

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On February 27, 2018, we organized our seventh Brazilian meeting on Orthoptera, the “VII Brazilian Symposium of Orthoptera”, at the city of Foz do Iguaçu, during the XXXII Brazilian Congress of Zoology. In this edition, the theme of the Symposium was “Challenges and perspectives for the Orthopterology in Latin America”. Since the Symposium was in Foz do Iguaçu, an internationally known city, we could gather Brazilian and foreign colleagues (especially Argentinians) to discuss relevant issues on Orthoptera, focused on the science conducted in Latin America.

In this edition, we promoted 10 talks of Brazilian orthopterists: (1) “VII Simpósio de Orthoptera: desafios e perspectivas para a orthopterologia da América Latina (VII Symposium of Orthoptera: challenges and perspectives for the Latin America orthopterology)” by Dr. Pedro G.B. Souza-Dias; (2) “Orthoptera Species File as a tool to maximize the efficiency of taxonomic tasks” by Dr. Maria Marta

Cigliano; (3) “Acoustic monitoring as a tool for Orthoptera conservation and species discovery”, by Dr. Klaus Riede; (4) “Chromosome evolution in South American Melanoplinae (Orthoptera: Acrididae)” by Dr. Elio Rodrigo Castillo; (5) “Biogeographic studies within the Neotropical Romaleinae (Orthoptera, Acridoidea, Romaleidae)” by Dr. Martina Pocco; (6) “O maravilhoso e secreto mundo dos Tetrígidae (The wonderful and secret world of the Tetrígidae)” by MsC. Daniela Santos M. Silva; (7) “Complexo fálico de grilos Landrevinae (Grylloidea, Gryllidae): proposição de homologies para reconstrução histórica (Phallic complex of Landrevinae crickets (Grylloidea, Gryllidae): proposition of homologies for historical reconstruction)” by MsC. Darlan R. Redü; (8) “Como



Participants of the VII Brazilian Symposium of Orthoptera

grilos nos ajudam a compreender a seleção sexual? (How crickets help us to understand the sexual selection?)” by MsC. Gabriel Lobregat de Oliveira; (9) “O gênero *Eidmanacris* Chopard, 1956 (Grylloidea, Phalangopsidae): hipótese de relacionamento filogenético e distribuição (The genus *Eidmanacris* Chopard, 1956 (Grylloidea, Phalangopsidae): hypothesis of phylogenetic relationship and distribution)” by MsC. Lucas Denadai de Campos; (10) “A diversidade de Orthoptera em terra Brasilis: estado da arte (The Orthoptera diversity in terra brasilis: the state of the art)” by



Participants of the VII Brazilian Symposium of Orthoptera



Participants of the VII Brazilian Symposium of Orthoptera

Dr. Marcos Gonçalves Lhano. Moreover, a total of 18 results of several interesting projects were presented in the poster and oral presentation session. Included below is a set of some abstracts of the talks.

Orthoptera Species File as a tool to maximize the efficiency of taxonomic tasks

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The Orthoptera Species File (OSF, <http://orthoptera.speciesfile.org/>) is a taxonomic database of the world's Orthoptera (grasshoppers, locusts, katydids, crickets), both living and fossil, updated daily with the most recent references. It has synonymic and taxonomic information for more than 27,690 species, 45,270 scientific names, 13,800 references, 90,800 images of type and alive specimens, 1,560 sound recordings, and 96,600 specimen records. As such, OSF assures access to reliable data about Orthoptera species as well as provides the general classification of the group used worldwide. The emerging field of cybertaxonomy represents the convergence of traditional taxonomic goals with new ones, powered by the full potential of cyberinfrastructure,

digital technology, information science, and computer engineering. The potential of using OSF for integrating many of the most recent cybertaxonomic tools will be discussed. Additionally, an introduction to "Taxon Works", the new platform that will integrate the

best features of Species Files software with other software (mx and 3i), was presented. This new platform, constituted by a collection of open source tools and services that cover all aspects of the taxonomic workflow will help to maximize the efficiency of taxonomic work allowing the exchange of data among the orthopterists' community and help to expand and enhance our knowledge of Orthoptera.

Acoustic monitoring as a tool for Orthoptera conservation and species discovery

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Passive acoustic monitoring of acoustically communicating species has developed into a powerful tool for species monitoring and discovery. For Orthoptera, bioacoustic profiling works well at a local scale, as demonstrated by case studies from three biogeographic realms (Neotropics, Mediterranean, and South East Asia). However, it is not yet applicable on a global scale, mainly because reference sound recordings are missing for around 80% of singing Orthop-

tera species. Ideally, recordings are based on collected voucher specimens recorded at known temperature. Sometimes, specimens belong to undescribed species, requiring taxonomic treatment including song parameters as a diagnostic feature. The Orthoptera Species File (OSF: <http://orthoptera.speciesfile.org/>) provides a database infrastructure for songs, including management tools for undescribed species.

To accelerate the collection of reference songs, I suggest two additional workflows:

- 1) Incorporation of Orthoptera into on-going acoustic monitoring projects targeting other species (mostly birds and frogs). As an intermediate approach, corpora of putative Orthoptera songs could be extracted semi-automatically by acoustic template detection (e.g. R-package *monitoR* <https://cran.r-project.org/web/packages/monitoR/index.html>).
- 2) Data-basing of published song descriptions from the literature, based on "simple features", consisting of time-frequency bounding box parameters, numbers of elements, and power spectra. "Simple features" facilitate efficient search for known and unknown songs, and rapid compilation of song libraries even for poorly known Orthoptera communities.

Testing the South American origin and diversification hypotheses for the Neotropical Romaleinae (Acridoidea, Orthoptera)

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Grasshoppers of the subfamily Romaleinae (Acridoidea, Romaleidae) are distributed in the Americas across a wide range of habitats, being mostly represented in the Neotropical Region. This group of colorful insects, with more than 250 valid species included in ten tribes, covers the entire range of distribution of the family, extending from southern South America (Argentina and Chile) to the south of the Nearctic region, where it is represented by few members. Assuming that Romaleinae constitutes a natural group, alternative ideas arise about the origin and diversification of this subfamily. Most of the hypotheses agree on a South American tropical origin of the group (Carbonell, 1977; 1986). However, based on a morphological perspective, North American romaleids were considered to be more primitive than South American ones (Amedegnato, 1977; Rowell, 2013). This study aims to elucidate the biogeographical history of the Romaleinae, based on a morphological and molecular phylogeny conducted on a comprehensive taxon sampling including most of the tribes of Romaleinae and members of the most closely related families (Song et al., 2015). We applied different methods to trace the biogeographic patterns and analyze the diversification processes that may have occurred within the group. Based on our biogeographic analyses, we test and discuss the South American hypothesis of origin and diversification postulated for this group, providing new insights into the evolutionary history of the Neotropical Romaleinae.

Chromosome evolution in South American Melanoplinae (Orthoptera: Acrididae)

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Acridid grasshoppers display an apparent karyotypic stability, with the vast majority of species exhibiting a standard acro-telocentric karyotype ($2n=23\♂/24\♀$; $FN=23/24$) and X0/XX sex chromosome determination mechanism (SCDS). Nevertheless, evolutionary structural modifications of the standard karyotype due to different types of chromosomal mutations have occurred along their history. One of the most important components of chromosome variation in Acrididae is constituted by neo-sex chromosome determination systems (neo-SCDS), which arose from standard X0/XX systems within several lineages. South American Melanoplinae received special attention in this aspect. The Scotussae group of genera include several clades showing species with extensive variation in the chromosome number, morphology and derived neo-SCDS (i.e., *Ronderosia*, *Atrachelacris*, *Dichromatos*, *Eurotettix*, *Scotussa*, *Leiotettix*, *Chlorus*). The observed neo-SCDS diversity is explained by the occurrence of chromosomal rearrangements, the most recurrent being a centric fusion between the X chromosome and an autosome, the neo-X, the non-fused autosome partner becoming the neo-Y. *Dichroplus* is another striking group studied in this aspect with species showing different evolutionary examples of neo-sex chromosome. This genus is also special not only because derived sex chromosomes evolve through additional chromosomal rearrangements but also comprises representatives considered major pests of several crops (barley, rye, oats, wheat, flax, lucerne) and forages on natural pastures in Argentina (i.e., *D. maculipennis*, *D. elongatus*, *D. vittatus*). The cytogenetic information supports the hypothesis that substitution from X0/XX to a derived neo-SCDS were favored during the evolutionary history of neotropical Melanoplinae. However, the understanding of the mechanisms that rule sex determination in South American

Melanoplinae (Orthoptera) is still a challenge. An interesting contribution could be the analysis of all these karyotypic information in a phylogenetic context, which is fragmented in this group.

The genus *Eidmanacris* Chopard, 1956 (Grylloidea; Phalangopsidae): hypothesis of phylogenetic relationship and distribution

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The systematic knowledge of the Grylloidea superfamily has gone through several divergences over the years, possibly due the lack of scientific studies for the group. Mainly taxonomic and systematic studies. The first cricket phylogenies were based in models of speciation, acoustic communication, and stridulatory apparatus diversification. Recently, Orthoptera phylogenies of Ensifera and Grylloidea began to clear their relationships. Therefore, new phylogenetic studies of less comprehensive taxa can help to clarify the relationships in larger groups. The genus *Eidmanacris* Chopard, 1956, has 29 described species that are distributed through Atlantic Forest, Cerrado, and Chaco in Brazil, Bolivia and Paraguay. These crickets are active at night, inhabiting natural cavities on the ground, dead tree trunks, crevices in rocks, and caves. Due to their great diversity and distribution through South America, *Eidmanacris* crickets, are good models of phylogenetic and biogeographic studies. *Eidmanacris* monophyly is attested in a phylogenetic reconstruction based on morphological characters. This phylogeny allows visualization of the the relationship of *Eidmanacris* with other Luzarinae taxa in addition to sustaining the synonym of *Endophalusia* de Mello, 1990 with *Eidmanacris*. Despite what little distribution

data exists for this group, this genus of crickets is also a good model of biogeographic studies. Thus, an event analysis can be a good tool to understand *Eidmanacris* cricket distribution through South America and why they inhabit humid areas (Atlantic Forest) and dry areas (Cerrado and Chaco) at the same time.

The Orthoptera diversity in terras brasiliensis: the state of the art

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The Catálogo Taxonômico da Fauna do Brasil (Taxonomic Catalog of the Brazilian Fauna - TCBF) is the first product of the efforts of more than 600 zoologists worldwide, experts in many different groups of animals that inhabit the Brazilian territory. This is the first time we have a robust value for the richness of Brazilian species. This project is an initiative of the

Brazilian Society of Zoology (SBZ) and BHL-SciELO Network (Global Biodiversity Heritage Library Network/BHL and Scientific Electronic Library Online/SciELO). Since the beginning of the Project, in April of 2015, the TCBF team has been working in an integrated manner to generate the first list of valid species found in the country. The TCBF has 3 leaders and 60 coordinators for higher taxa, besides the specialists from 98 Brazilian institutions and 52 international institutions. Marcos Lhano, who is responsible for Caelifera data, coordinates the team for Order Orthoptera; the experts for Ensifera data are Francisco de Assis Ganevo de Mello (Gryllidae), João Paulo Morselli (Anostostomatidae, Gryllacrididae, Mogoplistidae), and Juliana Chamorro-Rengifo (Tettigoniidae). So far, approximately 121,600 valid species of fauna are known in Brazil, the majority being arthropods (about 85% with almost 99,500 species) and most of it belongs to the Class Insecta (more than 89,000 species). For the

Order Orthoptera, 1,786 valid species and 63 subspecies from 564 genera have been reported. The authors who published valid species the most for Brazil were: S. Toledo-Piza (218 species), M. Descamps (188 species), L. Bruner (147 species), K. Bruner von Wattenwyl (134 species) and J.A.G. Rehn (119 species). We noticed that an improvement of the data of Brazilian Orthoptera has occurred in the past 10 years due to the “Biota of Orthoptera” project, which improved the knowledge of its biology and ecology, and the number of new taxa described. A quick analysis shows that we are far from knowing the Brazilian Orthoptera fauna in a comprehensive manner. Much work is still necessary for the taxonomists; many more inputs will be entered into the system. We hope that the TCBF, therefore, represents a facilitator and induces further studies to describe the animal diversity in Brazil more effectively. The list is available for consultation at <http://fauna.jbrj.gov.br>.

Green fool grasshoppers

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A pair of green fool grasshoppers (Acrididae: Gomphocerinae: *Acrolophitus hirtipes* (Say, 1825)) captured during copulation on a remote rangeland in New Mexico, U.S.A. during the 2017 field season of the USDA's Rangeland Grasshopper and Mormon Cricket Management Team. If you have never had the pleasure of encountering any species in this genus, then you may be surprised to learn that the majority of their body is “fuzzy”, being covered in a fine, dense mat of surprisingly soft setae. Remarkable!

