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METALEPTEA

THE NEWSLETTER OF THE ORTHOPTERISTS' SOCIETY

President's Message

By AXEL HOCHKIRCH
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Dear Society members,

A very happy New Year to everyone!

In October 2023, we had our 14th International Congress of Orthopterology in Mérida, Mexico. It was a great pleasure to meet so many Orthopterists again after years of Covid, which had also delayed our congress. We had an awesome congress and our heartfelt appreciation goes to Mario Poot and his team for organizing this congress so well in such a beautiful region. Those of us who joined the post-congress tour were impressed by the Maya ruins of Uxmal with the impressive pyramids, the beautiful Cenotes Santa Bárbara, and the mangrove forests of Celestún. During the congress, we discussed initial plans for the next congress to be held in Argentina, but the final decision depends upon the political and economic situation in Argentina, which currently faces a major economic crisis. My deep gratitude goes to María Marta Cigliano, who has instigated the organization. The potential venue would be at San Martín de los Andes, the place where the Pan American Acridological Society (the precursor of our Society) was founded in 1976 - 50 years before our next congress will take place.

During our Congress in Mérida, I became President of the Orthopterists' Society and I would like to express my sincere thanks to David Hunter,

who has navigated our Society so well through the Covid crisis and has a profound knowledge of our Society due to his role as Executive Director from 2013 to 2019. I am extremely pleased that David will remain on the Governing Board of the Society as our Financial Advisor (a new officer position). We also welcome Arianne Cease, Director of the **Global Locust Initiative**, to our Board as our Global Locust Initiative Representative (another new officer position). In this *Metaleptea* issue you will find the report of our Board Meeting, which was held on the 17th of October during our Congress.

In 2023, the *Journal of Orthoptera Research* received, for the first time, an Impact Factor by Web of Science (0.8). This is an important step to increase the reputation of our journal,

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which will become more attractive for many researchers. Please continue to submit good orthopterological manuscripts to *JOR*. Particularly, reviews can help to further increase the perception of our journal. My profound admiration goes to our *JOR* Editor-in-Chief, Tony Robillard, who manages the journal so successfully, but also to Corey Bazelet, who has initiated the listing in Web of Science.

In Central Europe, where I'm based, there are hardly any Orthoptera found during the winter months. This means that I can focus on lab work, analyze data, supervise students, and write papers or proposals. During the last years, the validation of Orthoptera records on citizen science platforms has become one of my favorite activities. The increasing interest in citizen science allows us to engage in the identification of Orthoptera throughout the year. The two largest citizen science platforms (**observation.org** and **iNaturalist**), have collected millions of Orthoptera records, many of which need to be validated by experienced Orthopterists. I regularly review some of these observations and their sheer quantity leads to some exciting records, including new records of species for countries or rediscoveries of lost species. I highly recommend engaging in this process, as the data will be valuable for biodiversity research and conservation.

I wish everyone success in their work for the coming year - all the best for 2024.

Brief of the 14th International Congress of Orthopterology, Mérida, Mexico

By **MARIO A. POOT-PECH**
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It is my pleasure to briefly inform you about the activities and attendance at ICO 2023, which took place from October 16 to 19, 2023 in the City of Mérida, Mexico.

Organization

The main organizing institution for this congress was the Yucatan Plant Health (CESVY), which was supported by different national and international organizations and institutions.

Table 1. The number of talks and videos per symposium and oral presentation.

No	Symposia	# Talks	# Videos
1	Impact of climate change and new approaches on management of the Central American Locust	8	0
2	Anthropogenic impacts on acoustically signalling orthopterans	4	0
3	The effect of human activities on Orthoptera	7	0
4	Current Orthoptera research in Latin America	4	0
5	New vision on locust and grasshopper management	8	0
6	Recent advances in locust phase polyphenism research	5	1
7	Mycopesticides for locust control	4	0
8	Management and implementation of regional and national programs for locust management	11	0
9	Systematics & Phylogenetics	6	1
10	Orthoptera Conservation	2	1
	SubTotal	59	3
	Oral Presentation	# Talks	# Videos
1	Systematics & Phylogenetics	8	1
2	Development & Physiology	4	0
3	Population Biology & Management	4	5
4	Biodiversity Biogeography & Ecology	6	1
5	Behaviour & Communication	5	2
	SubTotal	27	9
	Total	86	12

Scientific Program

The scientific program consisted of 5 plenary speakers, 10 symposia, 5 sections of oral presentations, 14 posters, 2 workshops, and 3 meetings (Table 1). Unfortunately, for various reasons, such as the lack of visa or health problems, several speakers canceled their participation at the last minute and others sent their videos. These made it difficult to make a connection with the participants with video since the program would have to be accommodated the next day and avoid empty times.

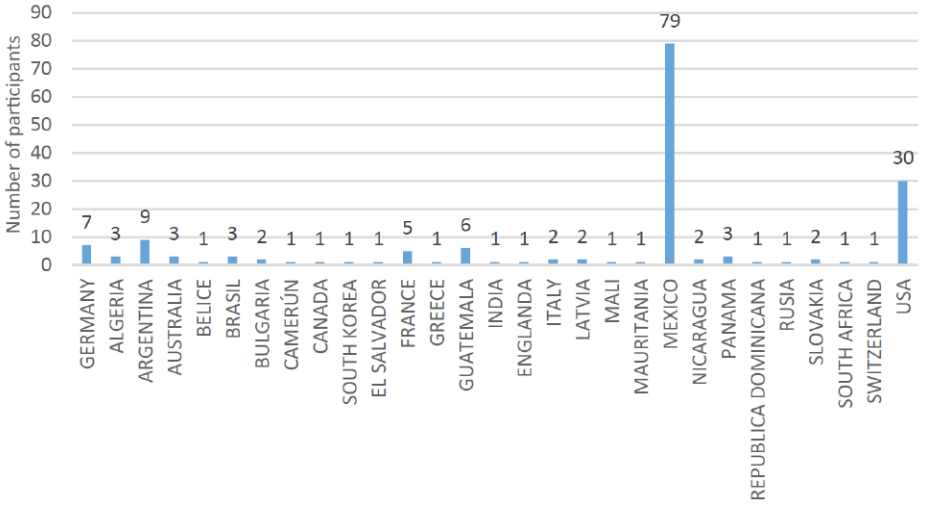

Figure 1. Information about the attendance.

Attendance

172 people attended ICO 2023 from 29 countries. Mexico, being the host nation, was the one with the most people attending (Fig. 1).

There was also participation of the FAO program "Locust and transboundary plant pest and disease," FAO Mesoamerica, Global Locust Initiative (GLI), and the different institutions of attendants at ICO 2023 (Table 2).

Table 2. Internantional organizations that attended this congress

Institution	Acronym	Countries represented
Regional International Organization for Plant Protection and Animal Health	OIRSA	Mexico, Belice, Guatemala, Honduras, Nicaragua, El Salvador, Costa Rica, Panamá y República Dominicana
Plant Health Committee of the Southern Cone	COSAVE	Argentina, Bolivia, Brasil, Chile, Paraguay, Perú y Uruguay
Commission for Controlling the Desert Locust in Western Africa	CLCPRO	Argelia, Burkina Faso, Chad, Libia, Marruecos, Mauritania, Níger, Senegal y Tunicia

Field visit

On Friday there was a visit to the Municipality of Buctzotz where the nymphs of the Central American locust were observed, drone control operations were demostrated, insects were collected in grasses, and a free lunch was provided at the invitation of the owner of the ranch.

Sponsors

We appreciate the support of the OS Board, OIRSA Sede in EL Salvador, OIRSA Mexico, SENASICA México, Government of Yucatan (SEDER), FAO Mesoamerica, and the Mexican aerial application company "Helimaz," everyone contributed to achieving this successful congress.

Figure 2. Traditional "handing off the hat" ceremony at the gala dinner from the previous President David Hunter to the new President Axel Hochkirch.

The Theodore J. Cohn Research Fund: Call for Applications for 2024
(Application Deadline: March 31, 2024)

By MICHEL LECOQ
Chair, Theodore J. Cohn Research Fund Committee
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Dear fellow Orthopterists,

I am pleased to announce a new call for applications for the Theodore J. Cohn Research Fund. This research grant is primarily intended to fund research projects on Orthopteroids carried out by young researchers, often as part of a Master's or Ph.D. degree, although Postdoctorates may also be funded. A total of $15,000 US dollars per year is available and it is possible to fund research grants of up to $1,500 dollars per beneficiary.

I strongly encourage students and young researchers from all over the world, and particularly Africa and Asia, to submit a project. The committee will examine all applications with the same care and attention. The intrinsic quality and originality of the research project will be the only criteria considered.

Full details are available on the **Orthopterists' Society website's dedicated research fund page**.

Proposals must be submitted in the suggested format and limited to the number of pages indicated. As usual, they should be submitted to the following address:
Michel Lecoq, Manager of the Ted Cohn Research Fund;
e-mail: **mlecoq34@gmail.com**

We remind you that those whose projects are selected will be asked to submit an article presenting their main results for our *Metaleptea* Bulletin.

Remember… you can't get one if you don't apply!!!

I wish all of you the best for the year 2024.

Update on the Singing Insects of North America (SINA) Website

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As mentioned in the last update, **SINA** was designed before the prevalence of small screens and, therefore, does not always display well on cell phones, tablets, and other such devices. I have created a template with updated coding for the species' map pages to make them responsive to smaller screens, as well as for browsers that are resized on larger screens. The template was created while adding a missing record (as pointed out to me by Ron Lyons) to *Idiostatus gurneyi*'s **map page**. Ron Lyons noticed there were three county records listed for this species in Rentz's 1973 publication ***The Shield-backed Katydids of the Genus Idiostatus***, but only two records appeared on both the publication's map and the SINA map. The missing record has been added to the SINA map, and another map, a close-up showing the locations listed for *I. gurneyi* in Rentz 1973 in each of the counties, was also provided. The section at the bottom of the map page, which gives a summary of the species' distribution and a list of records, was included, along with a pop-up box displaying the five regions of the United States. For species with distributions extending into Canada, a map of the Canadian Provinces will be provided. While I will be developing responsive code for the species pages (for instance, see *I. gurneyi*'s **species page**), my primary work over the next few months will be to continue updating and adding new records and information to the species' map pages.

Regional Reports - What's happening around the world?

Central and South America

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It was a great pleasure to participate in the 14th International Congress of Orthopterology that was held in the beautiful city of Mérida, Mexico, in October 2023. It was successfully organized, with excellent conferences and presentations! One of the 10 symposia held was the symposium "**Current Orthoptera research in Latin America**." It was organized by M. Celeste Scattolini, Ricardo Mariño-Perez & Salomón Sanabria-Urbán (Fig. 1) and included seven presentations (two of them were virtual presentations) that addressed the most recent advances in diversity, systematic, ecological, and evolutionary studies in Orthoptera research performed in Latin America.

Lucas Denadai de Campos from Brazil (Universidade of São Paulo) talked about the evolutionary history of characters related to acoustic communication in the family of tree crickets, Oecanthidae; and Elio Castillo from Argentina (IBS, CONICET-UNaM) presented a talk on the evolutionary dynamics of South American Melanoplinae (Acrididae) chromosomes. Salomón Sanabria-Urban from Mexico (UBIPRO, UNAM) talked about the evolutionary relationships, biogeography, diversity, and systematics of Melanoplinae grasshoppers in Mexico. In relation to ecological studies on pest species, M. Celeste Scattolini from Argentina (CEPAVE, CONICET-UNLP) presented recent

Figure 1. Organizers and speakers of the symposium "Current Orthoptera research in Latin America" at ICO 2023. Y. Mariottini, S. Sanabria-Urbán, M.C. Scattolini, R. Mariño-Perez, D. Santos Martins Silva.

Figure 2. Orthoptera team from La Plata and Tandil (Argentina) at ICO2023. M.C. Scattolini, B. Cabrera, M.M. Cigliano, Y. Mariottini, M.E. Pocco, H. Braun.

studies on the South American locust, *Schistocerca cancellata* (Acrididae), and determination of critical factors associated with the spatial distribution of its potential breeding habitats, and Yanina Mariottini from Argentina (UNICEN-CIC) gave a presentation on the population dynamics, ecology, and biology of two pest grasshoppers in Argentina, *Dichroplus maculipennis* (Acrididae) and *Bufonacris claraziana* (Tristiridae). Ricardo Mariño-Pérez (USA, University of Michigan) talked about the diversity and recent findings of the subfamilies Proctolabinae and Ommatolampidinae (Acrididae) in Mexico, while Daniela Santos Martins Silva (USA, Miami University) gave a presentation on the "Grasshoppers from Brazil" project, which proposes to assemble the first group to specifically study the grasshoppers (Caelifera) in Brazil.

With the continuous support of the Orthopterists' Society, the ICO meetings are always a great opportunity not only to strengthen the scientific networks, share experiences, and plan new collaborative projects, but also to meet friends and colleagues from all over the world! The Orthoptera team from Argentina was delighted to attend this amazing congress (Fig. 2).

East Europe - North and Central Asia

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The international team of orthopterists from Kazakhstan, Russia, Turkmenistan, Uzbekistan, and FAO prepared and published a book concerning the Moroccan locust's (*Dociostaurus maroccanus* (Thunberg)) taxonomy, distribution, ecology and population management in the eastern part of its range (FAO, 2023 —doi.org/10.4060/cc7159ru) (unfortunately only the Russian version). There are xxviii + 561 pages and numerous figures and tables. It includes the following chapters:

1. Introduction
2. History of the Moroccan locust studies
3. Taxonomy
4. General distribution
5. Morphological peculiarities of different developmental stages
6. Phase variability
7. Ontogenesis and behavior
8. Adults migration
9. Feeding and trophic behavior
10. Enemies and diseases of the Moroccan locust
11. Habitats and main areas of outbreaks of the Moroccan locust in the eastern part of its range
12. Population monitoring and forecasting
13. Population management
14. The Moroccan locust

Figure 1. The cover page of the book about the Moroccan locust (FAO, 2023)

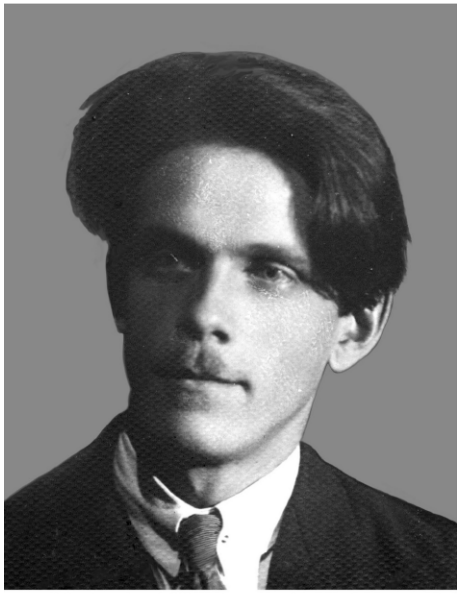

Figure 2. A portrait of Russian orthopterist Sergey Petrovich Tarbinsky taken from the Proceedings.

and climate changes
15. Laboratory rearing
16. Conclusions

There are some supplements as well. Among them are lists of enemies, diseases, and food plants, and biographic essays dedicated to several acridologists whose studies were important for understanding the Moroccan locust taxonomy, distribution, and ecology in the eastern part of its range.

Also, the Russian Entomological Society published a **special volume (94th) of its Proceedings** dedicated to the famous Russian orthopterist Sergey Petrovich Tarbinsky (Fig. 2). The volume includes the following articles:

- Gorochov A.V. Word about Sergei Petrovich Tarbinsky (1902–1942) (in Russian)
- List of publications by Sergey Tarbinsky
- Sergeev M.G. Orthoptera of the Altaian plains: are there some shifts in diversity? (in Russian)
- Storozhenko S.Yu. A new species of the genus *Saussurella* Bolívar, 1887 (Orthoptera: Tetrigidae) from South-East Asia (in English)
- Storozhenko S.Yu., Lapteva S.V. To the knowledge of the genus *Omocestus* I. Bolívar, 1878 (Orthoptera: Acrididae) (in Russian)
- Van'kova I.A., Sergeev M.G. Zonal-landscape distribution of *Calliptamus barbarus* (Costa) (Orthoptera: Acrididae) (in Russian)
- Gorochov A.V. New and little known taxa of the tribe Mirolliini (Orthoptera: Tettigoniidae: Phaneropterinae) from Indo-Malayan region (in English)
- Korsunovskaya O.S. Acoustic signals of bush-crickets of the tribe Pholidopterini (Orthoptera: Tettigoniidae) of Eastern Europe and the Caucasus (in Russian)
- Benediktov A.A., Mikhailenko A.P. Fauna and acoustic signals of the long-horned orthopterans (Insecta: Orthoptera: Ensifera) of the Streletskaya Steppe of the Central Chernosem State Nature Reserve (in Russian)
- Gorochov A.V. New data on the tribe Odontogryllini (Orthoptera: Gryllidae: Landrevinae) from America (in English)
- Anisyutkin L.N. Two new earwigs (Dermaptera: Anisolabididae) from Bi Dup – Nui Ba National Park, Vietnam (in English)

In 2023, field studies of orthopteroid insects (general ecology, acoustic, and population management) were continued in the countries of Central Asia (including the southern parts of Kazakhstan) and the Caucasus, as well as across the southern parts of Russia. The project "Ecologo-geographical modeling of distribution of possible pest and rare species of grasshoppers and other orthopteran insects over the south of the Asian part of Russia and adjacent regions," supported by of the Russian Science Foundation (22-66-00031), has been carried out by the orthopterists from Novosibirsk State University, the Institute of Systematics and Ecology of Animals (Novosibirsk), and the Federal Scientific Center of the East Asia Terrestrial Biodiversity (Vladivostok). In 2023, the team produced and compared sets of different models for several abundant (e.g., *Angaracris barabensis*, *Arcyptera microptera*, *Chorthippus apricarius*) and rare (*Paracyphoderris erebeus* — doi: 10.3390/insects14100789, *Decticus nigrescens* — doi: 10.25221/fee.487.2 et al.) species of Orthoptera. Our colleagues also continue to study cytogenetic and molecular genetic diversity of orthopteroid insects relative to their phylogeny and distribution.

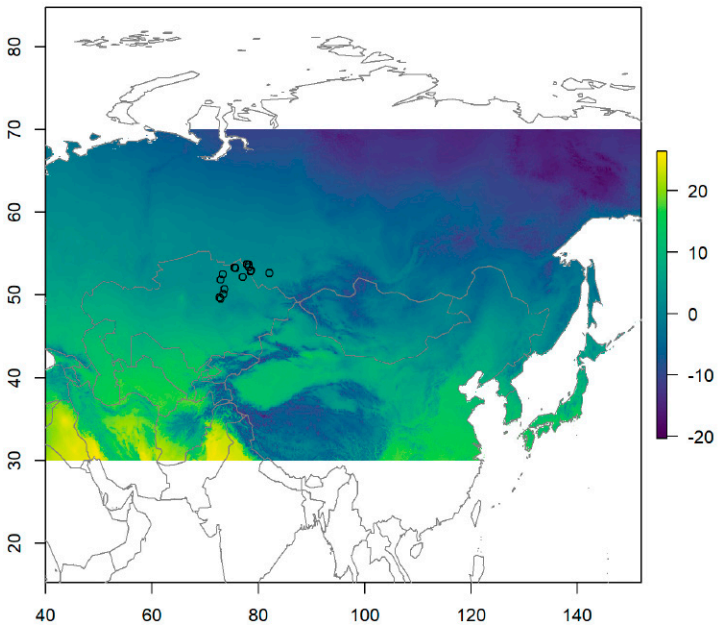

Figure 3. Known localities of the rare grasshopper *Aeropedellus baliolus* Mistshenko relative to the distribution of annual mean temperatures (produced by the ellipsenm package)

Theodore J. Cohn Research Fund Reports

Operational Sex Ratio and the Evolution of Male Calling Effort in Decorated Crickets

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A deeper understanding of the evolution of sexually selected traits requires consideration of the environmental factors thought to shape variation in sexual selection. A range of ecological factors affect the direction and magnitude of sexual selection, among them, the structure of the mating system, as this determines the extent to which individuals are able to access potential mates (Emlen & Oring, 1977). One proxy for this environmental component is the operational sex ratio (OSR), defined as the number of sexually active males to sexually receptive females within a population. Theory predicts that when the OSR is skewed, the more abundant sex should experience greater intrasexual competition, whereas the less abundant sex should exhibit greater choosiness (Emlen & Oring, 1977; Janicke & Morrow, 2018). Typically, it is males that compete fiercely for access to mates whereas females typically exhibit greater choosiness with respect to prospective mating partners.

Although the OSR can affect the evolution of sexual traits, some male behavioral traits related to mating may vary plastically in accordance with the current OSR in the environment. For example, behaviors such as intrasexual aggression and courtship displays in males can increase in response to the presence of increasingly male-biased OSRs (Souroukis & Cade, 1993; Grant & Foam, 2002). However, theory predicts that selection over generations under a constant, extreme environment of a specific variable (such as OSR) will lead to decreased sensitivity or plasticity to variation in that variable in the expression of relevant traits. Thus, we might predict that not only would differences in sexual traits arise for males experiencing different extreme OSRs over multiple generations, but also differences in the ability to modulate expression of relevant sexually selected traits. Specifically, under male-biased OSRs, there should be intense directional sexual selection for greater expression of secondary sexual traits because of the need to compete with other males, attract females, or both.

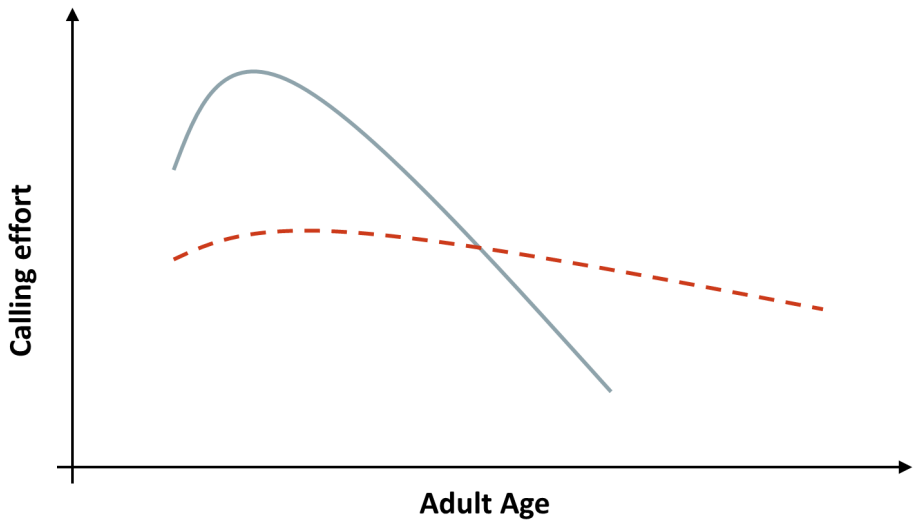

Figure 1. Hypothetical evolutionary outcomes for age-specific male investment in calling effort in response to varying OSR. Males from male-biased lines (high male: female ratio; solid blue) should exhibit higher calling effort shortly upon becoming adults, but decreased longevity due to increased investment into reproduction. Meanwhile, males from female-biased lines (dashed orange) should exhibit more balanced calling over their lifetime and have increased longevity when compared with males from male-biased lines.

Crickets make an ideal system to investigate the relationship between the OSR and the intensity of sexual selection acting on male secondary traits and trait plasticity. In crickets (Gryllidae), males produce an obvious and readily quantifiable sexual trait to attract mates via acoustic signaling. Calling is critical for males to obtain matings with females (Sakaluk, 1987; Zuk & Simmons, 1997). With the help of the Theodore J. Cohn Research Fund, I was able to investigate how the OSR affects the evolution of calling effort in male decorated crickets, *Gryllodes sigillatus*, by leveraging replicate experimental evolution lines imposing two different selection regimes: one with a severe male-biased sex ratio, and the other with a severe female-biased ratio.

Using a custom-built sound monitoring array, I was able to measure the calling effort of males from both OSRs under each of two levels of perceived competition: in the absence of rivals and in the presence of experimentally muted rivals. Muted males were from an outbred colony from our laboratory and had one of their wings clipped to prevent any confounding calling activity. We predicted that individuals from male-biased lines

Figure 2. Individual calling boxes and room set-up. A) Males are placed in individual plastic containers with egg carton, food, and water to have their calls recorded. All boxes have a lid mounted microphone that relays back to the computer for measurement. B) Overall set-up of calling studio room, where over 100 individuals can be recorded at once.

would have higher calling effort early in their lives compared with those from female-biased lines since they would be constantly competing with a greater number of rivals (Fig. 1). In contrast, we predicted that males from female-biased lines would call at lower rates overall, but that they would retain a greater degree of plasticity in calling effort. Individuals were placed in boxes and had their calling effort recorded over three consecutive weeks with the sound-monitoring equipment. I collected calling effort data points for over 457 individual male crickets.

Surprisingly, our results were contrary to our predictions, with males originating from the female-biased lines calling slightly more on average than males from male-biased lines. This was consistent throughout the three weeks that calling effort was measured. However, both OSR lines showed substantial plasticity in calling, with both lines calling significantly more when housed with a muted outbred competitor compared with those that were solitary. These findings suggest that the OSR had only a modest effect on calling effort; however, the contemporary competitive environment greatly influenced male investment.

The unexpected effect of OSR on calling may have occurred because selection instead favored other sexual signals, such as other components of song (Bertram et al., 2022; Froome 2022) or cuticular hydrocarbons (Ryan & Sakaluk 2009). Regardless, the high degree of plasticity aligns well with that observed in other traits of male competitiveness in crickets, such as the propensity to engage in intrasexual aggression (Souroukis & Cade, 1993) and sperm allocation (Schaus & Sakaluk, 2001). The high degree of plasticity shown in this study did not come without a cost, however, as increased calling effort resulted in an increased mortality risk. An important objective moving forward is to determine the extent to which the plasticity itself can evolve and to identify those elements of the social environment that alter the breadth of this plasticity.

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Molecular Phylogeny of Phaneropterinae (Orthoptera: Tettigoniidae): Including the Neotropical Taxa

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Although the phylogeny of Tettigoniidae has been explored in the past few years, mainly via the use of molecular data (e.g., Mugleston *et al.* 2013, 2016, 2018), several genera and tribes have still not been included, and this is even more evident when we pay attention to the leaf katydids from the Neotropical Region. As explored by Mugleston et al. (2018), we face a widespread taxonomic incongruence among Tettigoniidae, with several taxa being para- or polyphyletic. When we consider only the Phaneropterinae, it is even worse, since from the more than 30 tribes, only one of them was recovered as monophyletic: the lichen-katydids from the Dysoniini. After the publications of Mugleston *et al.* (2013, 2016, 2018), Grzywacz *et al.* (2018) recovered Barbitistini as a natural group, and Rocha-Sánchez *et al.* (2019) found that the Odonturini from Mexico also compose a monophyletic group

Phaneropterinae represents the most diverse subfamily of Tettigoniidae with more than 2,800 species and 380 genera (Cigliano *et al.* 2024). When we picture the Neotropical region, more than 950 species are recorded, making Brazil the most diverse country of phaneropterines in the world (Cigliano *et al.* 2024). Despite all diversity, the Neotropical taxa of phaneropterines are underrepresented in molecular studies so far, with only 26 genera represented in the aforementioned studies, representing less than 25% of the diversity in the Neotropical region, which has more than 110 genera recorded up to now.

When I proposed my project back in March, 2022, I aimed to provide molecular data of 45 species of Phaneropterinae and to propose a phylogenetic hypothesis for such katydids, sequencing data of four DNA markers of specimens belonging to more than 35 genera with no molecular data. At that time, I had extracted the DNA and amplified 4 molecular markers from the taxa sampled in the Brazilian Atlantic Forest, and the Theodore J. Cohn Research Fund provided me with the budget to buy the following reagents for the sequencing: Qubit™ 1X dsDNA High Sensitivity, BigDye™ Terminator v3.1, and POP-7™ Polymer. You can't imagine how happy I was with the approval of the project, and how much this approval helped in my academic career, as well as all the grants I have already received via the Orthopterists' Society and OSF, I will be forever grateful for

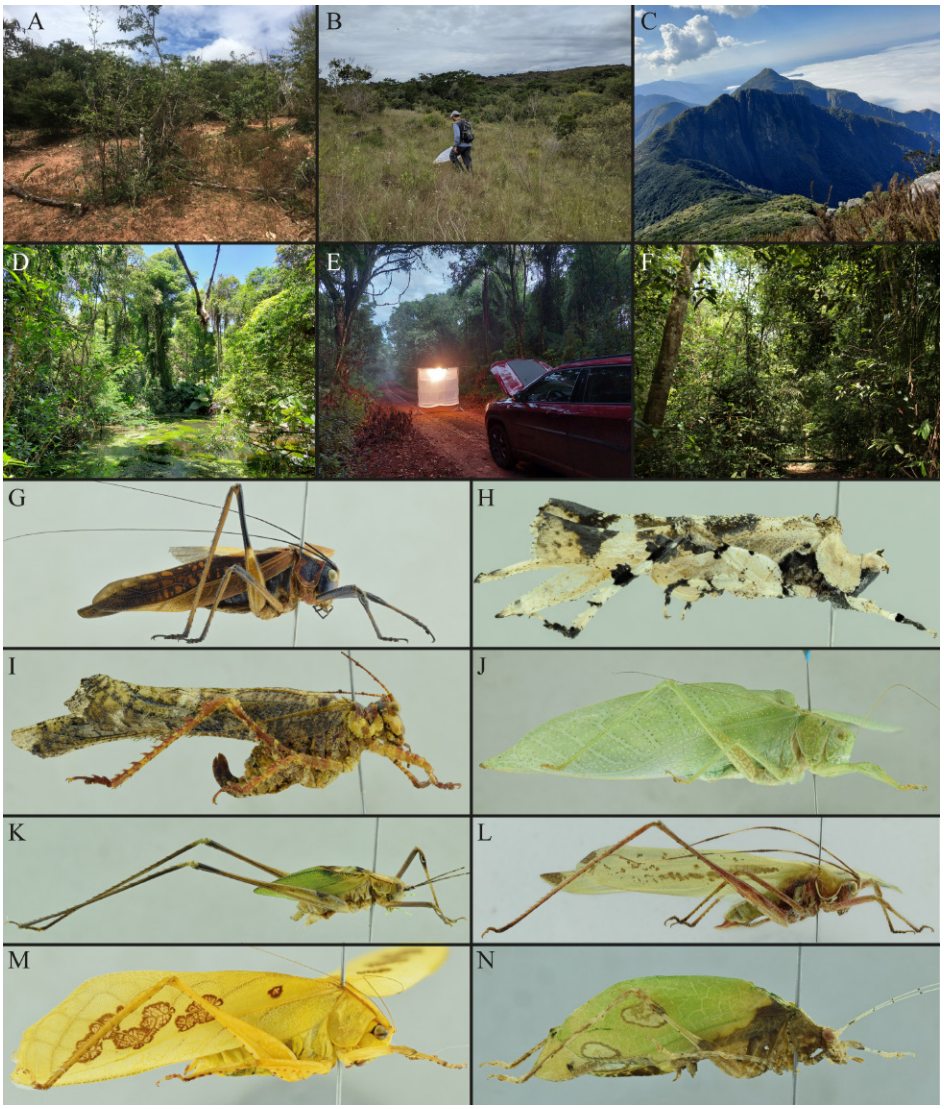

Figure 1. Sampling sites and morphological diversity of Phaneropterinae from the Neotropical region. Biomes: **A–F**; Vouchers: **G–N**. **A**: Caatinga (sampling site from Bahia State, photo by Dr. D. Barbosa); **B:** Cerrado (from Paraná State); **C:** altitude fields in a mountain range (Paraná State); **D:** Atlantic Forest (from Rio Grande do Sul State); **E:** light trap installed on a road in the Atlantic Forest, powered by my advisor's car; **F:** Amazon Forest (from Amazonas State, photo by MSc. Larissa Queiroz); **G:** *Scaphura* sp.; **H:** *Lichenodentyx dentatithorax*; **I:** *Anaphidna* sp.; **J:** *Anapolisia* sp.; **K:** *Engonia* sp.; **L:** *Hammatofera nodicornis*; **M:** *Metaprosagoga insignis*; **N:** *Pycnopalpa bicordata*.

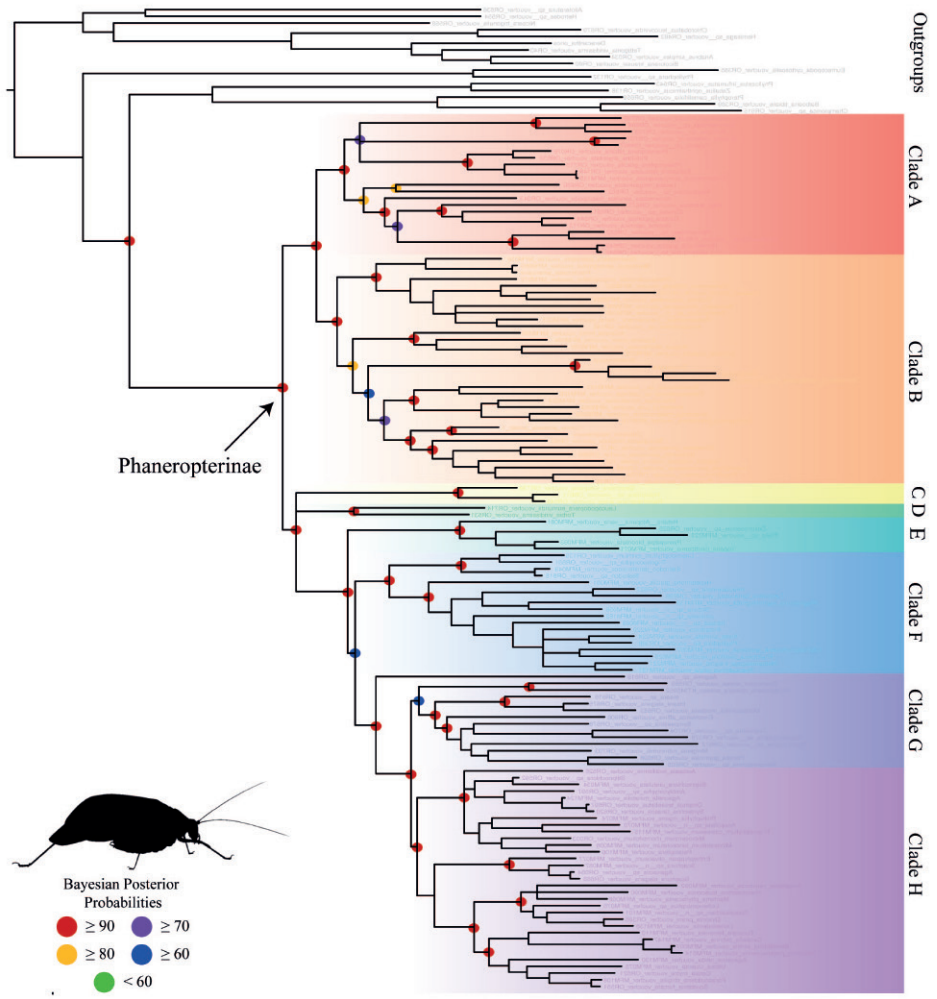

Figure 2. Bayesian phylogenetic tree of Phaneropterinae based on the combined analysis of four nuclear markers (18S, 28S, H3 and WG) and one mitochondrial marker (COII). Circles denote posterior probabilities, colored rectangles in gradient show the eight major clades also indicated on the right.

everything you gave me!

As time has passed, I had the opportunity to collect more katydids, and several colleagues helped me on that, such as my advisor Dr. Gabriel A.R. Melo, and my friends MSc. Hemanueli Preis, Dr. Diego Barbosa, Dr. Neucir Szinwelski, and Dr. Elton Orlandin. With such help, I was able to expand the diversity of sampled katydids both in species, genera, and tribes as well as geographically. At the current time, I have already obtained molecular data of 57 species, belonging to 53 genera, 47 of which have had no available molecular data until now! Such taxa are from all Brazilian biomes (except Pantanal), covering the Atlantic Forest (South and Coastal Region), Caatinga (Northeastern Region), Cerrado (West-Central, Northeastern, Southern and Southeastern Region), and Amazon Forest (North and Northeastern Region) (see Fig. 1A-F). Among these genera I can cite the wasp-katydids from the *Scaphura* (Fig. 1G) and *Aganacris* genera, the lichen-katydids from the *Lichenodentyx* (Fig. 1H) and *Lichenomorphus* genera, the moss-katydids from the *Anaphidna* (Fig. 1I), *Angara*, and *Machima* genera, the white-cheeked katydid *Philophyllia*, the angle-winged katydids from the *Petaloptera*, and *Anapolisia* (Fig. 1J) genera, the short-winged katydids from the *Angara*, *Anisophya*, *Engonia* (Fig. 1K), and *Xenicola* genera, and the katydids with necrotic marks on wings, such as *Agaurella*, *Hammatofera* (Fig. 1L), *Metaprosagoga* (Fig. 1M), *Pycnopalpa* (Fig. 1N), and *Theia* genera.

For the systematic approach and to construct the phylogenetic tree, my advisor and I used data from one mitochondrial (COII) and three nuclear (18S, 28S, H3) markers. Unfortunately, we failed to amplify the Wingless (WG) gene; therefore, all data from the WG gene comes from GenBank. We produced phylogenetic trees using the Bayesian Inference (BI) and Maximum Likelihood (ML) analyses, using the concatenated data of the aforementioned five molecular markers.

Both BI and ML results showed strong support regarding the monophyly of Phaneropterinae (Fig. 2), a status questioned by Mugleston *et al.* (2016, 2018). We recovered Phaneropterinae as comprising eight main groups, all with strong support in both BI and ML analyses (Fig. 2). From all the tribes in our analysis, we recovered Dysoniini, Scudderiini, Barbitistini, the Mexican Odonturini, and the Afrotropical Odonturini as being monophyletic groups. Some well-sampled tribes, such as Phaneropterini, Microcentrini, Amblycoryphini, Phyllopterini, Pycnopalpini, Odonturini, Ducetiini were recovered as para- or polyphyletic.

Our findings showed that many tribes are unnatural groups, corroborating Mugleston *et al.* (2018) who first noticed the taxonomic incongruence among Tettigoniidae. We were also able to provide molecular data of tribes with no available data, such as Plagiopleurini and Percyniini, and inferred their position on the Phaneropterinae phylogenetic tree; we were also able to find new Phaneropterinae genera that will be described soon, supported by molecular and morphological data.

Currently, I am finishing my PhD studies and writing an article proposing a phylogenetic hypothesis dealing with Phaneropterinae, focusing on the Neotropical taxa, where some tribes will be proposed as new, as some tribes will be synonymized under others, providing a better classification of Phaneropterinae. As some people say, the work never stops, so we will continue our work describing the new taxa, both genera and tribes; we will then perform additional analyses, fo-

cusing on the evolutionary history of flightless katydids and Phaneropterinae biogeography.

Acknowledgements
I would like to express my gratitude to several people without whom this project could not have been carried out. Among them are: Dr. Gabriel A.R. Melo, Dr. Diego N. Barbosa, Dr. Elton Orlandin, Dr. Eduardo Carneiro, Dr. Neucir Szinwelski, MSc. Hemanueli Preis, Dr. Francisco A.G. Mello, and Dr. Pedro G.B. Souza-Dias, and all those who contributed in some way to the progress of the project. I also thank the entire Orthopterists' Society committee, the Orthoptera Species File, Dr. Hojun Song, Dr. Michel Lecoq, Dr. Maria M. Cigliano, and Dr. Holger Braun for all the help, I (really) appreciate it!

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Orthoptera Species File Grant Reports

Photographic Records of the Groundhoppers (Orthoptera: Tetrigidae) of the Unexplored Wetlands of Ramaroshan, Accham, Nepal

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Ramaroshan lies in the Far western region of Nepal comprising a total of 12 wetlands and 18 patches of meadows with numerous freshwater streams spanning over an area of 10 km^2. Situated at an altitude of 2,500 meters above sea level (m.a.s.l.), this largely unexplored area is the perfect habitat to the hydrophilic groundhoppers (Orthoptera: Tetrigidae). There is no prior information on this group of insects in Ramaroshan, Achham, Nepal. I conducted a study with grant support from the Orthoptera Species file (OSF) grants committee during the month of June, 2023 in Ramaroshan, Achham with the permission of the Department of Forests and Soil Conservation, Kathmandu, Nepal. Several localities of the area were searched for tetrigids. The images of the individuals were taken both in natural habitat and post collection.

Additionally, I conducted another field study in the Shivapuri Nagarjun National Park (SNNP), Nepal with the funds remaining from the survey in the Ramaroshan area.

Results

A total of 7 species (Fig. 1) viz., *Coptotettix coniopticus* (Hancock, 1915), *Criotettix bispinosus* (Dalman, 1818), *Bolivaritettix insignis* (Kirby, 1914), *Systolederus frontalis* (Hancock, 1915), *Ergatettix panchtharis* Ingrisch, 2001, *Skejotettix kasalo* Subedi, 2023, and *Hedotettix samitae* Subedi, 2023 were recorded from Ramaroshan, Achham. Among them, one species, *H. samitae*, is new to science while another species, *B. insignis*, is recorded for the first time from Nepal. The new species is brachypronotal with anterior margin of pronotum slightly rounded; robust hind femora; and antennal grooves with top margin above bottom margin of eyes and bottom margin slightly below. The new species is in many ways similar to *Hedotettix gracilis*. *Hedotettix (gracilis)* species group is described to include these two species, which differ mainly in the shape of the hind femora, scutellum, and anterior margin of pronotum.

The paper containing the results from Ramaroshan, Achham, Nepal is published in the Journal of Insect Biodiversity: **https://doi.org/10.12976/jib/2023.42.1.1**

A total of 11 species were reported from SNNP of which 5 species are new to science. The paper containing the results are in the process of publication, the results of which will be updated in OSF.

Discussion

Of the seven species found in the

Figure 1. Different groundhopper species from Ramaroshan, Achham, Nepal. **A.** *Coptotettix coniopticus*; **B.** *Criotettix bispinosus;* **C, D.** *Hedotettix samitae;* **E.** *Skejotettix kasalo;* **F.** *Bolivaritettix insignis;* **G.** *Systolederus frontalis;* **H, I.** *Ergatettix panchtharis.*

Ramaroshan area, three (*Ergatettix panchtharis*, *Hedotettix samitae*, and *Systolederus frontalis*) were found above 2,200 m a.s.l. *Hedotettix samitae* and *Systolederus frontalis* were found as low as 1,650 m a.s.l. *Bolivaritettix insignis*, *Criotettix bispinosus*, and *Coptotettix coniopticus* were found only at 1,650 m a.s.l. *Ergatettix panchtharis* was found up to an altitude of 2,450 m a.s.l. No species were found above 2,450 m a.s.l. This is also the first record of *Ergatettix panchtharis* apart from its type locality. The species was found up to an elevation of 2,800 m a.s.l in Eastern Nepal (Ingrisch 2001). Western Nepal is placed at higher latitude than the Eastern parts. The interaction between higher elevation and higher latitude in western Nepal could be the reason for the low diversity in the designated areas. Orthoptera species diversity is known to decrease with the increase in elevation (Alexander & Hilliard 1969; Claridge & Singhrao 1978). Paudel *et al.* (2012) mentioned low rainfall in the western parts of Nepal as one of the reasons for the low biodiversity in the areas.

Acknowledgements

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Digitization of Pakistani and Sri Lankan Type Specimens Deposited in the Natural History Museum (NHM), London

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The Indian subcontinent is known to harbor a high level of insect biodiversity and endemism, but is also one of the most poorly studied regions in terms of biodiversity discovery (Song, 2010; Zahid et al., 2020). This region includes Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka (Briggs 2003). Pakistan is the second-largest country in South Asia, as well as the fifth most populous country in the world, having 18 of the 50 highest mountain peaks, the three largest glaciers in the world (Banat, 1988), and retaining one of the most extensive and oldest civilizations of Afro-Eurasia (Badian, 1987; Robin and Ruth, 2015). Pakistan is one of the most beautiful countries in the world with rich flora and fauna but, in terms of biodiversity, it is one of the least-studied regions (UNPO, 2016). According to the data available from the Orthoptera Species File (OSF), the total number of orthopteran taxa described from Pakistan is only 50 (Cigliano et al., 2024). The type specimens of these species are, at the moment, housed in different museums of the world (28 in the Natural History Museum in London (BMNH),

Table 1. Photographed type specimens from Pakistan.

	PAKISTAN SPECIES IMAGED	SPECIMENS
1	*Choroedocus pallens* Uvarov, 1933	Holotype
2	*Calliptamus balucha balucha* Uvarov, 1938	Holotype
3	*Calopterusa balucha (Paraduymadusa balucha)* (Uvarov, 1932)	Holotype
4	*Ceracris striata* Uvarov, 1925	2 Syntypes
5	*Chrotogonus* (*Chrotogonus*) *trachypterus robertsi* Kirby, 1914	Lectotype
6	*Conophyma mitchelli* Uvarov, 1921	Holotype
7	*Cophotylus splendens* Uvarov, 1933	Holotype
8	*Dericorys ramachandrai* Uvarov, 1933	Holotype
9	*Dicranophyma hingstoni* Uvarov, 1921	Holotype
10	*Eremocharis granulosa brachycera* (Kirby, 1914)	Holotype
11	*Eremocharis granulosa granulosa* (Walker, 1871)	Syntype
12	*Eremocharis granulosa rufipes* Uvarov, 1943	Holotype
13	*Eremocharis subsulcata beccalonii* Ünal, 2016	Paratype
14	*Eremocharis wazira* Uvarov, 1943	Holotype
15	*Eremopeza cinerascens aurantipes* (Uvarov, 1933)	Holotype
16	*Eusphingoderus predtetshensky* (Mistshenko, 1937)	Holotype
17	*Gotvendia albipennis* Chopard, 1969	Holotype
18	*Modicogryllus (Promodicogryllus) ehsani* Chopard, 1961	Holotype
19	*Oxyina bidentata* (Willemse, 1925)	Holotype
20	*Platycleis pathana* Zeuner, 1941	Holotype
21	*Sphingonotus (Sphingonotus) montanus* Mistshenko, 1937	Holotype
22	*Sphingonotus (Sphingonotus) nebulosus discolor* Uvarov, 1933	Holotype
23	*Sphingonotus (Neosphingonotus) pictus onerosus* Mistshenko, 1937	Holotype
24	*Sphodromerus luteipes rubripes* Uvarov, 1943	Holotype /Paratype
25	*Turanogryllus pakistanus* Ghouri & Ahmad, 1959	Holotype
26	*Turanogryllus sexlineatus* (Chopard, 1963)	Holotype
27	*Calliptamus balucha balucha* Uvarov, 1938	Holotype
28	*Cophotylus splendens* (Uvarov, 1933)	Holotype
29	*Eusphingoderus predtetshenskyi* (Mistshenko, 1937)	Holotype
30	*Modicogryllus* (*Promodicogryllus*) *ehsani* Chopard, 1961	Holotype
31	*Platycleis pathana* Zeuner, 1941	Holotype
32	*Sphingonotus* (*Neosphingonotus*) *pictus onerosus* Mistshenko, 1937	Holotype
33	*Sphingonotus* (*Sphingonotus*) *montanus* Mistshenko, 1937	Holotype
34	*Sphingonotus* (*Sphingonotus*) *nebulosus discolor* Uvarov, 1933	Holotype
35	*Tenuitarsus orientalis* Kevan, 1959	Holotype
36	*Turanogryllus sexlineatus* (Chopard, 1963)	Holotype
37	*Turanogryllus pakistanus* Ghouri & Ahmad, 1959	Holotype

5 in MNHN Paris, 3 in MfN Berlin, Germany, 1 in NMW Vienna, 1 in SMED Frankfurt, 1 in ZMUC Copenhagen, 1 in MCST Triest, 1 in MHNG Geneva, 1 in St Petersburg, 1 in NZSI Calcutta, 1 in INPC Pusa, 1 in HNHM Budapest, and 5 in Pakistani collections) (Cigliano et al., 2024).

According to data available from OSF there are 145 type specimens of species described from Sri Lanka in the Natural History Museum (NHM) London, and 63 of them had not been digitized (Cigliano et al., 2024). As there are no active orthopterists from Sri Lanka, the orthopteran diversity in this country is essentially unstudied. The type specimens need to be photographed in order to enhance developing research from that area and for future entomologists to search for available data online through OSF.

Photographic data can be used to identify species by entomologists, ecologists, conservationists, and pest management professionals. The absence of digital access to the type specimens poses a significant challenge to the field of taxonomy. Therefore, the objective of this project was to generate high-quality digital images of the orthoptera type specimens from Pakistan and Sri Lanka, specifically housed in BMNH, London.

Methods and Activities

Visit to BMNH

In May 2023, I was given the opportunity to visit the BMNH. Due to limited access on weekends and public holidays, photographing was a little difficult. However, I made the most of my time and was able to take a significant number of photographs. I took 287 photos over the period of 20 days, which I then submitted to OSF. Each specimen was carefully captured from both lateral and dorsal viewpoints, and it was accompanied by the specimen's original labels.

Digital Imaging and Illustration

The high-resolution digital images of external morphology were taken using the Visionary Digital LK Imaging System available in the collection room of the BMNH, Department of Entomology, in combination with a Canon EOS 6D camera using 65 and 100-mm lenses to take multiple pictures altering the depths of field. After photographing, Adobe Lightroom v.3.2 was used to import the images and transform them from RAW files to TIFFs and for stacking the images into a single focused image using Helicon remote. Finally, the focus-stacked images were imported to Adobe Photoshop CS5 to adjust light

Table 2. Holotype specimens not present in Pakistan depository.

	Specimens
1	*Callogryllus ovilongus* Saeed, Saeed & Yousuf, 2000
2	*Catantops unimaculata* Mahmood, Yousuf & Khaliq, 2002
3	*Formosatettix obtusus* Azhar, Suhail, Sabir & Saeed, 2000
4	*Plebeiogryllus retiregularis* Saeed, Saeed & Yousuf, 2000
5	*Chloebora bishamensis* Wagan & Khatri, 2021

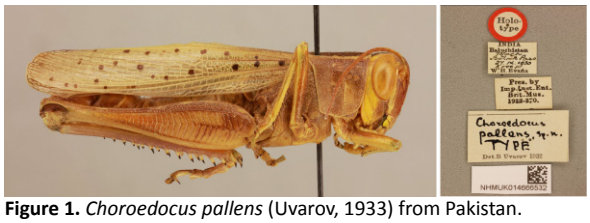

Figure 1. *Choroedocus pallens* (Uvarov, 1933) from Pakistan.

Figure 2. *Eremocharis wazira* (Uvarov, 1943) from Pakistan.

Figure 3. *Sphingonotus nebulosus discolor* (Uvarov, 1933).

Figure 4. *Eliya gibbosa* (Henry, 1933) Sri Lanka.

Figure 5. *Pelecinotus lankae* (Henry, 1933) Sri Lanka.

Figure 6. *Orchetypus rugifrons* (Waterhouse, 1914) Sri Lanka.

levels, sharpness and background color.

Visit to Pakistani depository

I got the opportunity to visit the depository in the Faisalabad Museum's Department of Entomology in Pakistan in April 2023 to photograph five type specimens that were held there. However, due to insufficient care of the collections, none of the targeted types were present in the places mentioned in OSF. As a result, none of the five species listed in Table 2 could be photographed.

Table 3. Photographed specimens from Sri Lanka.

	SRI LANKA SPECIES IMAGED	SPECIMENS
1	*Choroedocus pallens* Uvarov, 1933	Holotype
2	*Amusurgus* (*Amusurgus*) *unicolor* (Chopard, 1925)	Syntype
3	*Arachnomimus* (*Arachnomimus*) *bicolor* Chopard, 1928	Holotype
4	*Bambusacris greeni* Henry, 1933	Holotype
5	*Brachyntheisogryllacris crassipes* (Walker, 1859)	Holotype
6	*Cardiodactylus praecipuus* (Walker, 1869)	Holotype
7	*Caryanda platycerca* Willemse, 1924	Holotype
8	*Cercina phillipsi* Henry, 1933	Holotype
9	*Ceyloria vicina* (Chopard, 1928)	Holotype
10	*Chloebora marshalli* (Henry, 1933)	Holotype
11	*Cingalia dubia* (Walker, 1870)	Not type
12	*Clonacris finoti* (Kirby, 1914)	Holotype
13	*Clonacris greeni* (Kirby, 1914)	Holotype
14	*Coiblemmus compactus* (Chopard, 1928)	Syntype
15	*Cyrtoxiphoides pubescens* (Chopard, 1925)	Holotype
16	*Derectaotus henryi* (Chopard, 1928)	Holotype
17	*Dittopternis turbata* (Walker, 1870)	Holotype
18	*Ducetia lanceolata* (Walker, 1859)	Holotype
19	*Ectatoderus ceylonicus* Chopard, 1928	Syntype
20	*Eliya gibbosa* Henry, 1933	Holotype
21	*Eliya pedestris* Uvarov, 1927	Holotype
22	*Eliya pictipes* Uvarov, 1927	Holotype
23	*Eliya venusta* Henry, 1933	Holotype
24	*Eucoptacra ceylonica* Kirby, 1914	Holotype
25	*Euscyrtus* (*Euscyrtus*) *necydaloides* (Walker, 1869)	Holotype
26	*Eyprepocnemis kalkudensis* Henry, 1937	Holotype
27	*Genimen ceylonicum* Uvarov, 1927	Holotype
28	*Genimenoides coloratum* Henry, 1934	Holotype
29	*Genimenoides subapterum* Uvarov, 1927	Holotype
30	*Gryllodes supplicans* (Walker, 1859)	Syntype/ Holotype
31	*Homalogryllus depressus* Chopard, 1925	Holotype
32	*Landreva clara* (Walker, 1869)	Holotype
33	*Landreva subaptera* Chopard, 1925	Holotype
34	*Loxoblemmus* (*Loxoblemmus*) *longipalpis* Chopard, 1928	Holotype
35	*Luzaropsis ferruginea* (Walker, 1869)	Holotype
36	*Luzaropsis henryi* Chopard, 1928	Syntype
37	*Metiochodes greeni* (Chopard, 1925)	Holotype
38	*Mitius flavipes* (Chopard, 1928)	Holotype
39	*Nemobiodes laeviceps* Chopard, 1925	Holotype
40	*Nemobiodes nigrocephalus* Chopard, 1925	Holotype
41	*Ochlandriphaga xanthelytrana* Henry, 1933	Holotype
42	*Orchetypus rugifrons* (Waterhouse, 1914)	Holotype
43	*Pachyacris violascens* (Walker, 1870)	Holotype
44	*Pelecinotus lankae* Henry, 1933	Holotype
45	*Plebeiogryllus guttiventris obscurus* (Chopard, 1969)	Holotype
46	*Poliotrella greeni* (Chopard, 1925)	Syntype
47	*Urugalla pearsoni* Uvarov, 1927	Holotype
48	*Uvarovacris gammaduensis* (Henry, 1933)	Holotype
49	*Uvarovacris gracilis* (Uvarov, 1927)	Holotype
50	*Varitrella* (*Varitrella*) *varipennis* (Walker, 1869)	Holotype
51	*Wellawaya greeni* Uvarov, 1927	Holotype
52	*Xya curta* (Chopard, 1936)	Not type
53	*Xya nigraenea* (Walker, 1871)	Not type
54	*Zeylanacris cingalensis* (Kirby, 1914)	Holotype
55	*Zeylanacris crassibrachiatus* (Henry, 1933)	Holotype
56	*Zygophlaeoba bolivari* Henry, 1933	Holotype
57	*Zygophlaeoba varicornis* Henry, 1933	Holotype

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Caelifera Type Collection of Bernice P. Bishop Museum (BPBM)

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The insect collection of the Bernice P. Bishop Museum (BPBM) in Hawaii holds approximately 13.5 million specimens, making it the third-largest insect collection in the USA (after the Smithsonian Institution in Washington, D.C. and the American Museum of Natural History in New York) and the eighth-largest collection worldwide (after Paris, London, Munich, Ottawa, and Bonn collections). The great majority of the specimens came from many of the great explorations of the past, from the early explorers through expeditions such as the Galathea Expedition, the Mangareva Expedition, and the Pacific Entomological Survey (Polynesia). Also, there are specimens from critically important biological surveys, such as Fauna Hawaiiensis, Insects of Micronesia, Southwest Pacific and Southeast Asia arthropods of medical importance, the Terrestrial Arthropod Survey of Fiji, and numerous recent arthropod surveys of French Polynesia.

Regarding Caelifera, there are type material of 72 species, but 28 of them were already photographed (Tetrigidae described in 2014 and 2015). Thus, the remaining type specimens of 44 species were photographed.

Results

As usual, after checking the drawers containing type material, the number reported in the Orthoptera Species File was different from the actual number deposited, and in the end, the type material of 47 species and subspecies of Caelifera were photo-

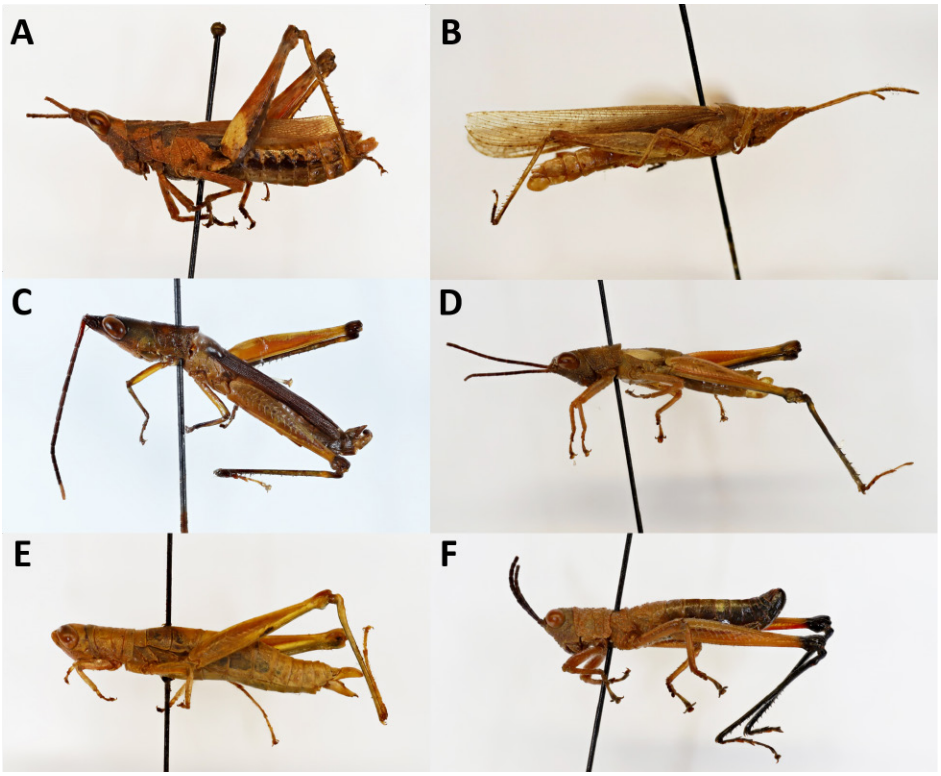

Figure 1. Some Pyrgomorphidae types from BPBM. **A.** *Apodesmoptera curtipennis* Kevan, 1966 (♂, HT) Philippines. **B.** *Desmopterella curvata* Kevan, 1970 (♂, HT) Indonesia. **C.** *Fijipyrgus gracilis* Kevan, 1966 (♂, HT) Fiji. **D.** *Meubelia schistacra* Kevan, 1967 (♂, HT) Philippines. **E.** *Noonacris novahibernica* Kevan, 1966 (♀, HT) Papua New Guinea. **F.** *Tarbaleopsis hystrix* Kevan, 1966 (♂, HT) Papua New Guinea.

Figure 2. Some Tetrigidae types from BPBM. **A.** *Carolinotettix montanus* Willemse, 1951 (♀, HT) Federated States of Micronesia. **B.** *Carolinotettix palauensis* Kevan & Vickery, 1997 (♀, HT) Palau. **C.** *Hydrotetrix marquesana* Hebard, 1933 (♀, HT) French Polynesia. **D.** *Hydrotetrix samoana* (Chopard, 1929) (♀, HT) Samoa.

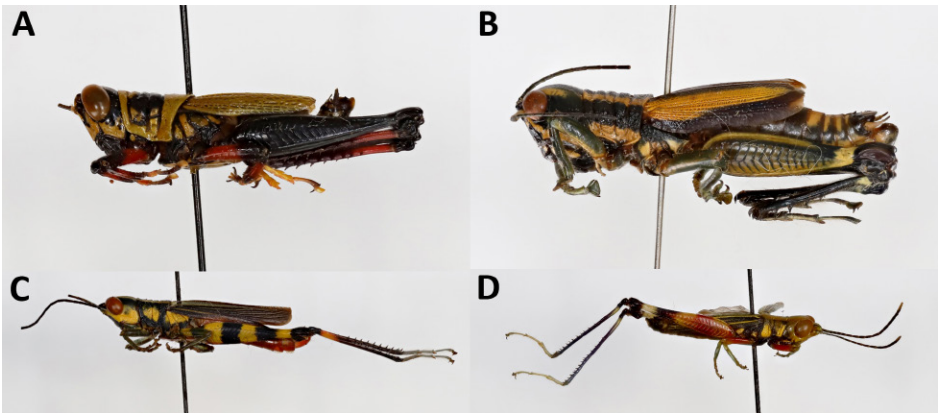

Figure 3. Some Acrididae types from BPBM. **A.** *Bumacris venosa* Willemse, 1975 (♂, HT) Solomon Islands. **B.** *Cranae longipennis* Willemse, 1977 (♂, HT) Papua New Guinea. **C.** *Pseudocranae picta* Willemse, 1973 (♂, HT) Papua New Guinea. **D.** *Sphaerocranae maai* Willemse, 1973 (♂, HT) Papua New Guinea.

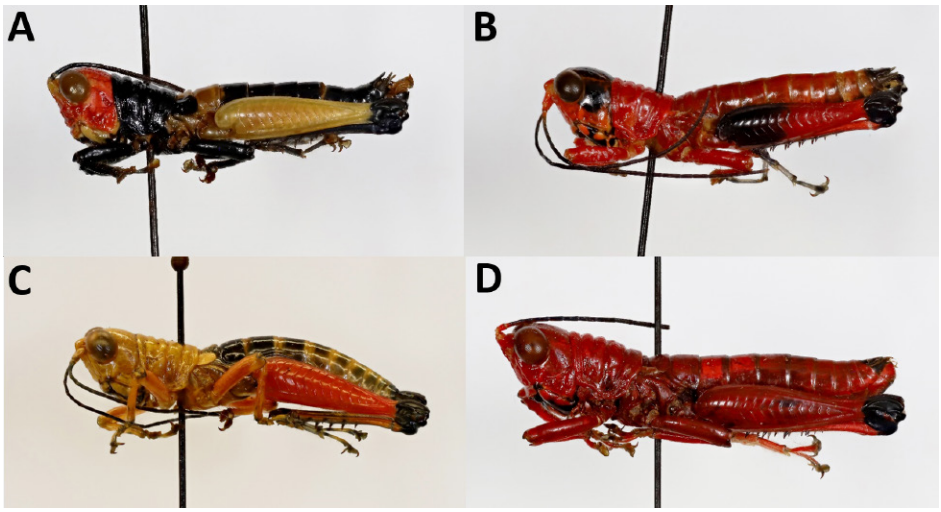

Figure 4. Some *Opiptacris* types from BPBM. **A.** *Opiptacris alata* Willemse, 1975 (♂, HT) Papua New Guinea. **B.** *Opiptacris bougainvillea femorata* Willemse, 1975 (♂, HT) Solomon Islands. **C.** *Opiptacris novageorgica* Willemse, 1975 (♂, HT) Solomon Islands. **D.** *Opiptacris unicolor* Willemse, 1975 (♂, HT) Solomon Islands.

graphed (Figs. 1-5). In some cases, both holotype and allotypes were present. In total, 70 specimens were photographed in lateral and dorsal views with an additional image for the labels. In total, 210 images have been uploaded to OSF. In Table 1, a summary of the material photographed is presented. Usually, a single shot was taken per view, but this time, a different protocol was used due to the availability of an in-house imaging system. The type specimens were carefully set in a semi-vertical position in a MacropodPro imaging system (for Tetrigidae and some small Pyrgomorphidae, a Canon 65mm lens was used; for the rest, a 100mm lens; StackShotPro motor). The resulting files were converted from RAW to TIFF format using Adobe Lightroom (v.4.4), 20 images were stacked into a single composite image using Zerene Stacker (v.1.04), and then Adobe Photoshop CC 2018 was used to add scale bar and adjust light levels, background coloration, and sharpness as needed. For labels, I used a Sony DSC-HX99 camera, and I used Photoshop CC 2018 to adjust light levels.

Another joy when visiting museums is to check all the possible drawers in the general collection that time allows, particularly the unsorted material. Fortunately, I had some time to spare, and I spent some hours curating the Pyrgomorphidae collection worldwide and different families of Caelifera from the Neotropics. This task is rewarding for visitors like myself and very much appreciated by the curators and collections managers.

Concerning Pyrgomorphidae, there are materials of 12 valid species. These types are from the Pacific region and will fill the geographic gaps existing for Pyrgomorphidae photographic type collection in the Orthoptera Species File. The collection has representatives of the tribe Desmopterini, such as *Apodesmoptera curtipennis*, *Desmoptera curvata* and *Stenoxyphula microphallica* (Fig. 1A-B). This group is characterized by a body laterally compressed and

slender, integument finely rugose, fastigium of vertex usually bluntly triangular with tegmina rarely reduced but never absent. It is distributed in Northern Australia and the South Pacific region to the Philippines. This tribe has some affinities with the Nereniini (elongate spermatheca) tribe. Precisely another tribe represented at BPBM is Nereniini with type material of species such as *Noonacris novahibernica* and four species of *Tarbaleopsis* (*T. hystrix, T. minor, T. proxima* and *T. stellae*) (Fig. 1E-F). This tribe possesses a cylindrical body or almost integument granular or rugose, and a fastigum of vertex that is very short and blunt. It is distributed in the New Guinea Islands and Southwestern Pacific Islands. Of particular interest was the type material of Fijipyrgus gracilis (Fig. 1C). This species is the sole member of the tribe Fijipyrgini, characterized by a cylindrical body, slender and with the fastigium of vertex long and acute. The tegmina and wings are well developed. As its name suggests, it is distributed in the Fiji Islands.

For Tetrigidae, the majority of types (described in 2014 and 2015) have already been photographed. However, the type material of five species remained without a photographic record. Two of them in the genus *Carolinotettix* (*C. montanus* and *C. palauensis*) (Fig. 2A-B) from the Federated States of Micronesia and Palau respectively and three species in the genus *Hydrotetrix* (*H. carolinensis, H. marquesana* and *H. samoana*) (Fig. 2C-D) from Federated States of Micronesia, French Polynesia and Samoa respectively. Interestingly, the holotypes for these species were females.

Regarding Acrididae, type material from different subfamilies is present. The genus *Bumacris* (Catantopinae) is represented by three taxa from the Solomon Islands (*B. pagdeni kolombangarae, B. p. mundae,* and *B. venosa*) (Fig. 3A). Type material of the Hemiacridinae genus *Cranae* is represented with five species from New Guinea Island (Indonesia and Papua

Table 1. Type material photographed in BPBM.

Species	Holotype	Allotype	Neotype
Apodesmoptera (Apodesmoptera) curtipennis Kevan, 1966	♂		
Bumacris (Bumacris) pagdeni kolombangarae Willemse, 1975	♂	♀	
Bumacris (Bumacris) pagdeni mundae Willemse, 1975	♂	♀	
Bumacris (Cristovalacris) venosa Willemse, 1975	♂	♀	
Carolinotettix montanus Willemse, 1951	♀		
Carolinotettix palauensis Kevan & Vickery, 1997	♀		
Cranae genjam Willemse, 1977	♂		
Cranae glabra Willemse, 1977	♂		
Cranae longipennis Willemse, 1977	♂	♀	
Cranae manokwari Willemse, 1977	♂	♀	
Cranae rubra Willemse, 1977	♂	♀	
Cranaella kevani Willemse, 1977	♂	♀	
Desmopterella curvata Kevan, 1970	♂	♀	
Desmopterella sylvatica (Montrouzier, 1855)			♀
Fijipyrgus gracilis Kevan, 1966	♂		
Hydrotetrix carolinensis Kevan & Vickery, 1997	♀		
Hydrotetrix marquesana Hebard, 1933	♀	♂	
Hydrotetrix samoana (Chopard, 1929)	♀	♂	
Meubelia schistacra Kevan, 1967	♂	♀	
Noonacris novahibernica Kevan, 1966	♀		
Opiptacris alata Willemse, 1975	♂		
Opiptacris bougainvillea fauroensis Willemse, 1975	♂		
Opiptacris bougainvillea femorata Willemse, 1975	♂	♀	
Opiptacris castanea Kevan, 1966	♀		
Opiptacris choiseulensis Willemse, 1975	♂	♀	
Opiptacris novageorgica Willemse, 1975	♂	♀	
Opiptacris tenuis Willemse, 1975		♀	
Opiptacris unicolor Willemse, 1975	♂	♀	
Pseudocranae gressitti Willemse, 1973	♀		
Pseudocranae litoralis Willemse, 1973	♂		
Pseudocranae picta Willemse, 1973	♂		
Pseudopyrgus curtipennis Kevan, 1966	♂	♀	
Sphaerocranae bicingulata Willemse, 1973	♂	♀	
Sphaerocranae bipartita Willemse, 1973	♂	♀	
Sphaerocranae distincta Willemse, 1973	♂	♀	
Sphaerocranae maai Willemse, 1973	♂	♀	
Sphaerocranae nakatae Willemse, 1973	♀		
Sphaerocranae poecila Willemse, 1973	♂		
Sphaerocranae pseudogracilis Willemse, 1973	♂		
Spinacris elegans Kevan, 1966	♀		
Stenoxyphula microphallica Kevan, 1966	♂	♀	
Tarbaleopsis hystrix Kevan, 1966	♂	♀	
Tarbaleopsis minor Kevan, 1966	♀		
Tarbaleopsis proxima Kevan, 1968	♀		
Tarbaleopsis stellae Kevan, 1966	♂		
Tauchiridea adusta brunnea Willemse, 1973	♂	♀	
Truxalis oceanicus Montrouzier, 1855 (synonym of *Atractomorpha crenaticeps*)			♀

Figure 5. *Pseudopyrgus curtipennis* Kevan, 1966, Malaysia. **A.** Male, holotype. **B.** Holotype labels. **C.** Female, allotype. **D.** Allotype labels.

New Guinea) (*C. genjam, C. glabra, G. longipennis, C. manokwari* and *C. rubra*) (Fig. 3B). The Oxynae genus *Pseudocranae* is present with type material of three species from Papua New Guinea (*P. gressitti, P. litoralis* and *P. picta*) (Fig. 3C). The Catantopinae genus *Sphaerocranae* from New Guinea Island is well represented with 7 out of the 11 species (the others are in Leiden and Berlin). The species in BPBM are *S. bicingulata, S. bipartita, S. distincta, S. maai, S. nakatae, S. poecila,* and *S. pseudogracilis*. (Fig. 3D).

Mentioned apart are the beautifully colored representatives of the Hemiacridinae genus *Opiptacris* from Papua New Guinea, Solomon Islands, and Vanuatu. Type material of 7 out of 13 species is deposited here (*O. alata, O. bougainvillea fauroensis, O. b. femorata, O. castanea, O. choiseulensis, O. novageorgica, O. tenuis* and *O. unicolor*) (Fig. 4).

Finally, in this collection, the sole member of the genus *Pseudopyrgus* (Trigonopterygidae: Trigonopterygynae) is deposited; *Pseudopyrgus curtipennis* from Malaysia. In Figure 5, both male holotype and female allotypes are depicted in lateral view, together with their labels. They really resemble pyrgomorphids, and for many years, some genera of Trigonopterygidae (*Borneacris, Trigonopteryx, Systella, Moultonia*) were classified as Pyrgomorphidae.

The Orthoptera Type Collection of Bernice P. Bishop Museum (BPBM) is rich in material from Malesia, Papuasia, and Pacific regions. The digitization of this type of material is closing the geographic gaps existing in the Orthoptera Species File, and it is of the utmost importance due to the remoteness of this collection.

Acknowledgments
This trip was possible thanks to the OSF grant "Caelifera type collection of Bernice P. Bishop Museum (BPBM) in the Orthoptera Species File" to RMP. Special thanks to the collection manager, Jeremy Frank, and the museum technician, Keith Arakaki, for hosting me and allowing me to use the in-house MacropodPro imaging system.

Searching for the World's Smallest Orthopterans in the World's Second Largest Rainforest

By **BRANDON M. WOO[1*], RICARDO MARIÑO-PÉREZ[2], JACKSON LINDE[1], HOJUN SONG[1], CHARLY OUMAROU NGOUTE[3]**
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Poring over the taxonomic literature, one constantly reads about astonishing insects known only from remarkable corners of the globe. It is common to dream of visiting those distant lands and to discuss those desires with like-minded entomologists. What is much more uncommon is having that dream become a reality. Such was the case during a recent Song Lab trip to Cameroon and Equatorial Guinea, some of the most biodiverse countries in the world.

One of Brandon M. Woo's projects as a Ph.D. student is to produce a molecular phylogeny of pygmy mole crickets (Tridactylidae), a group of tiny orthopterans whose taxonomy is mostly based on a series of monographs by Gunther in the 1970s. Many of his species descriptions are based on a limited amount of specimen material, particularly those from tropical climates. Among these, one highly enigmatic species always stood out: *Paratridactylus eidmanni*, a heavy-bodied and completely flightless species known only from the holotype male collected decades ago on Bioko Island, Equatorial Guinea. One day in 2022, Brandon mentioned this to his advisor, Dr. Hojun Song, who immediately noted that western tropical Africa was one of the "black boxes" of orthopteran diversity worldwide, but that he had a colleague in Cameroon who might be able to facilitate a trip. An idea was thus born and, throughout 2023, a group of trained researchers formed and spent endless hours hammering out logistics, gathering permits, and planning a trip that would take us from the humid

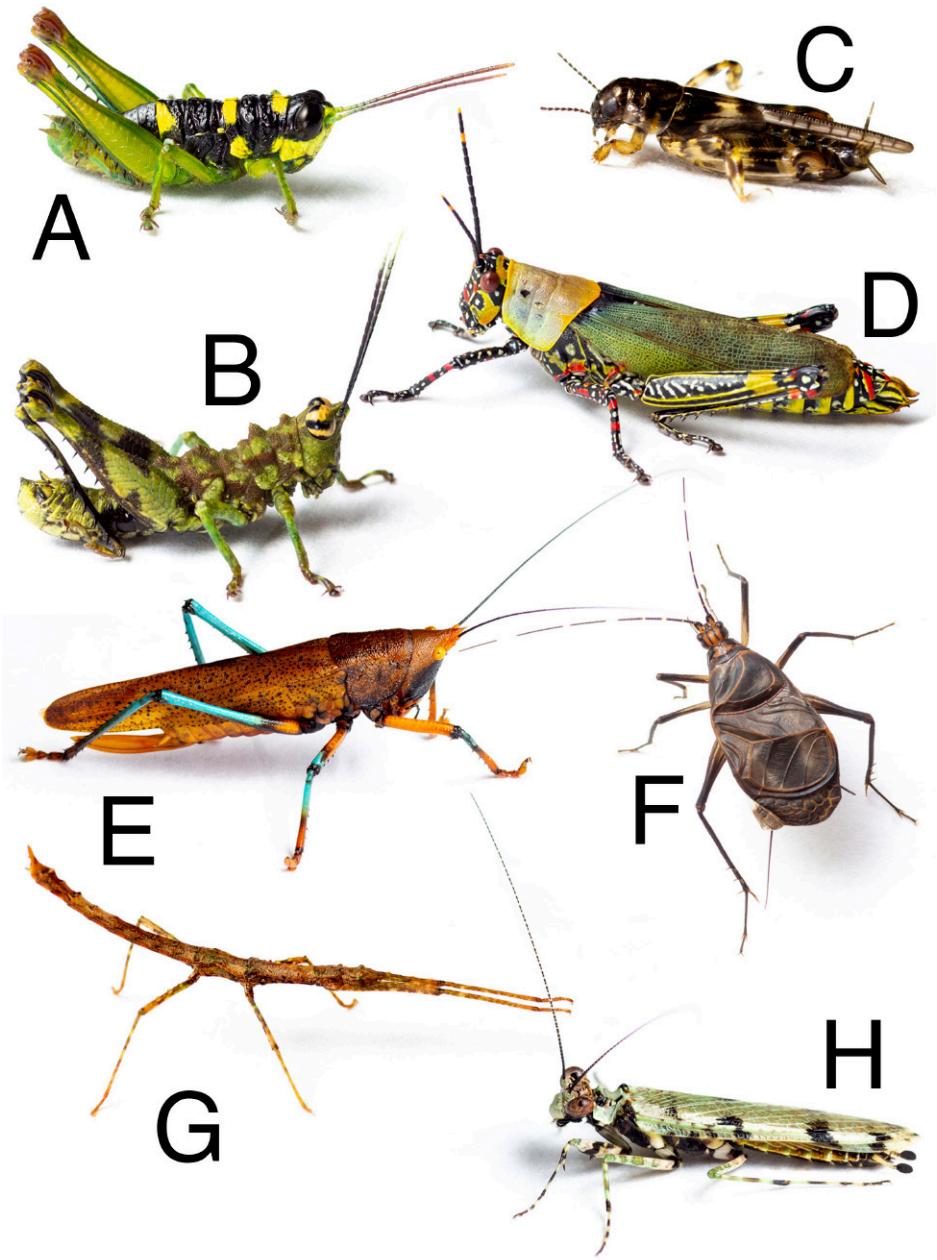

Figure 1. Polyneoptera collected during the expedition. A) *Pterotiltus* n. sp. B) *Barombia cf. tuberculosa*. C) *Afrotridactylus cf. usambaricus*. D) *Zonocerus variegatus*. E) *Plastocorypha* sp. F) *Homoeogryllus* sp. G) *Bathycharax* sp. H) *Maculatoscelis ascalaphoides*

lowlands of Cameroon to the montane highlands of Bioko Island. Hundreds of emails later, we were ready to travel in November 2023.

Our expedition's team consisted of Hojun and two of his students, Brandon and Jackson Linde, Dr. Charly Oumarou Ngoute and his students, Idris Kouahou Chekep and Obrix Ngameni Tchatak, and former Song Lab member Dr. Ricardo Mariño-Pérez. We all met up in Douala, Cameroon's largest city, as well as the home of the Université de Douala, where Charly works. Our two drivers, Innocent and Colince, did a superb job of navigating through the organized chaos of Cameroon city as we picked up some necessary supplies before our journey. With cars turning this way and that, motorcycles everywhere, and chickens and goats racing through the streets, it was unlike anything we had seen before. Initially, we thought we could just rent cars and drive ourselves, but after one day of Cameroon driving, even Hojun had to admit that it would have been impossible! Hojun also gave a talk on orthopteran systematics at the university, which triggered many questions and discussions with students and professors in the department. The infrastructure for scientific work, including taxonomy and systematics research, is at a different level in Cameroon than it is in countries like the USA, and researchers do not have access to many materials and lab equipment that we often take for granted, particularly when it comes to molecular biology. Hojun suggests establishing and fostering collaborations between scientists in different countries to help science progress.

After a day in Douala, we were ready to begin the three-day journey to Lobéké National Park in the East Region of Cameroon, a location deep within the Congo Basin that has never been surveyed for Orthoptera. Along the way we encountered some tantalizing hints of what was to come, like a gas station absolutely covered in tetrigids and a population of tridactylids (*Xya* sp.) right along a highway. We also saw flocks of straw-colored fruit bats (*Eidolon helvum*) flying to and from roost sites in the mornings and evenings. This region of Cameroon is French-speaking, and since most of us didn't speak French, we had to rely on Charly as our lifeline in almost every situation. We had to make a stop in Yaounde, the capital of Cameroon, to pick up some additional permits. It was here, at an open market on the east side of town, where we realized that we were going to have to rely on packaged food as well as the freeze-dried meals we had brought from home. There were hundreds of street food options, but one glance told us that our digestive systems would suffer mightily from anything available here. So began a strict, and sometimes excruciating, diet of cookies and crackers that saved us from stomach issues, but at the cost of starving ourselves each day.

After we exited the town of Batouri, the paved roads fell away to be replaced by dirt roads for the entire rest of the trip. These roads became increasingly awful as we drove onward, with massive potholes, muddy

Figure 2. A) Brandon and Hojun at Lobeke National Park. B) Group photo at Lobeke National Park. C) Group photo in front of Petite Savanne. D) Jackson and Hojun enjoying freeze-dried foods in the field. E) Toyota truck taking us to Petite Savanne. F) Jackson, Idris, Obrix, Charly processing specimens. G) Charly in the *Pterotiltus* habitat. H) Group photo at Lago Biao, Bioko Island. I) Specimen processing set up at Bioko Island in Moka Research Station.

areas, and bumpy sections that had us all bouncing around in our seats for hours on end. When we finally reached the town of Yokadouma, our drivers had had enough and we needed to find lodging. The "Hotel Elephant" wasn't great, but it was the best available option. In the morning, we awoke to a thunderstorm. While it was technically the dry season, in Cameroon, rain can come at any time. Charly became concerned that we would not be able to make it to the Mpem et Djm protected area, another location which we had hoped to visit, because the roads had been nearly destroyed. With the realization that even if the roads were passable the trip would add on several more driving days, we made the decision to forget about Mpem et Djm and concentrate solely on Lobéké. This would mean that we would only survey one protected area in Cameroon before heading to Equatorial Guinea, but it would also give us more collecting days overall and give us a chance to make a thorough survey of Lobéké.

Upon arrival in Lobéké on the evening of December 2nd, we were told that there was a guest house where we could stay. This was fantastic as we had expected to be camping for most of this trip. As we unloaded our gear, we got a taste of the next day's collecting by simply glancing at the lights of the guest house, which swarmed with an amazing array of insects from colorful moths to dozens of mantids. The mantid diversity was incredible and over the next week we would find nearly 40 species. The next day we headed out into Lobéké to finally start collecting, and we were blown away by the grasshopper diversity to be found along the roadsides. The red dirt we had observed from the road turned out to be omnipresent in Cameroon, and before long all of our clothes were stained red. After we had collected along the road for a few hours, Charly showed us that a completely different grasshopper fauna was to be found just within the forest. Hojun immediately noted the morphological convergence between many African forest grasshoppers and Neotropical forest grasshoppers.

There were plenty of other fascinating things to look at too, like big groups of butterflies puddling along the rivers and long lines of driver ants (*Dorylus* sp.) crossing the roads. As

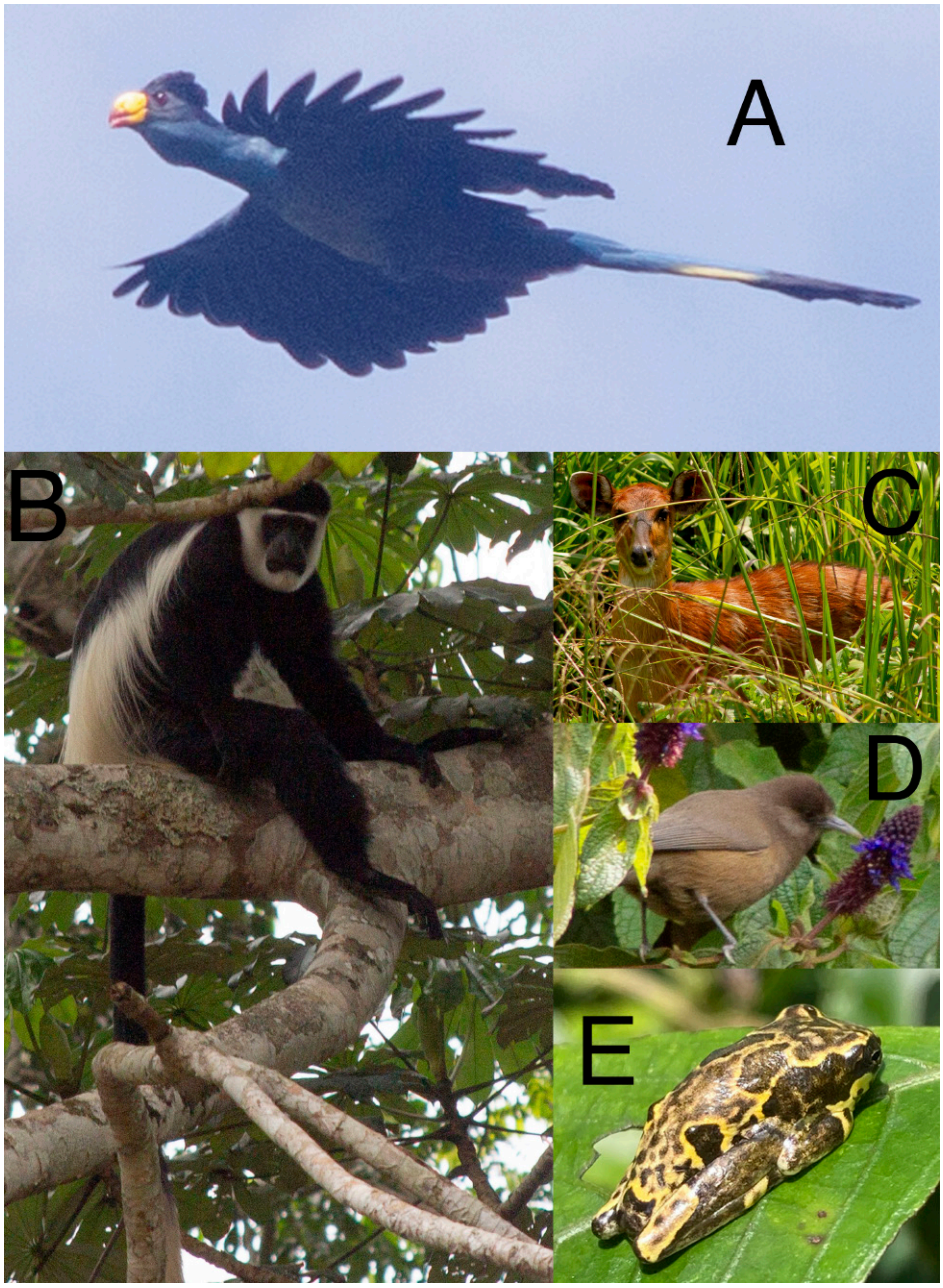

Figure 3. Other animals seen during the expedition. A) Great blue turaco. B) Black-and-white colobus. C) Forest sitatunga antelope. D) Bioko speirops. E) Reed frog.

Hojun and Charly tested their skills chasing after butterflies and Ricardo angrily shook the ants from his shoes and pants, Brandon managed to find more tridactylids on the riverbank. Hojun had an encounter with a tsetse fly, but, fortunately, our ranger, Hervé Sayo, quickly detected it and removed it from Hojun. Here, we also had the opportunity to meet the Baka people, a group of very short people inhabiting the rainforests of Cameroon, Congo, Gabon and Central African Republic. They were historically known as pygmies, a term now considered derogatory. Returning that evening for night collecting, the forest hummed with the songs of countless katydids and crickets. Tracking nocturnal ensiferans by their songs proved difficult in the dense Cameroonian forest, but we ended up with a good number of specimens. Back at the guest house later that night, our makeshift lab came abuzz with activity as Hojun showed Charly and his students how we process the material, while Brandon worked on taking high-quality photos of each species we encountered. Idris and Obrix learned to become evisceration masters as they gutted and stuffed the dozens of big katydids we collected.

The next day we entered a swamp forest that provided us with a number of new forest grasshopper species. More importantly, we discovered that our well-made hiking boots were no match for this habitat and were completely destroyed within the hour. Charly and his students, on the other hand, were expertly prepared with their rubber boots. After drying out and heading into a small village to pick up some rubber boots for ourselves, we decided we'd had enough of the swamp and visited a dry forest that looked great for night collecting. Sure enough, during the collecting that evening, we found many species of katydids we had not found previously. Grasshoppers of the genus *Mazaea* were also abundant at night; these completely flightless insects belong to a new family that Hojun and colleagues are describing.

On our third day of collecting, Brandon finally came face-to-face with the tridactylid genus *Afrotridactylus*, restricted to sub-saharan Africa. These cute little insects were hopping around in a roadside ditch next to a logging site, where we also got to see the incredible great blue turaco (*Corythaeola cristata*), a huge dragon-like bird with a haunting call, as well as African gray parrots (*Psittacus erithacus*). We also observed tons of stalk-eyed flies (Diopsidae) in a swamp and even got to witness males fighting with their antennae. On December 6th, we went to the Sangha River in search of more tridactylid species, but unfortunately only found more *Xya*. The river area did produce a number of interesting finds, including our first adults of the pyrgomorphid grasshopper *Zonocerus variegatus*. The next day we decided to take it easy and get caught up on specimen processing, which paid off as we witnessed some Colobus monkeys (*Colobus guereza*) right outside the guest house! That evening's collecting produced specimens of *Barombia*, a fantastic grasshopper, which likely represents an undescribed species.

December 8th brought us deeper into the park than we had been previously. For this excursion, we all had to cram into one of the park vehicles that we were told could handle more difficult road conditions. This proved to be an understatement as our driver took us down a forest track that felt more like a roller coaster or Mario Kart ride than anything else. After getting all shaken up, we explored some dry forest with a river edge, which yielded additional *Afrotridactylus* as well as our first and only snake of the trip: an African bush viper (*Atheris squamigera*). Our rangers told us that we could not night-collect here since there were a lot of leopards in the area, so we opted to night-collect along the road again. Here, Brandon was able to track down some large *Homoeogryllus* crickets by following their beautiful bell-like songs.

On December 9th, our final day in Lobéké, we decided to take a 3-km hike out to the "Petite Savane," a small grassland in the jungle. After enduring the Mario Kart ride again, we made the long and grueling trek under intense heat and humidity only to discover that the location was more of a wetland than a savannah. Collecting here produced a surprisingly low diversity of Orthoptera, although we did get to see a forest sitatunga antelope (*Tragelaphus spekii*) and lots of stingless bees in their nests. Forest elephants were in the area, as evidenced by their footprints and piles of dung, but we never saw any. What we (well, just Ricardo and Brandon) did get to see was a gorilla, which raced across the road and out of sight within milliseconds as we were driving back to camp. Getting to see one of our closest living relatives was, in Ricardo's words "a transformative experience that changed our understanding of what it means to be human"...or something like that.

The long trip back from Lobéké to Douala went more or less without incident, and before long we were on a very short flight from Douala to Bioko Island, Equatorial Guinea. This island is the largest landmass in the Gulf of Guinea, and is known for its high diversity of primates and nesting sea turtles. The only orthopterans documented from the island were from scattered historical collections and it has never received a proper survey of Polyneoptera. It was here that Brandon planned to search for the elusive *Paratridactylus*. Equatorial Guinea is also a Spanish-speaking country, which was a welcome relief to those of us who know Spanish. Upon arrival, we met with staff from the Bioko Biodiversity Protection Program (BBPP), who brought us to the Moka Wildlife Center and research station where we established our field laboratory again. Amancio Motove Etingüe and the other BBPP folks drove us all around the island and were extremely helpful in accessing many locations. The montane climate of Bioko, with cool mornings and evenings, was a welcome relief from the heat and humidity of Lobéké, and the annoying red dirt from Cameroon was replaced by volcanic rocks.

On our first day in Bioko, we marveled at the gorgeous moths that arrived at the research station's lights before heading out to the Ureca road, which led to the southern end of the island and provided an altitudinal gradient up to 1,000 m. Driving in Bioko was much easier than in Cameroon, since most roads are paved and relatively well-maintained. At our first site, we discovered a species of *Pterotiltus* that Charly believes is undescribed. It was a good omen of things to come. The habitat was completely different from Lobéké, being dominated by clubmosses, tree ferns, and lichens. As we entered the small village of Ureca, Amancio told us that there was a ritual in which all first-time visitors to Ureca must meet with the town elder and drink salt water. Shrugging our shoulders, we walked over to the elder's house, where each of us did indeed drink salt water from a small bowl. Not an experience you have every day! After overdosing on sodium, we explored Ureca beach, which is a black sand beach and one of the major nesting sites for sea turtles. There were lots of tetrigids, but, unfortunately, not many other orthopterans. For night-collecting, we picked one of the mid-elevation sites we had stopped at during the day. It was very cold, but, amazingly, the vegetation was filled with insects! We collected many katydids, grasshoppers, and gryllacridids, and even found the first phasmids ever documented for Bioko Island!

December 16th was a day that brought all of us to our breaking points. It was a 2.5 km hike up to the Lago Biao, a volcanic crater lake where we hoped to find tridactylids. The temperatures were pleasant enough, but the entire hike was uphill and proved extremely difficult. To add insult to injury, we finally arrived at the lake only to find that there was no tridactylid habitat in sight! We did find lots of cute reed frogs and collected some different grasshoppers, but by the end of the day we were exhausted and decided to forego night collecting in favor of a good night's sleep. Luckily the next day's collecting in Riaba and the eastern coast of Bioko yielded some more interesting insects, including the rare grasshopper *Gemeneta opilionoides* and the beautiful flightless pyrgomorphid *Parapetasia femorata*. Brandon also managed to find some tridactylids… but they were just more *Xya*! That same night, Jackson fell into some quicksand and almost got sucked under the surface as he frantically tried to escape while also capturing a mole cricket (*Gryllotalpa* sp.).

On December 18th, we secured permission to collect in Pico Basilé National Park, whose mountain peak has an elevation of 3,011 m. Here we hoped that we would find some interesting grasshoppers in the alpine heathlands, which also host an endemic bird, the Bioko speirops (*Zosterops brunneus*). Unfortunately, the mountaintop habitat yielded almost no orthopterans at all! There were many colorful flowers and a large diversity

of flies, but we did not find grasshoppers until we started descending to mid-elevations. Luckily, Brandon did manage to find and photograph the speirops at the last minute before we exited the alpine habitat. The grasshopper fauna of the park ended up being fairly similar to that which we had found during the previous few days, although Brandon did find the first Thericleidae for the island, and Hojun captured three adult *Cyrtacanthacris aeruginosa* in a single net sweep! On our final day in Bioko, we tried our best to find *Paratridactylus*, stopping at every conceivable habitat that might host tridactylids, but unfortunately it was all for naught. Brandon found several more populations of *Xya*, but the *Paratridactylus* was nowhere to be found.

As all good things must, our fieldwork in Africa came to a close. After returning to Douala to pick up the Cameroon specimens from Charly's office, we bade farewell to the Afrotropics and headed home with many specimens, photos, and memories. This trip was a great success in many regards, and none of it would have been possible without the tireless effort of Charly. In time, we will identify all of the specimens, as well as work up lists and manuscripts of the Orthoptera of the regions we surveyed, including new species descriptions. Our collaboration with Charly and his students will continue and hopefully prove fruitful for both of our research programs. Paratridactylus, alas, will continue to remain a mystery...at least for now…

Acknowledgments
We would like to thank MINRESI and MINFOF for permiting us to collect in Cameroon. David Montgomery and his team from BBPP helped with permits for Bioko Island. We also thank the hospitality of the park rangers and staff at Lobeke National Park and the staff of BBPP for allowing us to access remote places. This trip was financially supported by the NSF grant (DEB-1937815) to HS.

The Orthopterists' Society Board Meeting Minutes at ICO 2023, Mérida, Yucatán, México, 17 October 2023

Compiled by DAVID HUNTER
Past President
davidmhunter100@gmail.com

1. **Welcome from Chair:** David Hunter
2. **Apologies:** Pamm Mihm, Michel Lecoq
3. **Officers of the Orthopterists' Society:**
   President: David HunterPast President: Aleandre Latchininsky
   Incoming President Elect: Axel Hochkirch
   President Elect: Fernando Montealgre-Z

   Welcome to our President Elect, Fernando who will be part of the Board until he becomes President at the end of our next Congress.

   Executive Director: Mohamed Abdellahi Ould BABAH EBBE
   Treasurer: Pamm Mihm
   JOR Editor: Tony Robillard
   JOR Associate Editor: Nancy Morris
   Metaleptea Editor: Hojun Song
   Metaleptea Associate Editor: Derek A. Woller
   OS Website Manager: Derek A. Woller
   OSF Officer: María Marta Cigliano
   Theodore J. Cohn Research Fund Manager: Michel Lecoq

4. **Next OS Congress:**
   The first meeting of our society was held in San Martín de los Andes in December 1976 and to meet there again on the 50th anniversary would give full credit to all those that had the vision of what our society has become. The proposal was first put forward over a year ago by Dr Francisco Azzaro, a local SENASA official, who is an important local contact. This region in the Andes is amazing with mountains, lakes, valleys and being a major tourist area has plenty of facilities. María Marta did, however, outline some limitations: the town is not large so we would not have a large choice of venues and with the current high inflation in Argentina it has been difficult to get reasonable quotes on prices. Everyone at the meeting thought a 50th anniversary meeting was a great idea and María Marta will get back to us in a few months with updates.
   Claudia Hemp has also suggested Tanzania (Kilimanjaro) as a future option for our Congress.

5. **Treasurer's Report 2023:** Pamm Mihm
   Following the very generous donations of $1.24 million by Ted Cohn in early and late 2014, the Orthopterists' Society has total investments of $1.578M as of September 30, 2023. The investment balance consists of 70% invested in stocks and 30% invested in fixed income securities such as bonds and CD's. We moved some investments to Certificates of Deposit (CD's) in December 2022 to take advantage of their less risky nature and attractive interest rates.

Inflation and interest rates have had a negative impact on the stock market over the last two years. When the market is doing well, however, we have been moving some of the "gains" to lower risk investments. Historically, the stock market will recover in the long term so the long term investment strategy is to keep around 70% of the investments in US and international stocks. A global investment strategist at JPMorgan Private Bank said last week that 2023 can finish strong so I am hoping the Society can finish out the year with increased investment value.

The Orthopterists' Society earned $42,464 of dividends and interest during 2022. Other revenue sources were $15,421, excluding the OSF income from the University of Illinois. Expenses were $89,574 including a $7,000 contribution to this Congress and excluding OSF expenses. We were able to meet the needs of the Society by selling $20,000 of investment principal and using the dividends/interest income. This is an example of a pretty typical financial year for the Society. In most years the interest and dividends cover most of Society needs, though in a Congress year, we need to tap into the investment principal more.

During the 2019 Congress, we voted to take 3% of the total investment balance (calculated as the average total investment balance for the prior year; beginning total investment balance plus ending total investment balance divided by 2) per year to be used for OS expenses and set aside for future extra Congress expenses. This would be a ceiling of 9% over 3 years. This 3% would be in addition to amounts taken out of the money markets and cash accounts (where the dividends and interest are deposited) within the investment portfolio.

In closing, David Hunter has been very helpful to me in collaborating on investment and financial decisions for the Society. He has developed a special financial skill set over the years. I am recommending that David stay on as a financial advisor to the Society even though his term as President is complete.

Motion passed by the Board: that David Hunter continue on the OS Board as Financial Advisor.

6. **Metaleptea:** Hojun Song

Hojun Song, with able assistance from Derek A. Woller, continues to produce excellent *Metaleptea* newsletters. Reports by recipients of grants from the Orthoptera Species File/TaxonWorks and the Theodore J. Cohn Research Fund show what is being done by the young researchers we have funded. While many recipients of grants do send in their reports (thank-you), some have needed to be reminded to send in reports.

7. **Journal of Orthoptera Research:** Tony Robillard

The great news this year is that JOR has received an impact factor: the Clarivate Web of Science Impact Factor is 0.8. And for citations, JOR has a Scopus CiteScore 0f 1.3 for 2022 and the latest updated score is 1.4. The editorial team consisting of Tony Robillard, with Nancy Morris, the editorial assistant, and the new team of 13 subject editors, continue to work hard to ensure consistent publication of two issues annually containing high-quality scientific articles on a variety of subjects related to the Orthoptera and allies. They have steadily increased the number of articles published per year since 2014, and from 2018-2023 have reached a consistent size of the journal of 200-220 pages in 17-23 articles.

8. **OS website:** Derek A. Woller

Having the OS membership database associated with GLI's Hopperlink or similar was discussed. In whatever format is finally decided, there needs to be regular access to the database by Board members, including the Treasurer, to keep track of membership payments, and by the Executive Director for sending out of emails, the *Metaleptea* newsletter, and sending an updated list to Regional Representatives of members in their regions. However, the degree of access needs to be examined carefully so that we adhere to EU laws on data privacy and security, specifically the General Data Protection Regulation (GDPR). One idea that was discussed that would seemingly satisfy the conditions of GDPR is adding a section to the OS website that enables members to add their information voluntarily (basically a volunteer membership database). We are currently discussing ideas with the GLI to determine a course of action.

9. **Feedback from Regional Representatives and global representation**

North America – Kathleen King (present)
South and Central America – Martina Pocco (present)
West Europe - Gerlind Lehmann
East Europe, North and Central Asia – Michael Sergeev
Middle East, Caucasus – Battal Çiplak
East Asia – Long Zhang
Japan – Haruki Tatsuta
South Asia – Rohini Balakrishnan (present)
North and Sahelian Africa – Amina Idrissi
East Africa – Claudia Hemp (present)
Sub-Saharan Africa – Vanessa Couldridge (present)
Australia, New Zealand and Pacific Islands - Michael Kearney (present)

Hojun Song mentioned the importance of a report to *Metaleptea* at least once a year from each regional representative as a way of letting everyone know what is happening in their area. There are guidelines for regional representatives and these will be circulated to all representatives along with a list of members in their region.

10. **OS Species File/TaxonWorks:** María Marta Cigliano

María Marta Cigliano mentioned the release of a major new version of the Orthoptera Species File (OSF). September 2023 marked a pivotal moment as OSF migrated to the TaxonWorks platform, aiming to provide a more streamlined and accessible experience for users, advanced search and data analysis; efficient workflows and modern data management. In addition, there is a new Assistant Editor of OSF, Maria Belen Cabrera, and that Claudia Hemp has joined the Governance/Scientific Committee, replacing David Rentz, who asked to step down from these responsibilities.

In addition to the Workshop on TaxonWorks that was held during the Congress, several other implementations are being conducted in order to support the transition of the community to the new platform: Monthly Virtual Meetings; Development of Software Help Manuals; duplicate database for practice that is synchronized weekly with the production database.

11. **Awards and Grants:** David Hunter

The Theodore J. Cohn Research Fund: About $15,000 awarded each year (usually in April) to support Research projects by students and young professionals up to a value of $1,500 each. Funds are taken from earnings of the Research Grant Accounts that currently have just over $470,000. Since 2014, 123 grants worth $135,000 have been awarded to students and young professionals and while about half have been from the USA, there have been grants to individuals from 27 different countries. To date 75 articles presenting the results have been in *Metaleptea*. Committee: Michel Lecoq (Chair), David Hunter, Battal Çiplak, Lacey Knowles.

Awards during each Congress: About $60K in Awards and Grants were supplied for the 2023 Congress: most are funded from the earnings of the Ted Cohn gifts. A total of ~$50K was provided for travel to, and accommodation and registration at, the Congress for Board Members, Plenary Speakers, Symposium Organizers, and Young Professional Orthopterists.

In addition, there were two $2,500 Awards for Young Professional Orthopterists, and two $2,500 Awards for the Sir Boris Uvarov Award in Applied Acridology, the latter funded in part by a grant from the Association of Applied Acridology. In addition, there is the D. C. F. Rentz Award for Lifetime Dedication to Orthoptera. All winners of an Award receives a certificate or a plaque in the case of the Sir Boris Uvarov Award.

General support for Society Members: Ggrants are given to financially support symposia held at other meetings, plus support for books and publications. For books and publications, partial funding is generally envisaged with some support found elsewhere and the books or publications supported need to be refereed as part of keeping high standards for Orthopterists' Society publications. The many grants and awards made possible by the Ted Cohn gifts serve to facilitate support for students and young professionals, which was a clear wish by Ted Cohn while he was President. For a number of our members, there is a further avenue of support through the direct mentoring of individual students, both in our own countries and in developing countries, which encourages and supports orthopterology all over the world as part of making our Society truly international.

12. **Other business:**

It was proposed that the Board invite Arianne Cease of the Global Locust Initiative (GLI) to become a member of the Board in a new position called the Global Locust Initiative Representative in view of the strong support the GLI gives for locust and grasshopper research and management. Arianne accepted the invitation and is also the current Director of the GLI.

To expand the Board for David Hunter (Financial Advisor) and Arianne Cease (Global Locust Initiative Representative), it was moved that the Constitution and By-Laws be updated from their 2005 form. This update, to happen in the near future, will also examine the duties of each of the Officers of the Society.

Treasurer's Report

By PAMELA MIHM
Treasurer
p.mihm@regency-multifamily.com

The Statement of Assets as of December 31, 2023 and the 2023 Summary of Cash Receipts and Expenditures are shown below. The Orthoptera Species File (which is funded by an endowment from the University of Illinois) and publishing the *Journal of Orthoptera Research* (*JOR*) are the two largest uses of resources. Since the Congress was held during 2023, there were many expenditures associated with it such as travel grants, travel reimbursements, a $6,000 contribution to the Congress and awards. The Society's total assets increased from $1.6 million at the end of 2022 to $1.7 million at the end of 2023. We made some changes in the investment portfolio to try to maximize the value and earnings and there was an improvement despite taking out extra funds for Congress expenditures. If you have any questions, please contact me at **p.mihm@regency-multifamily.com**.

Orthopterists' Society
Statement of Cash Receipts and Expenditures
(1/1/23 through 12/31/23)

Cash Receipts	
Dues	$3,850.00
Publications	1,550.00
Donations	75.00
Community Foundation endowment	8,577.60
Royalty and revenue sharing	4,562.63
Book reimbursements	236.95
Transfer cash from Vanguard & Wells Fargo	73,200.00
Proceeds from sale of investments	58,000.00
University of Illinois allocation	220,000.00
Total Cash Receipts	$370,052.18
Cash Expenditures	
Publisher JOR	$3,229.35
Pensoft Publishers	10,923.09
JOR assistance	12,000.00
Research grants (Ted Cohn)	14,827.00
Executive director remuneration (2020-2023)	6,000.00
Ed. Metaleptea remuneration	1,500.00
Assistant Ed. Metaleptea remuneration	500.00
Webmaster remuneration	1,000.00
JOR editor remuneration	3,000.00
Maintenance of Orthoptera Species File	174,500.00
Grants-Orthoptera Species File	56,311.00
Professional fees (income tax preparation and audit)	6,119.40
Webmaster SINA site support	3,900.00
Accounting	12,000.00
Uvarov and Young Professional Awards	10,000.00
ICE registration reimbursement	774.74
Congress travel reimbursement	33,200.21
Congress 2023 travel grants	15,461.33
Congress 2023 contribution	6,000.00
Other	1,912.69
Total Cash Expenditures	$373,158.81
Cash Receipts over Cash Expenditures	$(3,106.63)
Beginning Cash Balance	13,821.72
Ending Cash Balance	**$10,715.09**

Orthopterists' Society
Statement of Assets
(As of December 31, 2023)

Cash	
Paypal cash balance	$562.33
Chase Bank	10,152.76
	$10,715.09
Investments at market value	
Vanguard:	
Grants (Note 1)	$439,000.07
Operating (Note 2)	793,061.40
	$1,232,061.47
Wells Fargo:	
AAAI (Note 3)	$16,218.39
Endowment (Note 4)	40,012.89
Operating (Note 2)	312,430.79
Grants (Note 1)	102,094.38
	$470,756.45
Total assets	**$1,713,533.01**

Note 1: This fund is restricted and can only be used for research grants.
Note 2: This fund is nonrestricted.
Note 3: This fund can only be used for the Uvarov Award made at each int'l meeting.
Note 4: The income in this account is available for Society expenses; can extract capital but must have a plan for repaying it within 3 years.

Editorial

By HOJUN SONG
Editor, *Metaleptea*
hsong@tamu.edu

The ICO 2023 in Mérida was a major success. I traveled with my entire lab and those associated with the **Behavioral Plasticity Research Institute (BPRI)**, and everyone truly enjoyed the scientific camaraderie among the orthopterists and the beautiful Mérida, one of my favorite places on the planet. My friend, Mario Poot-Pech, was hands-down the most hard-working person who ensured that the congress ran as smoothly as possible. It was a massive effort for him and his team to pull this together, and I would like to take this opportunity to congratulate him on the successful execution of the ICO 2023.

After the congress, some of my students and colleagues associated with the BPRI spent a few more days in the gregarious zone of the Central American locust near Buctzotz and conducted various field-based experiments. Of course, this work could not have been possible without Mario and his team, so I owe him a lot!

For me, the end of 2023 flew by so quickly. I traveled to Cameroon and Equatorial Guinea with my students for a collection expedition for nearly a month in December. The last time I carried out an international field expedition was back in 2019 in Australia with Mike Kearney. I have longed to be in the field again collecting orthopterans, and this trip was the answer. Working in Cameroon and Equatorial Guinea was definitely different from the previous international expeditions I had taken. The logistics were complicated, getting around was challenging, and having decent meals was hard on some days. However, with the help of my friend and colleague, Charly Omaurou Ngoute, we were able to travel safely to the heart of the Congo Basin and collect various orthopterans. Please see my student Brandon's travelogue for our impression of the place. It was my first trip to the Old World tropics. Although I had never been to the Congo Basin, the plants, insects, sounds, and smells were all very familiar. While chasing after a grasshopper through the fern forest, I thought I was in Costa Rica. The degree of convergence between the Old World and the New World tropics was simply astounding. How the forms and colors of various orthopterans converged between very different regions was a question that kept me pondering throughout the whole trip. Charly and I discussed the urgent need to explore the Congo Basin and the lack of infrastructure to study the fauna. We need to think seriously about how to promote orthopteran research in that region.

I would like to thank our Associate Editor, Derek A. Woller, for his continued assistance in the editorial process. To publish in Metaleptea, please send your contribution to **hsong@tamu.edu** with a subject line starting with [Metaleptea]. A MS Word document is preferred, and images should be in JPEG or TIFF format with a resolution of at least 144 DPI. The next issue of *Metaleptea* will be published in May of 2024, so please send me the content promptly. I look forward to hearing from you soon!

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