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METALEPTEA

THE NEWSLETTER OF THE ORTHOPTERISTS' SOCIETY

President's Message

By DAVID HUNTER
President
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Dear Society Members,

The many reports of activities and research in the current issue demonstrate that we have generally been able to adapt to COVID-19 restrictions. I bring to your attention under "Latest News" the new book recently published, "*A Field Guide to the Bushcrickets, Wetas and Raspy Crickets of Tanzania and Kenya*" by Claudia Hemp et al., which provides a most comprehensive coverage of various crickets of Eastern Africa. And the most recent issue of the *Journal of Orthoptera Research*, 30(1), contains 11 articles: many thanks to *JOR* editor Tony Robillard and to YOU, our members, for such a comprehensive and varied set of articles!

Our investments continue to increase, which allows us to cover a significant part of our expenses. There is now over $100,000 in our low-risk Bond Reserve Fund that puts us in good stead to support student travel and various awards for our next Congress scheduled for late 2023 in the Yucatán region of Mexico. Mario Poot Pech and Hojun Song are starting to investigate alternatives for the Congress, including Zoom presentations for those who cannot make it. Exactly how the Congress will be run is uncertain since while COVID-19 is decreasing in some areas it is increasing in others, so it is difficult to know how much longer

the pandemic will continue before it declines to a level where we have a more normal situation, even if it is some sort of new normal. So, we are investigating a number of different scenarios, in a balance between live and Zoom presentations, but, regardless, the aim is to have sessions on-line, so everyone can listen in and participate.

It is with a great deal of pleasure that I draw your attention to the Ted Cohn Research Grants provided to a number of students and young scientists. Ten grants, totalling $14,687, have been awarded from a wide variety of countries. The list of awardees is on page 2.

Many thanks to Hojun and Derek for another comprehensive issue of *Metaleptea*! Enjoy!

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The 2021 Theodore J. Cohn Research Grants Funded

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

As usual, this year we have received various research proposals, mostly from PhD students, but also from BS and MS students. These proposals came from Argentina, Brazil, Cameroon, Colombia, Greece, Mexico, Germany, Turkey, and the USA. As usual, the task of the Committee was not easy. Based on their merit and our financial possibilities, we selected 10 research projects for a total amount of $14,687. Below is the list of successful applicants (in alphabetical order) and the title of their research project:

1. **Elio Castillo** (Argentina) - Are Andean species of *Jivarus* Giglio-Tos, 1898 the most ancient stock of South American Melanoplinae? Molecular phylogeny and chromosome evolution
2. **Leonardo Meza** (Colombia) - Climate change impacts on New Zealand alpine grasshoppers (Orthoptera: Acrididae)
3. **Nefeli Kotitsa** (Greece) - Sky-islands under threat: an evolutionary study of the endemic bushcrickets of the genus *Parnassiana*
4. **Juan Manuel De Luna** (Mexico) – Mantodea diversity of "El Cielo" Biosphere Reserve, Gómez Farías, Tamaulipas, Mexico
5. **Howon Rhee** (Germany) - Genetic bottleneck effects and inbreeding of *Psalmatophanes barretoi*
6. **Özgül Yahyaoglu** (Turkey) - Fingerprints of altitudinal adaptation in mitogenome: A snapshot from *Parapholidoptera* (Orthoptera, Tettigoniidae) (FAAM-SP)
7. **Charlie Woodrow** (UK) - Evolution of the ensiferan ear canal – a phylogenetic assessment of form and function
8. **Finn Gamble** (USA: CA) - Dueling crickets: Differences in male aggressive behavior among cricket morphs
9. **Gabrielle Welsh** (USA: CO) - Comparative assessment of courtship behavior in recently derived Pacific Field cricket morphs
10. **Stephen Bucklin** (USA: PA) - Colonization of New Habitat: Impacts of Playback Calls in Meadows on Abundance and Diversity of *Orchelimum* spp. and *Conocephalus* spp.

The selection committee comprises four members: myself (France), Battal Çiplak (Turkey), David Hunter (Australia), and Lacey Knowles (USA). On behalf of all the committee members, I would like to thank all our applicants for their participation, and congratulate those who have been selected and wish them good luck in their work.

The next call will be in early 2022 and we strongly invite BS/MS/PhD students and post-docs from around the world to submit their research proposals. I remind all that the only requirement is that the applicant be a member of the Orthopterists' Society in good standing. As usual, upon completion of their research, selected candidates will be asked to provide a short report, which will be published in our *Metaleptea* newsletter.

The 2021 OSF Grants Funded

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The OSF grants committee received and evaluated 10 proposals by applicants from eight countries: Brazil, Cameroon, Colombia, Croatia, Germany, India, Pakistan, and South Africa. The four proposals listed below were funded and were selected based on the amount of data (images, specimen records, and sounds) expected to be added to the Orthoptera Species File. Also considered was the candidates' expertise (if the proposal was related to a taxonomic research project) and the adequate budget.

1. **Daniela Santos Martin Silva** (Universidade Federal de Viçosa, Minas Gerais, Brazil) - The grasshoppers (Orthoptera: Caelifera) from Panga Ecological Reserve, Minas Gerais, Brazil
2. **Oscar Cadena-Castañeda** (Universidad Distrital Francisco José de Caldas, Bogota, Colombia) - Study of Melanoplinae (Acrididae), Mecopodinae and Hexacentrinae (Tettigoniidae) of high Andean forests and paramos of the eastern mountain range of Colombia

3. **Claudia Hemp** (Senckenberg Biodiversity and Climate Research Centre, Germany) - A photographic safari to western and southern Tanzania and northern Kenya
4. **Vanessa Catherine Kemsley Couldridge** (University of Western Cape, South Africa) - Acoustic profiling of South African orthopterans

The Orthopterists' Society, in cooperation with the Illinois Natural History Survey, provides funding for work in support of the Orthoptera Species File. Members of the Orthopterists' Society are invited to apply. Applications should be sent to María Marta Cigliano (cigliano@fcnym.unlp.edu.ar).

Grants are available for a project as defined by the applicant. The project must involve benefit to the Orthoptera Species File. The usual benefit is the addition of images (photographs of the habitus and diagnostic details of type specimens, other reliably identified museum specimens, living individuals in natural habitats), sound recordings, and/or geo-referenced specimen records. Any proposal that solely focuses on fieldwork or other systematic research without direct benefits to OSF will not be considered. Projects may be proposed for periods of one to three years.

Funding availability for 2022 will be announced in October 2021.

Updates from the Global Locust Initiative

By MIRA WORD[1] & RICK OVERSON[2]
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Hello, fellow Orthopterists! Spurred by locust outbreaks and continued growth to the Global Locust Initiative (GLI) Network, this past year has been full of ongoing research projects and enhancements to the Network. We're excited to embark on two new five-year projects at GLI Lab. One project, supported by an NSF CAREER award, will explore ecophysiology tradeoffs in locusts. Additionally, we are excited to be one of several collaborating partners in the newly formed Behavioral Plasticity Research Institute funded through the NSF-BII program. If you haven't visited our website in a while, we've updated content to include summaries of GLI Lab projects, information on outbreaking locusts, and other many other resources like the Pest Grasshoppers and Locusts in Central Senegal: An Agriculturist's Guide.

Figure 1. Members of Global Locust Network online community. Please join us: https://bit.ly/JoinGlobalLocustNetwork

New online private professional network

As we continue to grow, we've embarked on major efforts to enhance Network member interactions. Earlier this year, we launched a new online professional community (Fig. 1) supported by the Foundation for Food and Agriculture Research (FFAR) to increase the connectivity among Network members and make it easier to share information across disciplines, sectors, and continents. There are now over 100 members with profiles representing 30 countries and over 75 areas of expertise (and growing!). These include research scientists, field technicians, non-profit professionals, students, professors, farmers, and officials from intergovernmental organizations, like the FAO of the UN and USAID. This is a fantastic tool for staying abreast of research activities and stakeholder concerns at a global level and a great medium for posting information, like project updates, events, and job opportunities. The hosting software, Mobilize, works seamlessly with your email, so you can respond to messages and posts either from email

Figure 2. Participants at locust governance workshop in Tucumán, Argentina in February 2020.

or on the platform itself. You're also in control of the frequency and type of notifications you receive. If you'd like quick assistance on using Mobilize, please reach out to Mira Word. We encourage anyone with an interest in grasshopper and locust biology, integrated pest management, monitoring and forecasting, landscape ecology, food security, social sciences, and beyond to join! Also, feel free to extend the invite on this page to others as you see fit. See you there soon!

Stakeholder locust governance workshops

To better engage with stakeholders to understand the feedbacks among locust populations, land use, and governance, GLI Lab hosted two comparative workshops supported by FFAR and ASU's Swette Center for Sustainable Food Systems.

The first workshop took place in Tucumán, Argentina in February 2020 (Fig. 2). Participants ranged from researchers to farmers and representatives from national and provincial locust control agencies coming from Argentina, Bolivia, Uruguay and Paraguay. Lead facilitators, Dr. Clara Therville (Postdoctoral Scholar) and Dr. Marty Anderies (Professor, ASU) used participative methodology like collaborative social mapping to encourage participants to share their points of view regarding governance issues surrounding the South American locust (*Schistocerca cancellata*). They also explored topics around the current outbreaks of S. cancellata, identified the main actors involved in the governance system, characterized the interactions between actors, and discussed the main strengths, weaknesses, and threats to sustainable governance.

The second workshop was held for Australian stakeholders and focused on the Australian plague locust (*Chortoicetes terminifera*) with a similar format to the first workshop (albeit online) on February 16–17, 2021 (Fig. 3). Over 30 people participated with representatives from The Australian Plague Locust Commission, The Commonwealth Scientific and Industrial Research Organisation, The University of New South Wales, The University of Melbourne, Department of Primary Industries and other government entities. Preliminary results show contrasting outcomes based on the maps emerging from the social network exercises between South America vs. Australia.

These workshops are part of the GLI's continued efforts to compare and contrast locust governance and complex feedbacks within social ecological, technological systems. If you are interested in learning more about this topic a new publication authored by workshop leaders is available here. For more on our FFAR funded efforts click here.

We hope you engage by joining the new online community, also check our website (locust.asu.edu), and follow Twitter (@GlobalLocust) for more information about the initiative, events, and news.

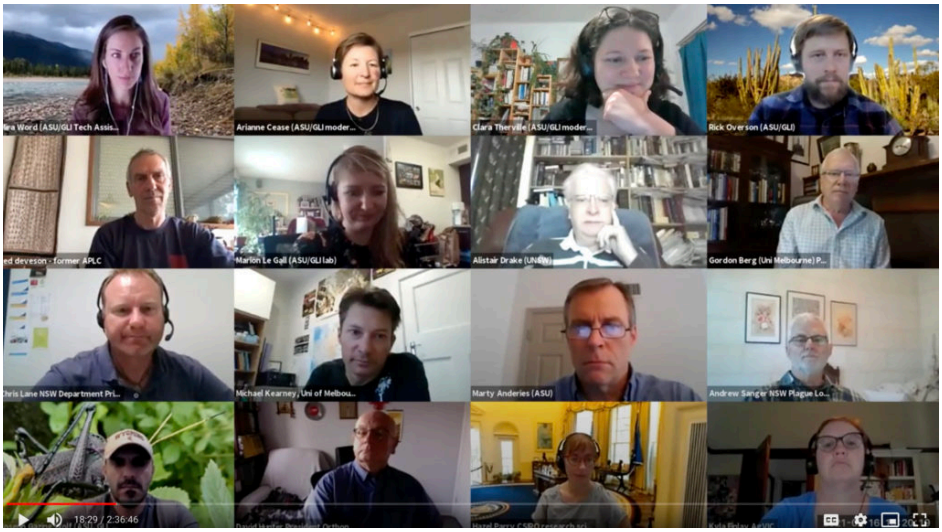

Figure 3. Virtual locust governance workshop with Australian stakeholders, February 2021.

Theodore J. Cohn Research Grant Reports

An evaluation of the Mediterranean species of the band-winged grasshopper genus *Acrotylus* (Fieber, 1853) using DNA barcoding

By TIMO WEHRT
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The grasshopper family Acrididae is one of the most diverse lineages within the Orthoptera, including more than 6,700 valid species (Cigliano et al., 2021). Interestingly, the family has a complex taxonomic history which leads to occasional difficulties in determining species status. One of those genera affected by such difficulties is the genus *Acrotylus* Fieber, 1873, which is accompanied by a history of a lost type specimen and the random designation of neotypes (Fries et al., 2007). Additionally, two of the species, *A. patruelis* Herrich-Schäffer, 1838 and *A. insubricus* Scopoli, 1786, are widespread in large parts of Europe, Africa, and Asia. Although *A. patruelis* is designated as the "slender burrowing-grasshopper" and *A. insubricus* is known to have a stouter body in general, both species share similar morphological characters as well as compared with some Mediterranean species (Krauss, 1890). While most of the species are endemic to Africa and the Middle East, five species out of the total 45 are endemic to the Mediterranean Basin. The Mediterranean region represents a hotspot of biodiversity with a high number of endemic species, whereas the center of biodiversity of the genus *Acrotylus* is located in South Africa (Myers et al., 2000). The species *A. kirbyi* Froggatt, 1903 is considered as an exception since it is endemic to western Australia.

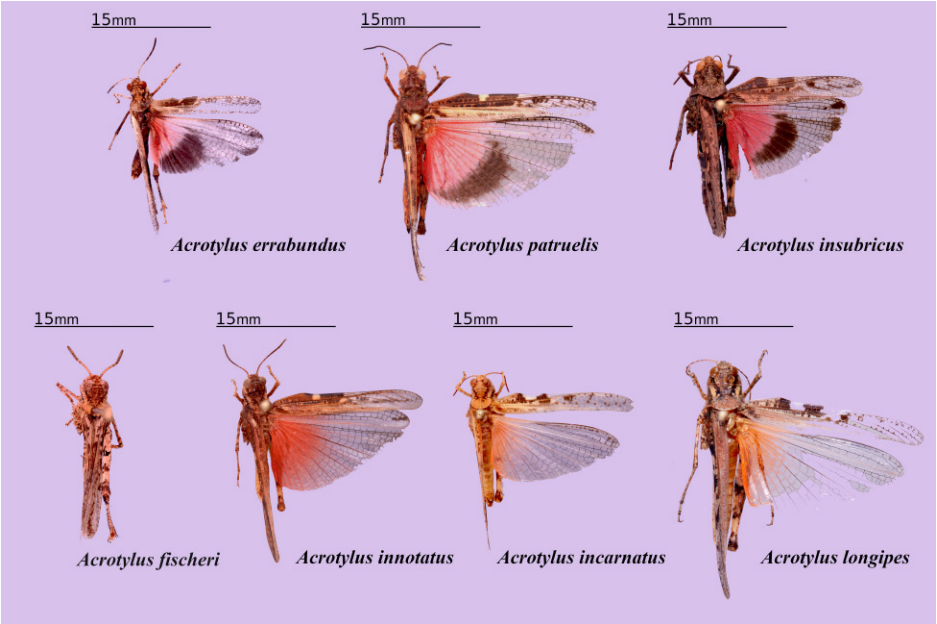

Figure 1. Seven species of the band-winged grasshopper genus *Acrotylus* with different wing morphologies

The aim of this study

The entomological collection of the Centrum für Naturkunde (CeNak) in Hamburg, Germany contained numerous amounts of dried *Acrotylus* specimens. I got interested in determining the species status of the Mediterranean species of this genus because recent research focused on other subjects while the phylogenetic relationships remained unclear and poorly understood. Since morphological characters are limited and variable within species, and are generally subjected to different ways of interpretation, molecular methods offer a more objective way to distinguish between taxonomic units. In this study, I used newly generated genetic and morphological data as well as additional data from online databases to test the following hypotheses:

1. The currently recognized *A. patruelis, A. insubricus, A. longipes* (Charpentier, 1845), *A. errabundus* Finot, 1893, *A. innotatus* Uvarov, 1933, and *A. incarnatus* Krauss, 1907 are valid and represent independent genetic clusters.
2. The species *A. patruelis* and *A. insubricus* have distinct, non-overlapping distributions.
3. The widespread species include yet-unrecognized additional cryptic diversity.

Genetic analyses

While Orthoptera are known to serve as a prime candidate group for the application of DNA barcoding, many researchers have faced difficulties, such as incomplete lineage sorting, hybridization, and so-called numts (nuclear mitochondrial

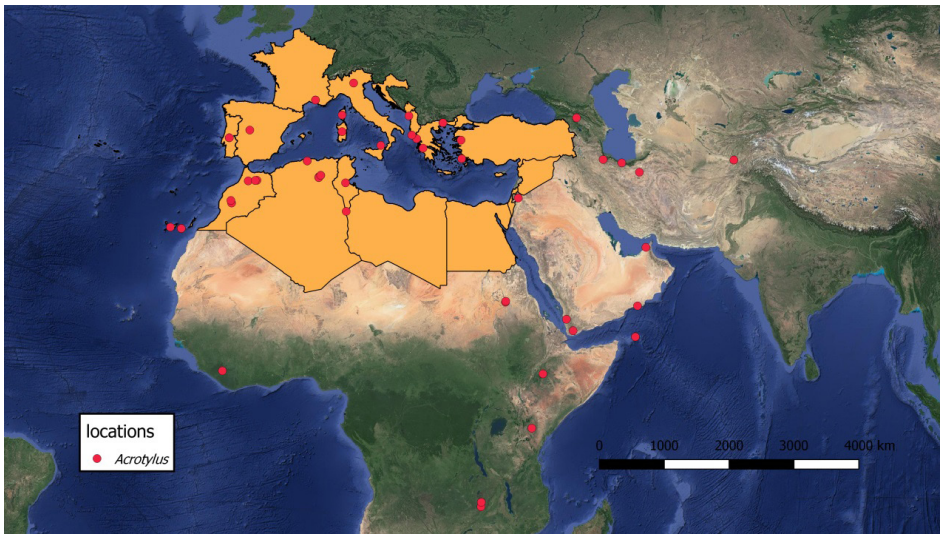

Figure 2. Distribution map of the collected samples of the genus *Acrotylus*. Yellow marked countries indicate the Mediterranean Basin.

psdeudogenes), which can all lead to obstacles in obtaining phylogenetic resolution (Butlin and Hewitt, 1985; Bella et al., 1992; Song et al., 2008 Hawlitschek et al., 2017) Surprisingly, I experienced no such difficulties as a total number of 80 (60 newly sequenced) specimens nested into 6 taxonomic groups using two different analyses (Maximum Likelihood and Bayesian Interference). The built alignment of the cytochrome oxidase subunit I (COI) gene resulted in a length of 602 bp. Additionally, the automatic barcode gap analysis (ABGD, (Puillandre et al., 2011)) detected 6 molecular operational taxonomic units, which is in line with the phylogenetic tree analyses. Therefore, I found that the current species status of *A. patruelis*, *A. insubricus*, *A. longipes*, and *A. innotatus* were valid. In contrast, the two species *A. errabundus* and *A. incarnatus* did not represent independent genetic clusters and perhaps need to be synonymized. Moreover, two new clades were recovered that may represent species new to science: one is found in the Middle East (Iran, Afghanistan), the other in the Balkan Peninsula (Bulgaria, Turkey).

Biometric analysis

I also performed a biometric analysis of the two common species of the genus *Acrotylus*, *A. patruelis* and *A. insubricus*. The body length and width, plus ratio, of these two parameters of both species were measured and compared in order to find a new morphological character to more easily distinguish these species. Statistically significant differences of

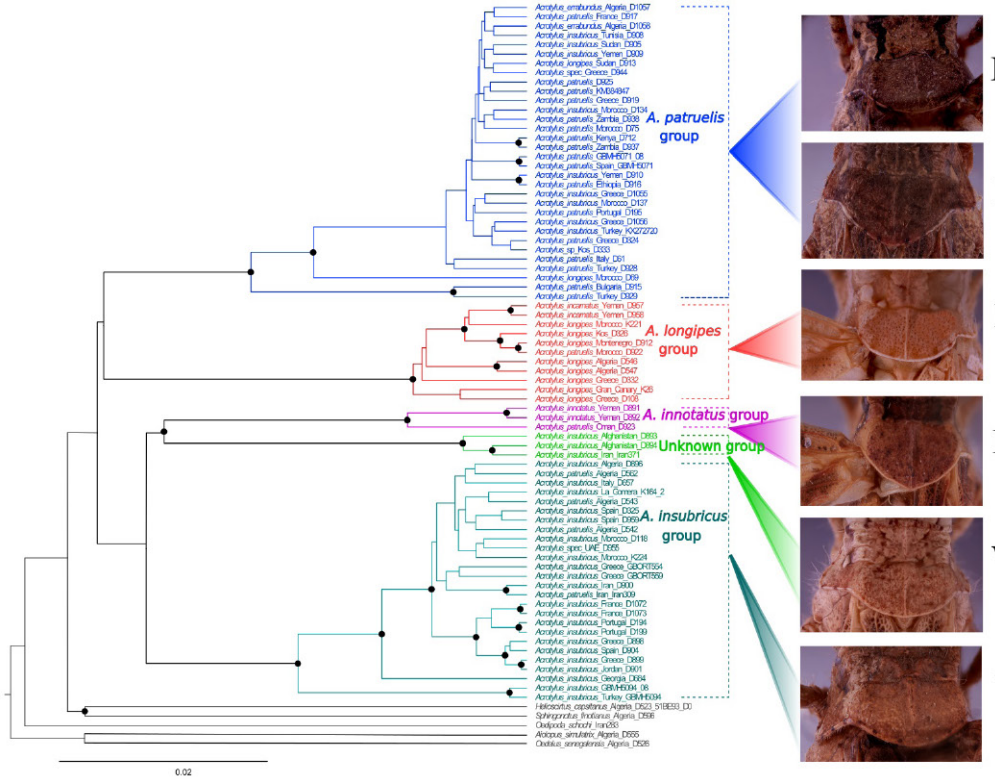

Figure 3. Phylogenetic tree of the Bayesian Interference analysis of the genus *Acrotylus*; black dots on nodes indicate posterior probability values >0.9; the variability of different pronoti of the genus *Acrotylus* is shown (dorsal view); numbers indicate different lineages within the genus *Acrotylus*: **I**: *A. patruelis* **II**: a clade likely representing a new unknown species consisted of individuals found in Bulgaria and Turkey; morphologically identified as *A. patruelis* **III**: *A. longipes* **IV**: *A. innotatus* **V**: a clade likely representing a new unknown species (called here *Unknown group)* **VI**: *A. insubricus*

the width between both sexes have been recorded, which means that, on average, *A. insubricus* is wider and has a stouter body than *A. patruelis* (p=0.0007).

Conclusion

This study confirms the distinct species status of *A. patruelis* and *A. insubricus*, which overlap in large parts of their distributions. Additionally, the species status of the species *A. longipes* and *A. innotatus* has also been confirmed by different phylogenetic analyses, as well as by species delimitation. In comparison, *A. errabundus* and *A. incarnatus*, currently recognized as distinct species, may actually represent synonyms of *A. patruelis* and/or *A. longipes,* or perhaps are conspecific with the mentioned species.

Within *A. patruelis*, a potentially new cryptic lineage has been found in the Balkan Peninsula, which differs from other species by a tapering margin of the pronotum and flat-like pronotum in general. Additionally, I found another possibly new cryptic lineage in the Middle East, which shares nearly identical morphological characters as *A. insubricus*. Unfortunately, the species *A. fischeri* was not included in the phylogenetic analyses. In further investigations of this genus, this species may play an important role, especially because of its controversial and confusing taxonomic history. Although the results based on the different analyses and approaches to resolve the relationships of the Mediterranean species within the genus *Acrotylus* were clear and conclusive, the assumptions based on this dataset need to be verified by phylogenetic studies with a larger gene and taxon sampling, which I am currently working on for my master's thesis.

Acknowledgements

First of all, I would like to thank the Orthopterists' Society for providing me with the Theodore J. Cohn Research Grant. I would like to give special thanks to Dr. Martin Husemann because the door to his office was always open whenever I ran into a trouble spot or had questions about my research. Also, special thanks to Rob Felix and Bruno Massa for providing me with countless specimens.

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How did Orthopterists and Orthoptera respond to the COVID-19 Pandemic?

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The COVID-19 pandemic has disrupted the lives of everyone all around the world. Many countries went into national lockdowns when the number of cases and deaths soared during the spring of 2020. For researchers, fieldwork and laboratory work have to be halted and research plans have to be reconfigured. "When life throws you lemon, you make lemonade," so I have decided to make the best out of the unprecedented global crisis by studying how the lockdowns for humans can, in turn, influence the behaviours of crickets.

As a postdoctoral fellow under the supervision of Dr. Tony Robillard, I was back in my home town in Singapore to study the population differences in the calling and exploratory behaviours of eneopterine crickets. Understanding population differences was a critical part of a larger project looking at individuality of singing and behavioural traits in crickets. But nearly mid-way through the study, Singapore went into a national lockdown, termed as

Figure 1. A male adult of *Lebinthus luae*, the subject of the study.

the Circuit Breaker. The initial data collected appeared to be going to waste until we started questioning how the drastic change in human activities due to the lockdown would impact wildlife. After about seven weeks of lockdown, I continued my data collection, but now with a new question in mind. In addition to understanding how different isolated populations of crickets may behave differently, I set out to explore how the Circuit Breaker can also change the behaviours in each population.

Eneopterine crickets are a fascinating group of crickets that are highly diversified in Southeast Asia (Vicente et al., 2017). In the small city state of Singapore, where nature is segmented by the highly urbanised landscape, there are as many as four species of these eneopterine crickets (Robillard & Tan, 2013; Tan & Robillard, 2014), one of which is *Lebinthus luae* Robillard & Tan, 2013 that I studied during the pandemic (Fig. 1). Unlike typical crickets, the males of *L. luae* call and explore around low-lying vegetation to look for potential mates (ter Hofstede et al., 2015). These behaviours are highly risky, so they have to strategise to ensure survival and reproduction.

Studying animal calling and exploratory behaviours simultaneously is rarely done. I attempted to address this by studying these behaviours in three isolated populations of *L. luae* in Singapore. Specifically, I collected the male adult crickets from three sites: Hindhede Nature Park, Labrador Nature Reserve, and Pulau [= Island] Ubin (Fig. 2). Hindhede Nature Park is a nature area surrounded by housing estates. Labrador Nature Reserve is another forest plot located near the Central Business District of Singapore. Lastly, Pulau Ubin is a rural island. After bringing the crickets back to a lab, they were each placed in an arena where their exploratory behaviours were video-recorded. Likewise, each cricket was also placed in an insect cage in a sound-attenuated room where their calls were recorded. From the video and sound files, the time spent exploring and call parameters were quantified respectively. In total, 39 crickets were observed over the course of the study.

We found that the crickets produced significantly shorter trills in the Hindhede population (Fig. 2). More interestingly, the crickets from Hindhede also produced significantly shorter trills after the Circuit Breaker, which is not observed in other populations (Fig. 2). Being surrounded by dense housing estates in the heart of Singapore and traditionally a popular nature park for hikers, crickets found in Hindhede produce shorter trills than other populations as a response to these elevated human pressures. During the Circuit Breaker, nearby residents are still able to visit parks and, in fact, more frequently due to teleworking and school closures (Tan, 2020; Wong, 2020), in comparison to the more deserted and out-of reach

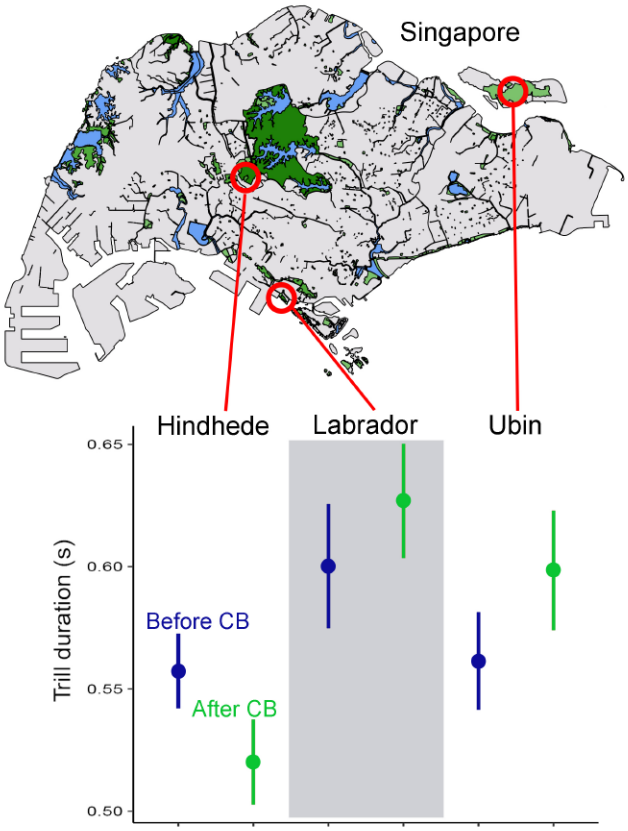

Figure 2. The map of Singapore showing the locations of the three populations and how the trill durations differed between the populations and before and after the lockdown (CB = "Circuit Breaker").

Labrador Nature Reserve and offshore Pulau Ubin. The further elevation in human pressures may have led to the crickets producing even shorter trills after the Circuit Breaker.

This study has been published in *Ecology (The Scientific Naturalist)* (Tan & Robillard, 2021), which also represents the first published report on the effect of the COVID-19 pandemic on natural populations of invertebrates (Rutz et al., 2020). It demonstrates that even a short Circuit Breaker has had an impact on the behaviours of the small and overlooked crickets, which, in turn, can drive the microevolution of different populations. This study has also inspired me to expand on this study, hoping to further decipher the impact of human pressures on animal behaviours and acoustics, especially in the hyper-biodiverse, yet highly threatened, region of Southeast Asia.

While we humans are still struggling to cope with the dramatic change brought about by the COVID-19 pandemic, this study has also reminded us that, for a long time, we have also impacted wildlife and the natural world, which are fighting to cope. While the virus has wreaked havoc on human society, it appears that the lockdowns have been a breather for the natural world.

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Wing polyphenism in *Gryllus firmus*

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Wing polyphenisms represent a classic life history trade-off between investment in reproduction or migration. While the analysis of trade-offs known as life history theory explains **why** this phenomenon occurs, **how** it occurs at an evolutionary, developmental, or mechanistic level remains unknown. The wing polyphenic sand cricket, *Gryllus firmus* Scudder, 1902, exhibits markedly different developmental trajectories based on environmental signals it receives during development. Upon completing nymphal development, this species of cricket ecloses with long functional wings, or small non-functional wings. This phenotypically plastic response allows the insect to stay and reproduce when conditions are good or migrate and fly away before commencing reproduction in poor conditions. My dissertation aimed to understand the developmental and mechanistic underpinnings of the complex life history and morphology seen across wing polyphenic insect taxa by assessing these features in *G. firmus* and was enabled by the generous Theodore J. Cohn Research Fund.

In chapter one of my dissertation, I reviewed what is known about the mechanistic underpinnings of the development of wing polyphenic insects (Hayes et al., 2019). Through this review I formulated a hypothesis about which signaling pathway underlies wing development in wing polyphenic taxa.

In chapter two, I assessed the development, morphology, and fitness of *G. firmus*. This chapter used two

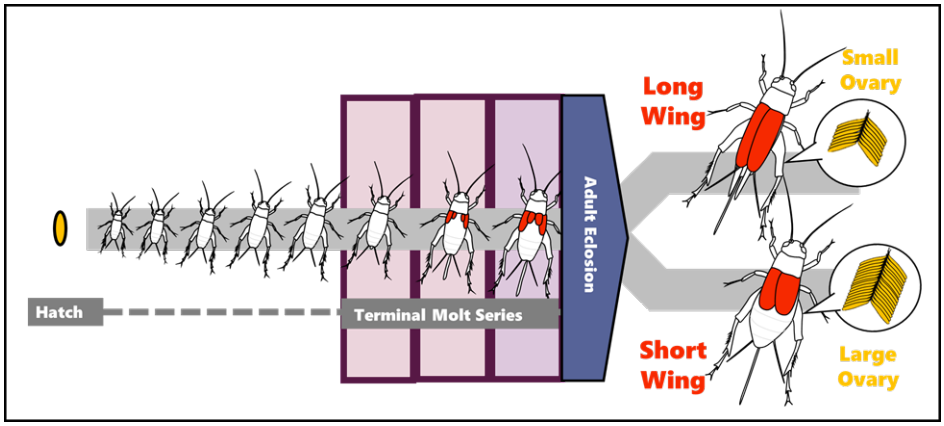


Figure 1. Developmental Timeline of *Gryllus firmus*: 8-11 nymphal instars (8 pictured), which ends with a predictable series of terminal instars, occurring prior to adult eclosion. Upon adult eclosion, the adult cricket either possesses long, flight-capable wings and relatively small ovaries or short, flight-incapable wings and relatively large ovaries.

selected lines, one selected for long wing morphs and one for short wing morphs. A longitudinal ontogenetic framework was utilized to compare developmental morphology of *G. firmus*, and a predictable terminal series of instars exhibited across sexes and morphs was identified, despite exhibiting a variable number of nymphal instars. No significant differences were found between the presumptive morphs until adult eclosion, lending support to the hypothesis that the sensitive period in wing polyphenic insects occurs during the terminal instars.

To extend my lab observations to natural populations, I used a field-collected line from Florida along with the lab-selected lines to compare responses to environmental cues across lines in controlled lab experiments. The grant funding was instrumental to being able to obtain this unselected field line from Florida. The field line was much more variable in morph outcome, whereas the selected lines favored the morph outcome that had been selected for. Limited food quantities resulted in significantly smaller adult size and favored production of long winged individuals. This is the first work to date to assess the cue of food quantity in a wing polyphenic orthopteran and the results align with the predictions dictated by life history theory.

In chapter four, I assessed the transduction mechanisms underpinning this environmentally sensitive phenotype using pharmacological inhibition and RNA interference in both the field-collected and lab-selected lines. Results implicate both the insulin and ecdysteroid signaling pathways, supporting the mechanistic hypothesis in chapter one. This suggests conservation of a mechanism to integrate environmental information into developmental trajectory and should be further explored across wing polyphenisms and other environmentally sensitive phenotypes.

This work provides insight on the environmental cues and mechanistic underpinnings of wing polyphenic insect development. Overall, my dissertation expands our understanding of how environmentally sensitive phenotypes function at an evolutionary, developmental, and morphological level. I would not have been able to complete several of the goals of this project without the grant and, for that, I am truly grateful.

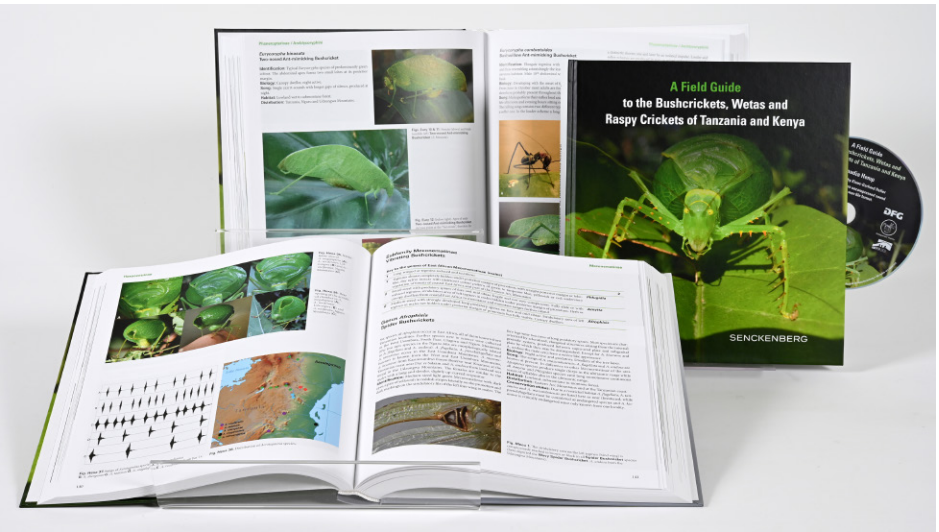
Book Review:

A Field Guide to the Bushcrickets, Wetas and Raspy Crickets of Tanzania and Kenya

By Claudia Hemp,
with contributions from: Andreas Hemp and Klaus-Gerhard Heller

By DAVID HUNTER
President
davidmhunter100@gmail.com

This book provides a most-comprehensive coverage of the bushcrickets (and more) of eastern Africa. An introduction presenting important characters used in the comprehensive identification keys is followed by over 1,000 photographs, where each species is amply illustrated. The photographs are extremely comprehensive, demonstrating the enormous diversity of bushcrickets et al. in the region. These include photographs of what each species looks like as well as special characters for identification, along with information on songs and distribution maps. Information on habitats (often localized for many species) and conservation status are particularly important in the face of climate change and human population pressures in the region. A beautiful, well-presented work, which, at the low price being offered to members of the Orthopterists' Society because of our financial support for the book, deserves pride-of-place on the bookshelf of anyone with an interest in Orthoptera.



To order, contact mail@schweizerbart.de. The price is 54.90 Euro, but only 27.45 Euro for Orthopterists' Society members.

Editorial

By HOJUN SONG
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Just a year ago, in May 2020, we were going through the worst period in our global fight against the COVID-19 pandemic. All of us were mostly stuck at home, paranoid about catching the virus, and completely in the dark about when this crisis would be over. Now, a year later, the situation is much different. Half of all adults in the U.S. are fully vaccinated, and the Centers for Disease Control and Prevention (CDC) has recommended that fully vaccinated people can resume activities without wearing a mask or physically distancing. At least in the U.S., people are starting to behave as if this crisis is already behind us. Restaurants and bars are full of people, and now people are beginning to travel more. However, this is no time to celebrate. It is not over yet. We don't yet know how long the vaccines will be effective for and we don't know where new virulent strains will pop up. It will take time to get back to normalcy, but I am cautiously optimistic that we will get there eventually.

What the pandemic has revealed is the best and the worst in all of us. It has shown the amazing ingenuity of scientists around the world in terms of developing highly effective vaccines in a very short period of time. Doctors and nurses have poured out their hearts to take care of their patients and save lives. We have seen many examples of kindness and caring. But, it has also revealed a lack of leadership, the lack of public trust in science, the lack of human decency, and the inequity among us. As of today, 168 million people have been infected and 3.49 million people have died from COVID-19. These are unfathomable numbers. Nevertheless, we still have people refusing to be vaccinated or even wear masks because they do not trust science. In the past few months, there was a sharp rise in hate crimes against Asians in the U.S., likely fueled by xenophobia related to COVID-19. While the U.S. and European countries have an abundance of vaccines, people in India and developing countries around the world are still dying. Needless to say, the past year has been emotionally draining.

The current issue of *Metaleptea* is relatively short compared to other issues. We did not receive as many contributions as usual. As the pandemic drags on, research activities have been seriously compromised, and maybe that's the reason why. Let's hope that things will get better by the end of this year.

I would also like to thank our Associate Editor, Derek A. Woller, for his continued assistance in the editorial process, despite his busy summer field season schedule.

I would like to challenge you to contribute to the next issue of *Metaleptea*. We welcome any content, such as personal essays, travelogues, stories, photos, or anything you want to share with fellow orthopterists.

To publish in *Metaleptea*, please send your contribution to hsong@tamu.edu with a subject line starting with [**Metaleptea**]. As for the format, 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 September of 2021, so please send me content promptly. I look forward to hearing from you soon!

Officers of the Orthopterists' Society