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METALEPTEA

THE NEWSLETTER OF THE ORTHOPTERISTS' SOCIETY

President's Message

By MICHAEL SAMWAYS
President
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The Orthopterists' Society (OS) Congress in Brazil is almost here! The OS congresses are always wonderfully interactive, with a great exchange of ideas and knowledge on this fascinating group of insects. Brazil is particularly exciting as its biodiversity is legendary and its orthopteran fauna vast and still largely in need of exploration. Also, there have been many vigorous developments in Brazilian Orthoptera research in recent years, giving the country a dynamic buzz…Orthopterology and Olympics!

The OS is today a truly international society with members from all across the globe. It has also become an important forum for many disciplines from phylogenetics and acoustics, to physiology and behaviour, to population control of outbreaks, and even conservation. This is a diverse array of disciplines with the various and varied range of orthopteran species providing subjects for a wide range of initiatives. Yet we are losing so much biodiversity worldwide that it is essential that we do our best to conserve as many orthopteran species as soon as possible. This can be done in essentially two ways: 1) focus on particular species and their needs and 2) as components in biodiversity as part of large-scale conservation initiatives. The conservation-of-species component of the OS is integrated with the IUCN/Species Survival Commission's Grasshopper Specialist Group,

actively chaired by Axel Hochkirch.

Singing species also have something unique to offer: an acoustic profile of the landscape. Acoustically-profiling a landscape for conservation is a non-invasive assessment method, known as ecoacoustics, that can be used to make management decisions for conserving large areas of land, even outside of protected areas. Ecoacoustics as a tool is also gaining ground for integrating agricultural production and the conservation of biodiversity (see Grant, PBC & Samways, MJ. 2016. Ecoacoustics of a production/protected area mosaic for better conservation. *Conservation Biology* (in press)). This new approach holds great promise, especially so in view of the real opportunities for conservation that now lie in the agro-forestry sector, with there being little likelihood of many more substantial protected areas being proclaimed in most parts of the world.

At the Brazil Congress, Alexandre Latchininsky becomes the new OS President and David Hunter the new President-Elect. During my term as

* Table of Contents is now clickable, which will take you to a desired page.

President I have received the most amazing support from the OS Board and from many other advisors on various matters. I would very much like to thank the Board and the OS membership for making the OS such a professional, dedicated, and dynamic society. Warm regards to all Orthopterists!

The 12th International Congress of Orthopterology

"*Orthoptera in a Changing World*"

(October 30 - November 3, 2016, Ilhéus, Brazil)

By MARCOS LHANO
President, ICO 2016
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Dear friends,

The next ICO is coming! And it will be a great privilege to host you here in Brazil, in the city of Ilhéus, Bahia.

Since the last announcement in *Metaleptea*, we have made a lot of progress to provide you with an outstanding event where it will be possible to discuss the latest findings in the various fields of orthopterology.

As you already know, the meeting will be held at the Hotel Praia do Sol (www.praiadosol.com.br – In Portuguese), which is in front of the beach, close to the suburbs of Ilhéus, and 5 minutes by car (2 km) from the airport (the organization will provide transfer from and to the airport for all ICO attendees). The hotel is small with beautiful gardens, a swimming pool, and restaurants. Remember that we have a special price at this hotel, which includes: 5 nights in an apartment: single, double, or triple during the event period from 30th October to 04th November at the Hotel Praia do Sol; daily breakfast, plus 6 meals (lunch on the days of 31st October and 01st, 02nd, & 03rd November; dinner on the days of 30th October & 03rd November: all meals without beverages); and regular transfer from the airport to hotel to airport.

Also, we want you to know that your flight tickets could be cheaper if you book a flight from your city to Salvador (airport code SSA) and then a second one from Salvador to Ilhéus. The GT5 group (Congress Secretariat) can help you to find the best prices for the domestic flights within Brazil. You can ask for a quotation directly from the ICO website, so please do not hesitate to contact them.

Organized by:

- **Orthopterists' Society**
- **Federal University of the Recôncavo of Bahia (UFRB)**

Sponsors:

- **Coordination for the Improvement of Higher Education Personnel (CAPES), Brazilian Ministry of Education (MEC)**
- **The Bahia State Research Support Foundation (FAPESB), Secretariat of Science, Technology and Innovation of State of Bahia (SECTI)**
- **National Council for Scientific and Technological Development (CNPq), Brazilian Ministry of Science and Technology (MCT)**

PLENARY CONFERENCES AND SYMPOSIA PROGRAM:

30th October (Sunday)		
Hour	**Description**	**Location**
8:00-17:00	Registration	Registration Desk
17:00-18:00	Opening Ceremony Marcos Lhano (President, 12th ICO, 2016) Alexandre Latchininsky (University of Wyoming, USA) (incoming President OS)	Conference Room
18:00-19:00	Plenary Lecture "Birth and Early Childhood of Orthopterology in South America with Emphasis on Native Taxonomists" *Francisco de Assis G de Mello* (UNESP, São Paulo State University, Brazil)	Conference Room
19:00-21:00	Welcome Reception	Hotel Praia do Sol

31st October (Monday)		
Hour	**Description**	**Location**
8:00-09:45	Workshop: Orthoptera Species File: beyond a taxonomic database Organizer: Maria Marta Cigliano & Holger Braun (Museo de La Plata, UNLP, Argentina)	Room 1
9:30-10:00	Coffee Break	Hall
10:00-12:00	**Symposium: "The orthopteran systematics in a changing world"** Organizer: Hojun Song and Ricardo Mariño-Pérez (Texas A&M University, USA) "Towards a cleaner, easier and informative taxonomic practice: a notation system to express Orthoptera meristic characters in descriptive and revisionary work" *Francisco de Assis G. de Mello* "Phylogenetic studies within the neotropical Romaleinae (Orthoptera, Acridoidea, Romaleidae)" *Martina E. Pocco, N. Guzmán, Viviana A. Confalonieri, Hojun Song, and Maria Marta Cigliano* "Current knowledge of Pyrgomorphidae Systematics using morphological and molecular data" *Ricardo Mariño-Pérez and Hojun Song* "First morphological phylogeny of Neotropical Phalangopsidae, with special reference to male genital characters" *Pedro Guilherme B. de Souza Dias* "Expanding the boundaries of the new morphological frontier: exploring functionality in 3D (Orthoptera: Acrididae: *Melanoplus:* Puer Group)" *Derek A. Woller and Hojun Song*	Room 1
12:00-13:30	Lunch	Hotel Praia do Sol
13:30-15:30	Session on Systematics and Taxonomy	Room 1
16:00-17:00	Plenary Lecture "Orthopteran systematics: Past, present, and future" *Hojun Song* (Texas A&M University, USA)	Conference Room
17:00-18:00	Poster Session	Hall
18:00	Social Program: Cocktail	

1st November (Tuesday)		
Hour	**Description**	**Location**
8:00-09:45	Information Session: Red List Organizer: Axel Hochkirch (Trier University, Germany)	Room 1
9:30-10:00	Coffee Break	Hall

1st November (Tuesday)		
Hour	**Description**	**Location**
10:00-12:00	**Symposium: Orthoptera Conservation** Organizer: Axel Hochkirch (Trier University, Germany) "Testing the Efficacy of Global Biodiversity Hotspots for Insect Conservation: The Case of South African Katydids" *Corinna Bazelet* "Orthoptera conservation in Mexico, current status and challenges" *Ricardo Marino-Pérez* "Big Data or Data deluge? How new information technologies can contribute to Orthoptera conservation" *Klaus Riede* "Orthoptera (weta) conservation in New Zealand" *Corinne Watts* "The conservation strategy of the Crau Plain Grasshopper – Practical implementation, first results and open questions" *Linda Bröder* "The conservation status of European Orthoptera – results from the first continental red list assessments" *Axel Hochkirch*	Room 1
12:00-13:30	Lunch	Hotel Praia do Sol
13:30-15:30	Session on Ecology & conservation	Room 1
13:30-15:30	**Symposium: Locust and grasshopper control: Efficacy, Economics and Environment. Can all three E's be achieved simultaneously?** Organizer: Alexandre Latchininsky (University of Wyoming, USA) "Characterization of zones of high and low frequency presence of the Desert locust *Schistocerca gregaria* (Forskål, 1775) populations in Mauritania using satellite imagery" *M.A. Ould Babah, M.F. Courel, J.F. Duranton, K.O. Maeno, and A.V. Latchininsky* "Development of the 2015-16 plague of the South American locust, *Schistocerca cancellata* (Serville, 1838) in Argentina" *David Hunter and Maria Laura de Wysiecki* "Grasshopper control in North America: recent trends" *Alexandre V. Latchininsky*	Room 2

1st November (Tuesday)		
Hour	**Description**	**Location**
13:30-15:30	"Locust Control in Australia: Hitting the Right Target" *Chris Adriaansen* "The use of Biopesticides as part of IPM of Locusts and Grasshoppers" *David Hunter* "Can we further improve Desert Locust's preventive strategy?" *Michel Lecoq*	Room 2
16:00-17:00	Plenary Lecture "Biodiversity and Landscape Ecology of Orthoptera" *Thomas Fartmann* (University Osnabrück, Germany)	Conference Room
17:00-18:00	Poster Session	Hall
18:00	Social Program: Nation's Party	

2nd November (Wednesday)		
Hour	**Description**	**Location**
8:00-09:45	Workshop: New generation sequencing (NGS) methods Organizer: Ioana C. Chintauan-Marquier, CNRS MNHN Paris, France	Room 1
8:00-09:45	Workshop: Recording and signal processing Organizer: Fernando Montealegre Zapata (University of Lincoln, UK)	Room 2
9:30-10:00	Coffee Break	Hall
10:00-12:00	**Symposium: Morphology, molecules and evolution in Orthoptera** Organizer: Ioana C. Chintauan-Marquier & Laure Desutter-Grandcolas, (MNHN Paris, France) "Each musician his instrument: 3-D imaging reveals stunning convergences in crickets, katydids and their allies" *Laure Desutter-Grandcolas, Lauriane Jacquelin, Ioana C.Chintauan-Marquier, Philippe Grandcolas, and André Nel* "RNA in Polyneoptera insects. De novo transcriptomic insights into the molecular substrate underlying evolutionary adaptations in *Amphiacusta* cricket (Orthoptera, Phalangopsidae)" *Ioana C. Chintauan-Marquier, Fiona McCarthy, Philippe Grandcolas, Richard A. Nichols, and Laure Desutter-Grandcolas* "Phylomorphology of *Psorodonotus:* ecology explains morphological conservatism" *Sarp Kaya and Battal Ciplak* "Searching numts in gigantic genome of Orthoptera: length and frequency of paralog copies of COI" *Sarp Kaya and Battal Ciplak*	Room 1
12:00-13:30	Lunch	Hotel Praia do Sol

2nd November (Wednesday)		
Hour	**Description**	**Location**
12:00-13:30	OS Board Meeting	Room 2
13:30-15:30	Session on Grasshopper & Locust Control	Room 1
13:30-15:30	**Symposium: Phylogeography and speciation** Organizer: Battal Çiplak (Akdeniz University, Turkey) "The ignored model budding speciation: light from *Psorodonotus venosus* (Orthoptera, Tettigoniidae) species group" *Battal Ciplak and Sarp Kaya* "Dynamic Biogeography of Acridid Outbreaks in the Palaearctic Region" *Mikhail G. Sergeev* "The importance of capturing unbiased species histories for testing phylogeograhic hypothesis and the promise of next generation sequencing data" *İsmail K. Saglam* "Integrating phylogenetic and niche modelling to elucidate the diversification process in south American grasshoppers (Acrididae: Melanoplinae)" *M. Celeste Scattolini, Viviana A. Confalonieri and María M. Cigliano*	Room 2
16:00-17:00	Plenary Lecture "New methods in population genetics and their empirical assessment in grasshoppers" *Marie-Pierre Chapuis* (CIRAD-BIOS, France)	Conference Room
17:00-18:00	Poster Session	Hall
19:00	Gala Dinner	

3rd November (Thursday)		
Hour	**Description**	**Location**
8:00-09:45	Workshop: Acoustic monitoring of biodiversity Organizer: Fernando Montealegre Zapata (University of Lincoln, UK)	Room 1
8:00-09:45	Information Session: R program Carlos Sperbe (Federal University of Viçosa, Brazil)	Room 2
9:30-10:00	Coffee Break	Hall
10:00-12:00	**Symposium: Acoustic and vibrational communication in Orthoptera** Organizer: Fernando Montealegre Zapata (University of Lincoln, UK) "Singing and optimal baffling behaviour in the tree cricket *Oecanthus henryi*" *Erica Morley* "Data mining soundscapes for Orthoptera songs: Big Data or data deluge?" *Klaus Riede*	Room 1

3rd November (Thursday)		
Hour	**Description**	**Location**
10:00-12:00	"Let me see what you hear: transparency in bush-cricket auditory systems" *Fabio Sarria* "Context-specific signaling with different carrier frequencies - the case of the bush-cricket genus *Gonatoxia*" Karsch 1889 *Klaus-G Heller and Claudia Hemp* "Sounds From The Past: From fossil to song in Ensifera" *Thorin Jonsson* "A new system of communication in crickets derived by sensory exploitation of anti-predator behavior (Orthoptera, Gryllidae, Eneopterinae)" *Tony Robillard* "Two mysterious little katydids from the Ecuadorian Andes and their ultrasonic calling songs" *Holger Braun* "Auditory mechanics in katydids: dual sound inputs in the pressure difference receiver" F*ernando Montealegre-Z*	Room 1
10:00-12:00	Session on Phylogeography & Speciation	Room 2
12:00-13:30	Lunch	Hotel Praia do Sol
13:30-15:30	**Symposium: Orthopterology in a changing Brazil** Organizer: Carlos Sperber (Federal University of Viçosa, Brazil) "Groping for the ecological niche of forest litter crickets" *Carlos Frankl Sperber* "Jumping among dinosaurs: (re)discovering the orthopterofauna of early Cretaceous from the Crato Formation, Brazil" *Pedro GB Souza Dias* "A short history for a giant country: revision and situation of the Tettigoniidae of Brazil" *Juliana Chamorro Rengifo* "The Gryllinae group in Brazil: state of art and future perspective" *Darlan R. Redu*	Room 1
13:30-15:30	Session on Behavior and Communication	Room 2

3rd November (Thursday)		
Hour	**Description**	**Location**
16:00-17:00	Plenary Lecture "Environmental Friendly Technology Systems for L&G in China" *Long Zhang* (China Agricultural University, Beijing, China)	Conference Room
17:00-17:30	Honours and Best Student Awards	Conference Room
17:30-18:30	OS meeting and Closing session	Conference Room

4th November (Friday)
One day tour (See the options at the "Tourism Reservations" at the ICO website)
From 5th November (Saturday)
Post Conference Tour

SOCIAL EVENTS:

- Welcome cocktail
- "Nations´ Party" (will be a party where the attendants will be asked to bring some typical costume/ hat/shirt, etc. and will be invited to sing a song from their country - a tradition that began during the last ICO, in China)
- Gala dinner
- Daily tours to Itacaré/Morro de São Paulo/Barra Grande/Camamú and other places (price will be indicated on the webpage, and the reserve can be made directly at the ICO website)
- One day tour: On Friday 4th November (See the options at the "Tourism Reservations" at the ICO website)
- Post Conference Tour: a trip to the amazing Chapada Diamantina region and Salvador city. This is a very attractive tour that will soon be announced on the Congress website in the next days. Notice that we will be starting our tour at the city of Ilhéus and finish it at the city of Salvador (the capital of Bahia state). So, we kindly encourage you to book your travel plans accordingly. For those who will take part in the tour, the last night at the hotel in Ilhéus (from 4th to 5th) is already included in the tour package. It is important to note that it will be mainly a touristic and photographic tour since it is not allowed to collect insects or any other organisms without the collecting permits in Brazil. The ICO2016 organization is not able to make any arrangements for collecting permits for the whole group or individual. If somebody is interested in collecting Orthoptera material, each scientist will be responsible for getting the permits to collect and the paperwork/permits to carry the material outside Brazil (they are different permits) at the Brazilian Government: Ministry of the Environment's (MMA) and at the Ministry of Science and Technology (MCT). Also we kindly ask to those who get the permits notify the local committee in advance, so we can manage the Post Conference Tour according to the Brazilian laws because all the Chapada Diamantina region is a National Park.

AWARDS:

2016 D.C.F. RENTZ AWARD FOR LIFE-TIME DEDICATION TO ORTHOPTEROLOGY:

The "D.C.F. Rentz Award for Life-time Dedication to Orthopterology" is intended to recognize the outstanding contributions of the nominee to Orthoptera research, particularly the work of retired or Emeritus Orthopterists who have devoted their entire life to the study of Orthoptera. Complete applications consist of a letter of nomination with a brief description of the accomplishments of the candidate proposed, along with one or two letters of support. Proposals should be sent to Michael Samways (samways@sun.ac.za) by September 30, 2016. The OS Executive Board will choose among the candidates and the awardees will receive a personalized award certificate to reflect the nature of their contributions to Orthopterology. The presentation will be made at the 12th International Congress of Orthopterology, that will be held in Ilheus, Brazil, October 30 to November 3, 2016.

2016 TED COHN AWARD FOR EXCELLENCE AS A YOUNG PROFESSIONAL ORTHOPTERIST :

The Ted Cohn Award for Excellence as a Young Professional Orthopterist is for young professionals, aged 35 or less, who are at the last stage of dissertation, or doing a postdoc, or even early-stage research or other relevant professional position. There are two $2500 awards, one for applied and another for non-applied Orthopterists. Because it is an excellence award, it should be based on research products, such as publications. The

application is based on 1-page personal statement, CV, 1 most significant publication, and 1-2 letters of support. Proposals should be sent to Michael Samways (samways@sun.ac.za) by September 30, 2016. The OS Executive Board will choose amongst the candidates and the awards will be presented at the 12th International Congress of Orthopterology in Ilheus, Brazil, October 30 to November 3, 2016.

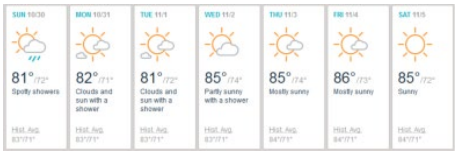
2016 SIR BORIS UVAROV AWARD IN APPLIED ORTHOPTEROLOGY:

The Sir Boris Uvarov Award in Applied Orthopterology is presented by the Association of Applied Acridology International and the Orthopterists Society. The award for outstanding achievement in applied Orthopterology and consists of a plaque and a $2500 prize. Application/nomination packages must be received by the Executive Director of the Association for Applied Acridology International, Dr. Alexandre Latchininsky (Latchini@uwyo.edu), by September 30, 2016. Nominees/candidates will be judged by an award panel consisting of three Orthopterists' Society members with international expertise in both theoretical and practical locust and/or grasshopper management plus 2 previous recipients of the award. The panel will be selected by the Executive Board of the Orthopterists' Society Presentation of the award will be made at the 12th International Congress of Orthopterology in Ilheus, Brazil, October 30 to November 3, 2016.

Best Poster and Oral Presentation Awards: The purpose of the Best Poster and Presentation Award is to encourage students and young scientists (who received their Ph.D. no longer than five years ago) to display outstanding presentations and posters during ICO2016. These awards are intended to reward the presenters for the extra effort it takes to prepare a hallmark presentation. The candidates for the prize-winner should be students and young scientists who received their Ph.D. no longer than five years ago. The award panel will consist of three Orthopterists' Society members with international expertise on different aspects of Orthopterology and the poster and oral presentation must have been exhibited/given during ICO2016. The criteria for the Best Oral Presentation and Poster Award are: Clarity of submitted abstract, significant contribution to the study of Orthoptera fauna, importance of the work, novelty of the work, and design of the poster and of the oral presentation. Presentation of the award will be made at the 12th International Congress of Orthopterology in Ilheus, Brazil, October 30 to November 3, 2016, during the Closing Ceremony of the event.

Ilhéus:

- **Weather forecast:** All seasons are good to visit Bahia because it is hot during all year long and the annual average temperature is 26°C.



- **Time Zone:** The time zone is the same as Brasilia - Brazil's capital (Brasília Standard Time - BRT), which is three hours behind Greenwich Mean Time (GMT-03:00). During ICO, Brazil will have the "Daylights saving time" (DST; or summer time) but Bahia is not included and the clocks must be turned backward 1 hour from the Brasilia time.
- **Vaccine:** Brazil does not currently require foreign nationals to be vaccinated against yellow fever or any other diseases. However, it is the responsibility of the traveler to consult your local health services before your trip to check whether you need to take any vaccinations or other preventive measures. The advice of the Brazilian National Health Surveillance Agency (ANVISA) is that vaccination against yellow fever is not necessary for travel to the coastal cities, including Ilhéus.
- **Voltage:** Local voltage is 110-127V/60Hz
- **What to bring:** The sun is usually intense, so it is advisable to pack: sunglasses, hat, sunblock, and lip protector. For walks, tennis shoes are the best option. Always have cash on you as there are places that will not take credit cards or cheques.
- **Currency:** The currency in Brazil is the 'Real' (plural 'reais'), abbreviated as R$. The real is divided into 100 'centavos'. The current exchange rate is around R$ 3.50 to US$ 1, however it can fluctuate quite significantly, therefore it is best to check before you travel.
- We recommend that you visit our website every week to stay up-to-date: http://www.ico2016.com.br

As President of the ICO2016 organization, I am delighted to host you here, and welcome to Bahia!

Regional Reports - What's happening around the world?

East Europe
North and Central Asia

By MICHAEL G. SERGEEV
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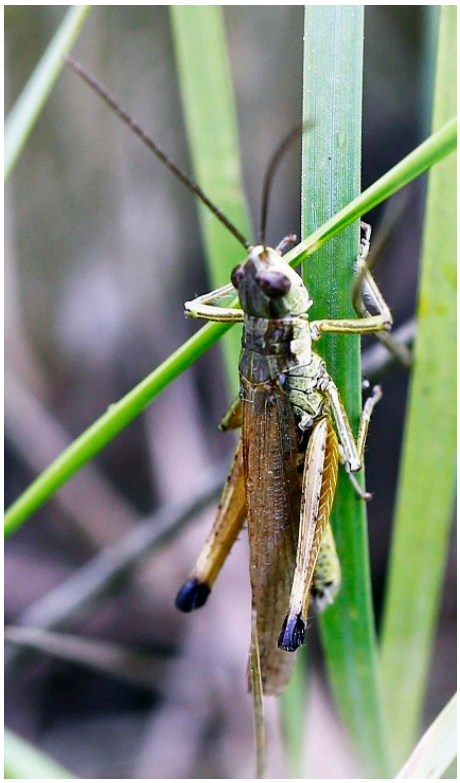
A comprehensive book about Orthoptera of the Korean Peninsula was prepared by an international team: Sergey Storozhenko of the Institute of Biology and Soil Sciences in Vladivostok, Russia, and Taewoo Kim and Mi-Jeong Jeon of the National Institute of Biological Resources in Incheon, Korea. The book includes full descriptions of all taxa, taxonomic keys, and numerous color and black and white illustrations; it was published in English in 2015.

Several field studies of ecology, distribution, and diversity of orthopteroids were organized during the summer season of 2016. One of them was organized in Tuva under an umbrella of the Russian Foundation for Basic Research. Tuva is an interesting and important region of South Siberia situated near the significant biogeographic boundaries between the Siberian taiga, the steppes of Kazakhstan and Mongolia, and the Gobi desert. The orthopteran fauna of the region includes forms associated with different parts of Eurasia. In August of 2016, the northwestern part of Tuva was studied. The expedition crossed the southern slope of the West Sayan Mts. and found some populations of more or less rare species (*Schmidtiacris schmidti* (Ikonnikov), *Bohemanella frigida* (Boheman), etc.). *Calliptamus abbreviatus* Ikonnikov was one of the main dominants in the mountain steppes, and *Arcyptera fusca* (Pallas) on the mountain meadows.



Schmidtiacris schmidti (Ikonnikov) — the main range of this species is in the Far East, North-East China, Korea, and Japan. Several insular populations are in the southern Transbaikal region and in Tuva.

Onconotus servillei Fischer de Waldheim in the Kulunda steppe (South Siberia)

Some studies of insect diversity were continued in the central part of the Kulunda steppe in South Siberia, near the boundary with Kazakhstan. In 2016, the populations of two rare species of katydids were found. One of them was *Miramiola pusilla* (Miram), the adults of which are very small and associated with short grasses of the dry steppes, such as *Festuca valesiaca*. The second species is from the genus *Onconotus*, namely *O. servillei* Fischer de Waldheim, which prefers the meadows in the steppe zone. Both species are distributed from the steppes of South-East Europe until the eastern part of Kazakhstan and the southern part of West Siberia.

The international team of orthopterists also continued some ecological studies of the Migratory and Italian locusts in the Amu Darya Basin and the Aral Sea area of Central Asia. Outbreaks of the Migratory, Italian, and Moroccan locusts occurred in different semi-arid and arid regions of the former USSR.

Northern Africa

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Evaluation of the potential use of drones for Desert Locust survey and planned preventive control in Mauritania

The Food and Agriculture Organization of the United Nations (FAO) is investigating the potential use of drones to help face the significant challenges in the battle against the Desert Locust in Africa, the Near East, and Southwest Asia, and to improve existing tools for detection and early warning, particularly in remote, inaccessible, and insecure areas. FAO's regional locust commission in Northwest and West Africa, CLCPRO, in collaboration with the FAO Desert Locust Information Service (DLIS) in Rome organized a planning meeting at CLCPRO headquarters in Algiers on April 27, 2016 that was attended by:

- The Senior Locust Forecasting Officer at DLIS, FAO HQ: Keith Cressman;
- The Executive Secretary of the FAO Commission for Controlling the Desert Locust in the Western Region (CLCPRO): Mohamed Lemine Hamouny;
- The Executive Secretary of the FAO Commission for Controlling the Desert Locust in the Central Region (CRC): Mamoon Al Alawi;
- The CLCPRO Technical Assistant: Hichem Dridi;
- The Director of the National Locust Centre in Mauritania, current CLCPRO President, and Regional Representative of the Orthopterist Society: Mohamed Abdellahi Ould Babah;
- The Innovation Manager of HEMAV (Spain): Carlos Ferraz.

The meeting finalized a concept paper and work plan for a pilot project in the Western Region. The initial field evaluation of this new technology will take place in Mauritania in November of 2016.

- Please see the video on the project: https://vimeo.com/163805528 (password: OUTMAV2015)
- Source : http://clcpro-empres.org/locust/index.php/fr/component/content/article?id=335&Itemid=278

Participants at the planning meeting for the potential use of drones for Desert Locust survey

- You can find more on the following websites :

FAO/DLIS: http://www.fao.org/ag/locusts/en/activ/DLIS/drones/index.html
FAO/CLCPRO: http://clcpro-empres.org/locust/index.php/fr/component/content/article?id=335&Itemid=278
FAO/CRC: http://desertlocust-crc.org
FAO Locust Watch: http://www.fao.org/ag/locusts
Hemav: http://hemav.com

Translated and edited by Mohamed Abdellahi OULD BABAH with the support and close collaboration of the stake holders, Keith Cressman, Mohamed Lemine Hamouny, and Carlos Ferraz.

Dedicated green team for locust control in Mauritania through Friendly Green Muscle biopesticide against desert locust hopper bands in Tiris Zemmour, Mauritania

During the 2015-2016 desert locust (*Schistocerca gregaria* Forsk) control campaign in Mauritania, the aim was to reduce dependence on the use of chemical insecticides on the environment. This was done by instead applying the fungus *Metarhizium acridum* (Green Muscle), which is regarded as being a low risk to humans and livestock, and having few effects on non-target organisms. This work was carried out by a dedicated "Green Team" from the National Locust Control Centre (CNLA) who tested treatments on desert locust hopper bands with a powder formulation of *M. acridum*.

The area of intervention was in the Wilaya of Tiris Zemmour, 70 km north of the town of Zouerate, (23° 15' N / 12° 18' W). In March-April, this area, characterized by presence of several wadis, was harboring many locust-breeding spots with considerable density of nymphal bands and adult locusts. The vegetation was dominated by tufts of *Schouwia thebaica* at the end of their life cycle.

Damage on *Schowia thebaïca* caused by third-stage desert locust hopper bands

Experimental wire mesh cages for mortality assessment

Preparation of the biopesticide and treatments with micro-ulva +

The efficacy was monitored with the use of cages and field assessment. In cages, mortality exceeded 80% after 8 and 12 days respectively for monitoring nymphs compared to control in which mortality did not exceed 3%. In the field, a reduction of 60-70% of the initial density of the treated hopper bands was observed after two weeks unlike the control block. A total of 19 ha of hopper bands were treated.

Additionally, the fungus was transported and stored under ambient conditions with similar temperatures to desert locust areas, and used in wadis characterized by dense vegetation with large clumps. All these factors did not reduce the effectiveness of the fungus after application on hopper bands.

These successful desert control treatments via friendly environmental means carried out by CNLA Green Team resulted in significant preventive measures against the destruction of agricultural areas around Zouerate and with no detected negative environmental impacts.

Source: Synthesized and edited by Mohamed Abdellahi OULD BABAH and Sidi Ould Ely from a field report by Mohamed Atheimine.

Theodore J. Cohn Research Grant Reports

Give it all we got tonight? A shifting terminal investment threshold in male cricket calling effort

By KRISTIN DUFFIELD
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Of particular interest in the evolution of life history strategies are potential trade-offs between immune defenses and reproductive traits; while investments in these traits promote an individual's fitness, they incur significant costs (1). Trade-offs necessitate that increased investment in one trait results in decreased investment in another. As a consequence of such trade-offs, the conventional view has been that individuals faced with some cue of their impending mortality, such as injury or disease, should shift investment away from reproduction and towards defense and repair to ensure their continued survival. However, a growing body of evidence suggests that some individuals often increase investment in current reproduction at a cost of decreased immune function following the perception of a mortality cue. While these results seem counter-intuitive, they can be explained within the framework of life history theory via the terminal investment hypothesis. This hypothesis predicts that as an individual's residual reproductive value (RRV), or the expectation for future offspring, decreases, their investment in current reproduction should increase (2). Such individuals are essentially making a last ditch effort, reducing the associated costs of a decreased reproductive lifespan, to maximize their lifetime reproductive fitness.

The strategy of terminal investment and the intensity at which a cue of decreased RRV is considered sufficient to trigger a shift of investment towards current reproduction may depend on context. Specifically, extrinsic or intrinsic factors further influencing RRV beyond the threat posed by, for instance, an infection, may alter an individual's assessment of the threat of infection and affect whether that individual terminally invests or increases immune defenses. For example, RRV is directly correlated with age; as individuals move towards the end of their lifespan, their prospect of future reproductive opportunities decreases. Therefore, age may determine the severity of an infection cue required to trigger terminal investment, and this tipping point, which can be referred to as the terminal investment threshold, may thus be dynamic and dependent on age. Figure 1 illustrates our predictions for how we expect individuals of two different age classes (young and old) to invest in reproductive effort given an increase in a threat to survival. At low levels of, or in the absence of, a survival threat, we predict that individuals should invest in reproduction at an intermediate level to balance the trade-off between reproduction and immunity. At increasing levels of a threat, we would expect individuals to increase investment in immunity to combat the threat and, because immune defense is costly, we expect a decrease in invest-

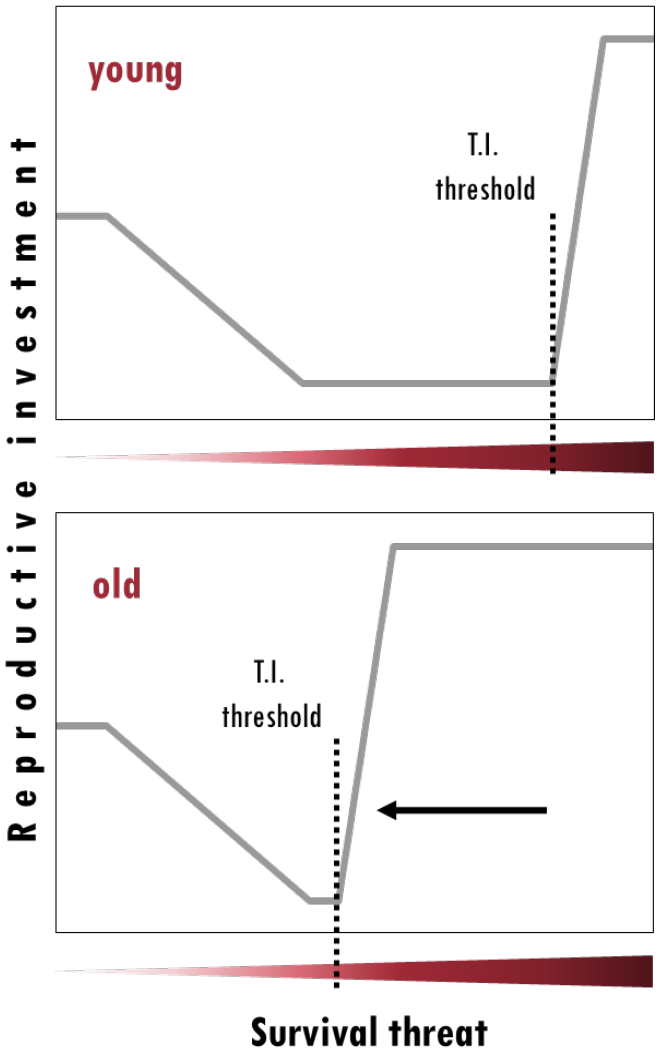

Figure 1. Reproductive investment given an increasing level of a survival threat for two age classes. These predictions are based on the hypothesis that a terminal investment threshold exists and is dependent on changes in intrinsic (age) and extrinsic (survival threat) residual reproductive value (RRV).

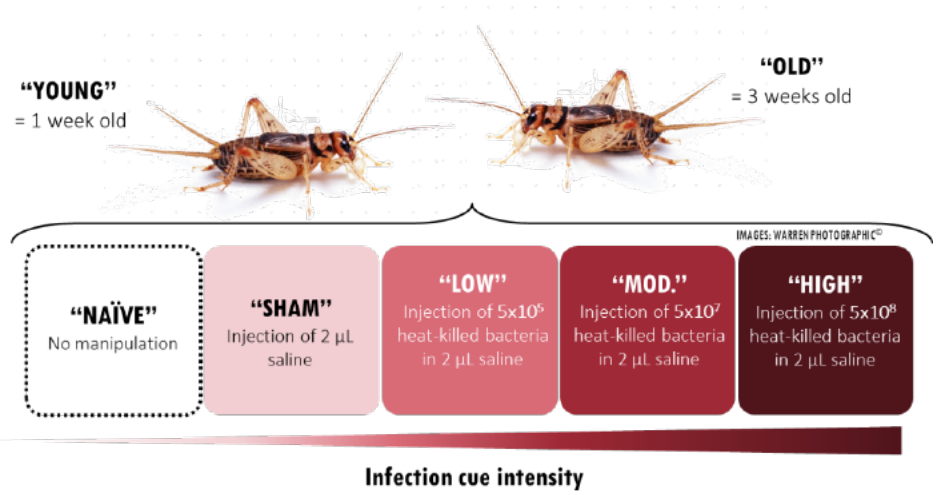

Figure 2. Experimental design.

ment towards reproduction. However, at a high level of survival threat at which the individual deems resistance to be futile, we would expect the individual to adopt a terminal investment strategy and increase investment to reproduction (the terminal investment threshold point). We expect this terminal investment threshold point to be different between young and old age classes due to intrinsic differences in RRV. Specifically, we expect older individuals to be more sensitive or responsive to threats to survival than younger individuals, and thus require a smaller threat to elicit terminal investment.

Orthopteran insects are well-known for their acoustic signaling, which plays a critical role in mate acquisition. In crickets (Gryllidae), males produce a species-specific calling song through stridulation of their forewings. Because calling is often essential for gaining access to females, the more time a male spends calling the more likely he will be successful at finding a mate. However, calling effort is costly both in terms of energy (3) as well as increased predation risk (4, 5), and males that call more vigorously in early adulthood often suffer decreased longevity (6). As part of the work funded by the Cohn award, we assessed the existence of a shifting terminal investment threshold in male decorated crickets, *Gryllodes sigillatus*, a species for which methods for quantifying time spent calling and activating an immune response via a non-pathogenic infection cue have been previously established. We predicted that male decorated crickets, when cued to a decrease in RRV through a non-pathogenic immune response, would terminally invest by increasing the time they spend calling. Additionally, we expected the point at which males terminally invest to be contingent on age. Specifically, we predicted that older individuals would terminally invest in calling effort at lower infection cue doses than young individuals.

In a randomized block design, males from two distinct "young" or "old" age classes were randomly assigned to one of five treatments from an increasing spectrum of an infection cue (see Fig. 2 for specific treatments) which included a Naïve (unmanipulated), Sham, Low, Moderate, and High infection cue dose. In this experiment, heat-killed *Escherichia coli*, a gram-negative bacterium, functioned as the infection cue because it is known to illicit an immune response in many insect species (7) including *G. sigillatus* (Duffield et al. in preparation). Heat-killing ensures that the components of the bacterial cells still constitute a cue of infection without the confounding effects of bacterial proliferation and pathogenic effects,

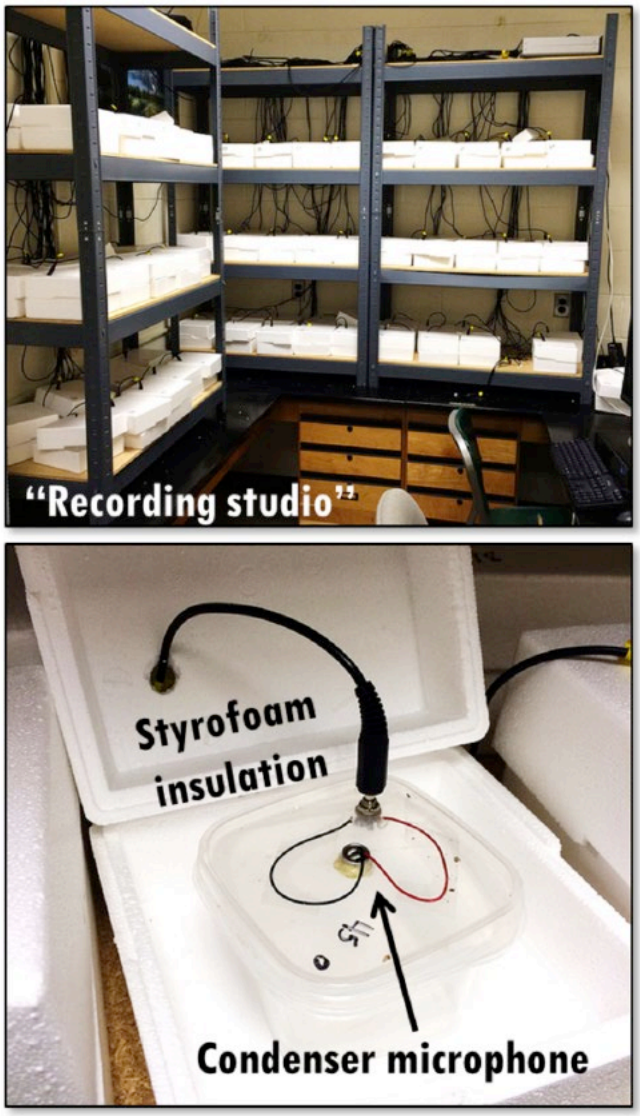

Figure 3. Custom-built sound relay equipment. Top photo is the entire array. Bottom photo shows one individual box. During call recording periods, one male resides in an individual box (which contains a lid-mounted condenser microphone) and is then placed within Styrofoam insulation to prevent cross-talk.

ensuring that any observed response is due to a shift in investment by the cricket, rather than a result of manipulation or direct sickness effects caused by the pathogen. The time spent calling for each individual male was recording for two consecutive nights following infection cue treatment using a custom-built sound monitoring apparatus (Fig. 3).

We found evidence that both male age and infection cue alter the amount of time a male spends calling over the call recording period. Notably, there appeared to be an interaction between age class and infection cue dose such that young Naïve males called more than old Naïve males, but that old males called more than young males at Moderate and High infection cue doses. Essentially, then, young males call more than old males when left unmanipulated, but old males call more than young males at high infection cue doses. These findings provide evidence that male crickets change reproductive investment strategies following particularly high levels of an infection cue. Moreover, these results suggest that the propensity to terminally invest depends on age. Based on these findings, it appears that older males are more sensitive to cues of infection (and thus changes in their perceived intrinsic RRV) and terminally invest at lower levels of infection cue than young males. Currently, we are running immune assays on hemolymph from males subject to the same age class and infection cue dose treatment (Fig. 2). These assays may reveal age-specific investment in immunity among males subject to different treatments, and also provide a more complete understanding of trade-offs underlying shifts in reproductive investment associated with terminal investment.

Natural selection is rooted in variation in reproductive success among individuals; thus, our understanding of evolutionary and ecological processes relies on our knowledge of the mechanisms that drive variation in reproductive tactics. This study contributes to our understanding of the evolution of phenotypic plasticity in reproductive effort in accordance with variation in RRV.

Acknowledgements:
Many thanks to the Orthopterists' Society for funding this research. Thanks also to Marion Sakaluk for help with animal husbandry and Kylie Hampton for piloting immune assay methods. This work was done in collaboration with my co-authors, John Hunt, Thomas Houslay, and James Rapkin, all at the University of Exeter, and my co-advisors, Ben Sadd and Scott Sakaluk at Illinois State University.

References Cited

1. B. C. Sheldon & S. Verhulst, Ecological immunology: costly parasite defences and trade-offs in evolutionary ecology. Trends Ecol. Evol. 11, 317–321 (1996).
2. T. H. Clutton-Brock, Reproductive Effort and Terminal Investment in Iteroparous Animals. Am. Nat. 123, 212–229 (1984).
3. W. W. Hoback & W. E. Wagner. The energetic cost of calling in the variable field cricket, *Gryllus lineaticeps*. Physiol. Entomol., 22, 286-290 (1997).
4. S. K. Sakaluk, J. J. Belwood. Gecko phonotaxis to cricket calling song: a case of satellite predation. Anim. Behav., 32, 659-662 (1984).
5. W. Cade (1975). Acoustically orienting parasitoids: fly phonotaxis to cricket song. Science. 190, 1312-1313.
6. J. Hunt et al., High-quality male field crickets invest heavily in sexual display but die young. Nature. 432, 1024–1027 (2004).
7. J. Rolff, S. Reynolds (eds.), Insect Infection and Immunity: Evolution, Ecology, and Mechanisms (Oxford University Press, 2009).

The Orthoptera Species File Grant Reports

Photo documentation of types in the Hungarian Natural History Museum as well as the Otto Herman collection and collecting distributional and taxonomic data of Balkan Orthoptera species

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With the help of a 2015 Orthoptera Species File (OSF) grant, we gained a considerable amount of new data on the Orthoptera fauna of Albania, Bosnia, and Herzegovina. Moreover, these investigations highlighted the fact that this region is still notably under-researched and study of it has serious scientific potential. During trips in the summer of 2015, we gathered new data on several data-deficient and/or very rare and little known species: *Leptophyes intermedia, L. asamo, Poecilimon albolineatus, Pachytrachis tumidus, Rammeihippus dinaricus, Chorthippus willemsei, Stenobothrus clavatus* etc. These data were useful for IUCN

Red List status assessments, which have been created for all European taxa, and the data will also help us to determine the taxonomic status of some groups (e.g. P*oecilimon elegans* group). Apart from several new species from the fauna of Albania, Bosnia, and Herzegovina, we found unknown taxa as well , descriptions of which are in progress (*Pachytrachis* sp.) or still need more material (*Chorthippus albomarginatus* group). Papers derived from faunistic, taxonomic, and bioacoustic results are in preparation.

Activities:

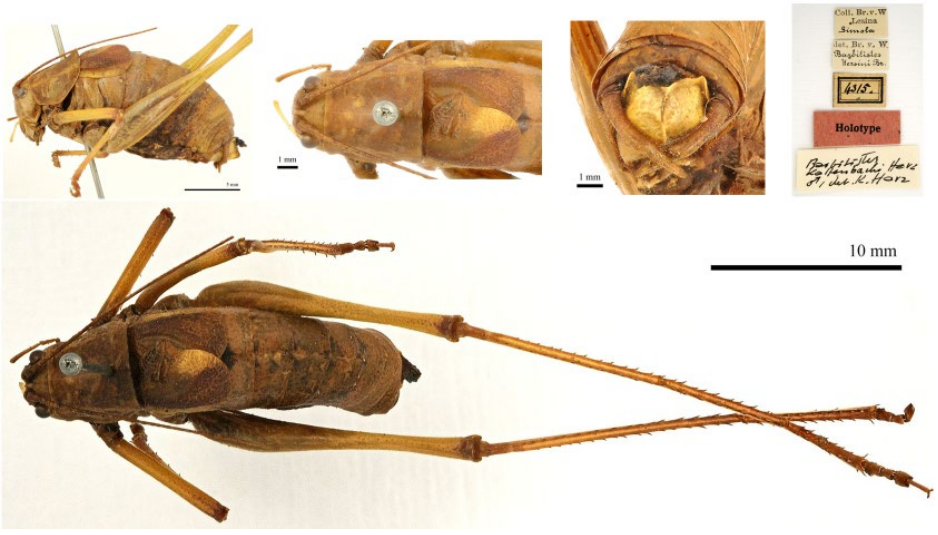
- Collecting trip, 19-28. Jul. 2015: *Bosnia-Herzegovina* (Željeznica valley, Treskavica Mts), *Montenegro* (Durmitor, Lovćen Mts), *Albania* (Shkodra lake, Fusha e Balldrenit, Kodra e Portës, Dajti, Krraba Pass, Belsh, Orikum, Mt 'Maja e Qiramangës', Griba Mts, mount Mali i Lunxhërisë, pass 'Qafa e Qarrit', Pepellash, Vallamarë Mts, Ohrid lake).
- Collecting trip, 4-10. Aug. 2015: *Bosnia-Herzegovina* (Raduša Mts, Čvrsnica Mts, Neretva valley, Prenj Mts, Velika Bjelasnica, Orjen Mts, Baba Mts).
- Type photographing, 12-13. Jun. 2015: Zoological Museum of the Babeş-Bolyai Unversity, Cluj, Romania (Otto Herman collection).
- Type photographing, 18-20. Jan. 2016: Natural History Museum Vienna, Austria (species described by Otto Herman or living in the Balkans).
- Type photographing in the Hungarian Natural History Museum, Budapest.

Benefits for Orthoptera Species File:

- recordings of the male calling songs of 21 Orthoptera species from Albania, Bosnia, Herzegovina, and Montenegro (Table 1)
- photos of live specimens of 41 Orthoptera species living in the Balkans (158 images of 96 specimens) (Table 2)
- distributional data with exact GPS coordinates of Orthoptera taxa collected or observed on our two Balkan trips (identifications are still in progress - 851 records uploaded on 31 January, 2016) (Table 3)
- photos of museum specimens (mostly types) of 67 taxa (507 images of 85 specimens)
- corrections of type information of taxa types that were photographed

Table 1. Taxa with male calling song added to OSF (click species name to link to OSF)

Taxon	County
Bicolorana bicolor bicolor (Philippi, 1830)	Bosnia-Herzegovina
Chorthippus willemsei Harz, 1971	Albania
Conocephalus fuscus fuscus (Fabricius, 1793)	Albania
Isophya clara Ingrisch & Pavićević, 2010	Montenegro
Leptophyes intermedia Ingrisch & Pavićević, 2010	Montenegro
Leptophyes laticauda (Frivaldszky, 1868)	Montenegro
Metrioptera hoermanni (Werner, 1906)	Bosnia-Herzegovina
Oecanthus dulcisonans Gorochov, 1993	Albania
Pachytrachis gracilis (Brunner von Wattenwyl, 1861)	Bosnia-Herzegovina
Pachytrachis tumidus Ingrisch & Pavićević, 2010	Bosnia-Herzegovina
Poecilimon affinis dinaricus Ingrisch & Pavićević, 2010	Bosnia-Herzegovina
Poecilimon albolineatus Ingrisch & Pavićević, 2010	Montenegro
Poecilimon ampliatus Brunner von Wattenwyl, 1878	Montenegro
Poecilimon ebneri Ramme, 1933	Albania
Poecilimon gracilis (Fieber, 1853)	Albania
Poecilimon jonicus jonicus (Fieber, 1853)	Albania
Poecilimon pseudornatus Ingrisch & Pavićević, 2010	Bosnia-Herzegovina
Psorodonotus illyricus Ebner, 1923	Montenegro
Sepiana sepium (Yersin, 1854)	Albania
Stenobothrus clavatus Willemse, 1979	Albania
Uromenus dyrrhachiacus (Karny, 1918)	Albania



Holotype of *Barbitistes kaltenbachi*

Table 2. Taxa with images of live specimens added to OSF (click species name to link to OSF)

Taxon	Specimen	Image	Sex	County
Acrometopa macropoda (Burmeister, 1838)	2	3	m, f	AL, BIH
Anterastes serbicus Brunner von Wattenwyl, 1882	6	7	m, f, juv.	AL, MK
Arcyptera brevipennis brevipennis (Brunner von Wattenwyl, 1861)	2	5	m, f	BIH
Arcyptera microptera microptera (Fischer von Waldheim, 1833)	2	2	m, f	MK
Chorthippus willemsei Harz, 1971	2	4	m, f	AL
Dociostaurus genei genei (Ocskay, 1832)	2	2	m	AL
Eumodicogryllus bordigalensis bordigalensis (Latreille, 1804)	3	4	m, f	AL
Euthystira brachyptera brachyptera (Ocskay, 1826)	1	1	f	MK
Galvagniella albanica (Mishchenko, 1952)	3	3	m, pair	BIH
Gampsocleis abbreviata abbreviata Herman, 1874	6	8	m, f, juv.	AL, MK
Gryllus bimaculatus De Geer, 1773	1	1	m	AL
Isophya clara Ingrisch & Pavićević, 2010	2	2	m, f	MNE
Isophya modestior Brunner von Wattenwyl, 1882	3	3	m, f	AL, BIH
Isophya speciosa (Frivaldszky, 1868)	4	5	m, f	AL, MNE
Leptophyes boscii Fieber, 1853	2	2	m, f	BIH
Leptophyes intermedia Ingrisch & Pavićević, 2010	2	4	m, f	MNE
Leptophyes laticauda (Frivaldszky, 1868)	4	5	m, f	AL, BIH, MNE
Metrioptera hoermanni (Werner, 1906)	3	7	m, f	BIH
Miramella irena (Fruhstorfer, 1921)	2	2	m, f	AL
Modestana ebneri excurvata (Willemse, 1975)	2	2	m, f	MK
Modestana modesta (Fieber, 1853)	3	3	f	BIH, MNE
Myrmeleotettix maculatus maculatus (Thunberg, 1815)	1	1	f	AL
Oecanthus dulcisonans Gorochov, 1993	1	6	m	AL
Omocestus minutus (Brullé, 1832)	2	2	m	AL
Oropodisma macedonica Ramme, 1951	2	2	f	MK
Pachytrachis tumidus Ingrisch & Pavićević, 2010	2	5	m, f	BIH
Platycleis affinis affinis Fieber, 1853	1	1	m	AL
Poecilimon albolineatus Ingrisch & Pavićević, 2010	5	5	m, f	MNE
Poecilimon zimmeri Ramme, 1933	3	3	m, f	AL
Ramburiella turcomana (Fischer von Waldheim, 1833)	1	2	f	AL
Rammeihippus dinaricus (Götz, 1970)	2	5	m, f	BIH
Saga natoliae Serville, 1838	1	3	f	AL
Sepiana sepium (Yersin, 1854)	2	5	m	AL
Stenobothrus clavatus Willemse, 1979	3	10	m, f	AL
Stenobothrus lineatus lineatus (Panzer, 1796)	1	1	f	MNE
Stenobothrus rubicundulus Kruseman & Jeekel, 1967	2	2	m	AL, MK
Tettigonia balcanica Chobanov & Lemonnier-Darcemont, 2014	1	2	m	AL
Tropidopola graeca graeca Uvarov, 1926	2	10	m, f	AL
Tylopsis lilifolia (Fabricius, 1793)	2	5	m, f	AL
Uromenus dyrrhachiacus (Karny, 1918)	4	12	m, f	AL
Yersinella raymondii (Yersin, 1860)	1	1	f	BIH

Table 3. Taxa with museum specimen images added to OSF (click species name to link to OSF)

***: new synonymy is needed;

H: holotype; S: syntype; S*: syntype labelled as holotype; S**: syntype labelled as paratype; L: lectotype; A: allotype; A*: labelled as allotype; but same sex as holotype; LA: lectoallotype; P: paratype; PL: paralectotype; n: not a type;

HNHM: Hungaryan Natural History Museum (Budapest, Hungary); NHMW: Naturhistorisches Museum (Vienna, Austria); ZMBBU: Zoological Museum, Babeş-Bolyai University (Cluj, Romania).

Name [synonymy]	Type	Sex	Specimen	Image	Depository
Acrida bara Steinmann, 1963	H	m	1	8	HNHM
Acrida coronata Steinmann, 1963	H	m	1	8	HNHM
Acrida crida Steinmann, 1963	H	m	1	10	HNHM
Acrida exota Steinmann, 1963	H	m	1	9	HNHM
Acrida formosana Steinmann, 1963	H	m	1	8	HNHM
Acrida fumata Steinmann, 1963	H	m	1	9	HNHM
Acrida gyarosi Steinmann, 1963	H	m	1	7	HNHM
Acrida hsiai Steinmann, 1963	H	m	1	8	HNHM
Acrida montana Steinmann, 1963	H	m	1	8	HNHM
Acrida rufipes Steinmann, 1963	H	m	1	8	HNHM
Acrida shanghaica Steinmann, 1963	H	m	1	8	HNHM
Acrida tjiamuica Steinmann, 1963	H	m	1	8	HNHM
Andreiniimon nuptialis (Karny, 1918)	S	m	1	6	NHMW
Anterastes serbicus Brunner von Wattenwyl, 1882	S, n	mf	3	11	NHMW
Arcyptera brevipennis brevipennis (Brunner von attenwyl, 1861)	S	m	1	5	NHMW
Asiotmethis nigripedis Steinmann, 1966	H, P	mf	2	10	HNHM
Asiotmethis tauricus flavipes Steinmann, 1966	H	m	1	6	HNHM
Barbitistes constrictus Brunner von Wattenwyl, 1878	L	m	1	6	NHMW
Barbitistes kaltenbachi Harz, 1965	S*	m	1	5	NHMW
Barbitistes obtusus Targioni-Tozzetti, 1881	n	m	1	7	NHMW
Barbitistes yersini Brunner von Wattenwyl, 1878	L, PL	mf	2	9	NHMW
Calliptamus barbarus palaestinensis Ramme, 1930	P	f	1	7	HNHM
Calliptamus barbarus pallidipes f. salina Maran, 1954 [= *Calliptamus barbarus barbarus* (Costa, 1836)]	P	f	1	3	HNHM
Calliptamus italicus insularis Ramme, 1951 [= *Calliptamus italicus italicus* (Linnaeus, 1758)]	P	f	1	3	HNHM
Chifanicus divum (Steinmann, 1965)	H	f	1	8	HNHM
Chrotogonus armatus Steinmann, 1965	H	f	1	9	HNHM
Chrotogonus changi Steinmann, 1965 [= *Chrotogonus armatus* Steinmann, 1965]	H	f	1	4	HNHM
Chrotogonus russicus Steinmann, 1965 [= *Chrotogonus turanicus* Kuthy, 1905]	H, P	mf	2	10	HNHM
Chrotogonus skopini Steinmann, 1965 [= *Chrotogonus turanicus* Kuthy, 1905]	H	f	1	4	HNHM
Circotettix stenometopus (Strohecker & Buxton, 1963)	P	m	1	5	HNHM
Conocephalus kisi kisi Harz, 1967	H, P	mf	2	13	NHMW
Euchorthippus declivus stichai Maran, 1954 [= *Euchorthippus declivus* (Brisout de Barneville, 1848)]	P	mf	2	10	HNHM

Name [synonymy]	Type	Sex	Specimen	Image	Depository
Gampsocleis abbreviata abbreviata Herman, 1874	S, n	m	2	11	NHMW
Gryllus chopardi Kis, 1967 [= *Modicogryllus truncatus* (Tarbinsky, 1940)]	P	m	1	5	HNHM
Isophya dobrogensis Kis, 1994	H	m	1	7	HNHM
Leptophyes boscii Fieber, 1853	S	m	1	5	NHMW
Melanoplus gurneyi Strohecker, 1960	P	m	1	4	HNHM
Metaballus sagaeformis Herman, 1874	L, n	mf	3	13	NHMW
Metaplastes ornatus (Ramme, 1931)	A	f	1	5	NHMW
Microtes helferi (Strohecker, 1960)	P	m	1	4	HNHM
Modestana modesta (Fieber, 1853)	S*	f	1	8	NHMW
Montana montana montana (Kollar, 1833)	H	f	1	7	NHMW
Montana stricta (Zeller, 1849)	H	f	1	7	NHMW
Neduba steindachneri (Herman, 1874)	S	m	1	6	NHMW
Odontopodisma carpathica Kis, 1961	P	m	1	7	HNHM
Oedaleus infernalis pendulus Steinmann, 1965 [= *Dociostaurus maroccanus* (Thunberg, 1815)]	H	m	1	3	HNHM
Oedipoda aurea jordanica Steinmann, 1965	H	m	1	6	HNHM
Oedipoda discessa Steinmann, 1965	H	f	1	5	HNHM
Oedipoda perurbana Steinmann, 1965 [= *Oedipoda miniata miniata* (Pallas, 1771)]	H	f	1	4	HNHM
Oedipoda schochii monotona Steinmann, 1965	H	f	1	6	HNHM
Oedipoda turkestanica Steinmann, 1965	H	f	1	8	HNHM
Paradrymadusa sordida (Herman, 1874)	S	mf	3	14	NHMW
Pholidoptera aptera karnyi Ebner, 1908	H, n	mf	2	13	NHMW
Pholidoptera dalmatica maritima Zeuner, 1931	S**	m	1	5	NHMW
Pholidoptera ebneri Ramme, 1931	H, A	mf	2	17	NHMW
Pholidoptera frivaldszkyi (Herman, 1871)	S	mf	2	12	ZMBBU
Pholidoptera macedonica cavallae Kaltenbach, 1965	H	m	1	7	NHMW
Polysarcus scutatus (Brunner von Wattenwyl, 1882)	S	m	1	9	NHMW
Rhachidorus marginatus Herman, 1874	L, LA	mf	2	10	NHMW
Saga gracilis Kis, 1962	H	m	1	7	HNHM
Sphingonotus beybienkoi percomis Steinmann, 1968 [= *Sphingonotus eurasius eurasius* Mishchenko, 1937]	H, A*	f	2	10	HNHM
Sphingonotus eurasius bazyluki Steinmann, 1968 [= *Sphingonotus eurasius eurasius* Mishchenko, 1937]	H	f	1	6	HNHM
Sphingonotus maculatus culpatus Steinmann, 1968 [= *Sphingonotus maculatus maculatus* Uvarov, 1925]	H	m	1	4	HNHM
Sphingonotus tenuipennis secundus Steinmann, 1968 [= Sphingonotus eurasius eurasius Mishchenko, 1937]	H	m	1	4	HNHM
Thamnotrizon mikoi Herman, 1871 [= *Pholidoptera aptera aptera* (Fabricius, 1793)]***	S	mf	2	13	ZMBBU
Uromenus dyrrhachiacus (Karny, 1918)	S	m	1	6	NHMW
Zeuneriana marmorata (Fieber, 1853)	S	f	1	9	NHMW

Holotype of *Acrida shanghaica* (left), and lectotype of *Metaballus sagaeformis* (right)

Working report on OSF Grant "Calling songs of West Palearctic Tettigonioidea"

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New recordings of the calling songs of 50 species of West Palearctic Tettigonioidea have been added to Orthoptera Species File (OSF). After digitization, all available sound files of the respective species (Table 1) were examined with the most suitable ones selected for uploading. These files were then cleaned and trimmed to an appropriate length. In many species, they were combined with special recordings of the wing movements during singing and additionally saved as two-channel recordings. Following this, with the assistance of Holger Braun, the metadata were prepared and all files, often two or more per species (all together, 84 files), were sent to OSF.

Table 1 (right). List of recorded species with sound files sent to OSF.

1	*Anterastes antitauricus*	30	*Parapholidoptera antaliae*
2	*Anterastes babadaghi*	31	*Parapholidoptera distincta*
3	*Anterastes ucari*	32	*Parapholidoptera signata*
4	*Bolua turkiyae*	33	*Parapholidoptera spinulosa*
5	*Eupholidoptera anatolica*	34	*Parapholidoptera ziganensis*
6	*Eupholidoptera annulipes*	35	*Pholidoptera brevipes*
7	*Eupholidoptera cypria*	36	*Pholidoptera transylvanica*
8	*Eupholidoptera epirotica*	37	*Poecilimon aegaeus*
9	*Eupholidoptera forcipata*	38	*Poecilimon angulatus*
10	*Eupholidoptera karabagi*	39	*Poecilimon deplanatus*
11	*Eupholidoptera krueperi*	40	*Poecilimon ege*
12	*Eupholidoptera kykladica*	41	*Poecilimon gerlindae*
13	*Eupholidoptera mersinensis*	42	*Poecilimon graciloides*
14	*Eupholidoptera tucherti*	43	*Poecilimon ikariensis*
15	*Eupholidoptera unimacula*	44	*Poecilimon inflatus*
16	*Eupholidoptera uvarovi*	45	*Poecilimon izmirensis*
17	*Isophya anatolica*	46	*Poecilimon kutahiensis*
18	*Isophya mavromoustakisi*	47	*Poecilimon lodosi*
19	*Isophya miksici*	48	*Poecilimon martinae martinae*
20	*Isophya salmani*	49	*Poecilimon pulcher*
21	*Isophya staneki*	50	*Poecilimon roseoviridis*
22	*Lithodusa helverseni*	51	*Poecilimon serratus*
23	*Montana armeniaca*	52	*Poecilimon soulion*
24	*Montana taurica*	53	*Poecilimon tschorochensis*
25	*Odontura glabricauda*	54	*Poecilimon unispinosus*
26	*Odontura stenoxypha arcuata*	55	*Psorodonotus specularis*
27	*Odontura stenoxypha stenoxypha*	56	*Rhacocleis crypta*
28	*Paradrymadusa aksirayi*	57	*Rhacocleis lithoscirtetes*
29	*Paradrymadusa brevicerca*	58	*Scotodrymadusa syriaca*

Rainproof katydids from the Yungas in the Argentine Northwest

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The Yungas are a type of mountain forest on the eastern slope of the Andes from Peru, Bolivia, and northern Argentina. The southernmost extensions are still a little bit reminiscent of mountain rainforest in Ecuador, were I did fieldwork between 1997 and 2000 and a few times afterward. Several species of birds I knew from there also occur in the Yungas in the Argentine Northwest. After having visited the region three times in the wrong season for katydids (birding trips in early and mid spring in the southern hemisphere), I finally went there in March of this year, staying for a week in the private reserve Eco-Portal de Piedra (Sierra de Santa Bárbara, Provinica de Jujuy). Since *Typophyllum inflatum* lives in the woods around the Iguazú Falls in the northeastern tip of Argentina (Braun 2015), I was hoping to discover a species of little walking leaf in the Yungas too. However, searching at night the understory vegetation along the trails, occasionally listening with an ultrasound detector, neither could I find one, nor did I hear the pure-tone sound typical of forest-dwelling *Typophyllum* species.

Figure 1. A few impressions of the forest; top: trees in clouds and small creek at almost 2000 m; middle: mountain forest at medium elevation; bottom: transitional forest (Chaco Húmedo/ Yungas) at around 1100 m.

Altogether only eleven species of katydids were found, three Conocephalinae and eight Phaneropterinae. Many of the individuals were covered with tiny droplets (Fig. 2C), due to the rainy weather, often the entire forest being within clouds. At the edge of the wood near the cabin were calling *Conocephalus borellii* (Giglio-Tos) and a species of *Neoconocephalus*. A unique blue-headed Copiphorini male turned out to belong to an unknown species of *Moncheca*, resembling *M. viridis* (Redtenbacher), but differing in shape of fastigium, morphology of cerci, and coloration. The first record of this neotropical genus for Argentina. Among the Phaneropterinae are *Ceraia cf. cornutoides* Caudell, a species of the so far monospecific genus *Enthephippion* (possibly *Amaura olivacea* Brunner von Wattenwyl described from Brazil, currently in genus *Homotoicha*), *Hyperophora brasiliensis* Brunner von Wattenwyl, *Scaphura* sp., and *Stilpochlora incisa* Brunner von Wattenwyl. Perhaps the most interesting find is a unique brachypterous female which cannot be accommodated in any of the described genera of short-winged Phaneropterinae (Fig. 2E). When I arrived, the owners of the reserve retreived from the freezer a female specimen of *Gongrocnemis hilaris* (Brunner von Wattenwyl) (Pseudophyllinae) which they had found a few weeks earlier.

After three days with a lot of rain it cleared up and the top of the cordillera became finally visible, so it was possible to ascend to a refuge at 2000

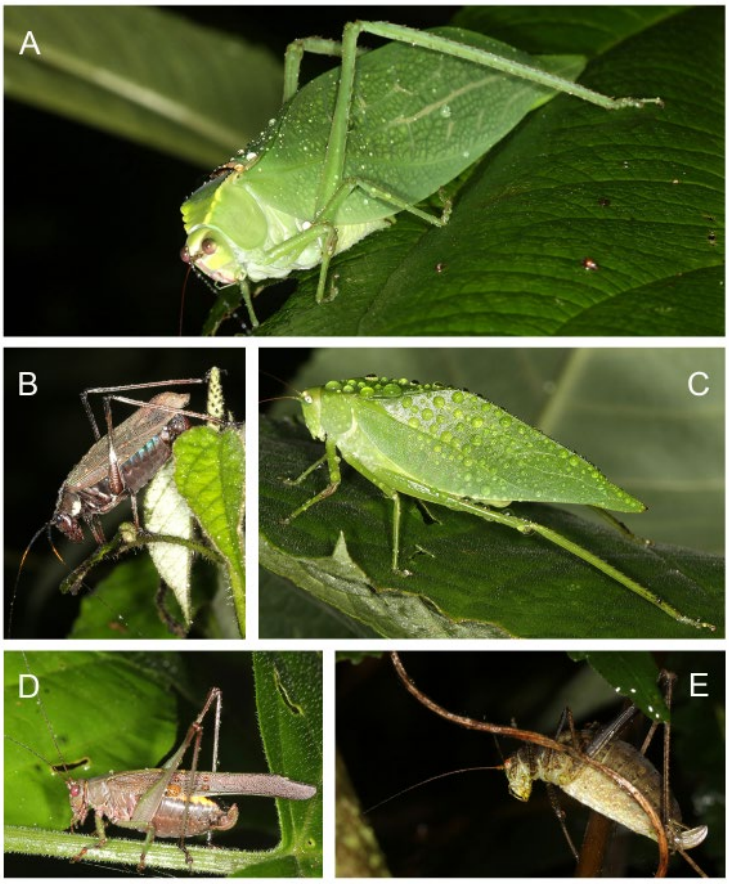

Figure 2. Some Phaneropterinae: A. *Stilpnochlora incisa*, male (total length 7.5 cm); B. *Scaphura* sp., female (a rather diurnal mimic of spider wasps); C. not yet identified species, female; D. *Enthephippion* sp., female; E. female belonging to an unknown genus (15 mm without ovipositor).

m. However, on a nocturnal search in the surrounding forest not a single katydid could be seen or heard. Apparently too late in the season for higher elevations, overall very few insects were around up there. I am planning to return earlier in the next year.

Acknowledgements

I am very grateful to the Strelkov family of Eco-Portal de Piedra for their hospitality and company on the search for katydids (and birds). I am looking forward to returning to their beautiful reserve.

Reference Cited

Braun, H. 2015. The little walking leaves from Iguazú National Park (NE Argentina) – comparisons between subtropical and tropical *Typophyllum* species (Orthoptera: Tettigoniidae: Pterochrozinae). Journal of Orthoptera Research. 24(2):55–58.

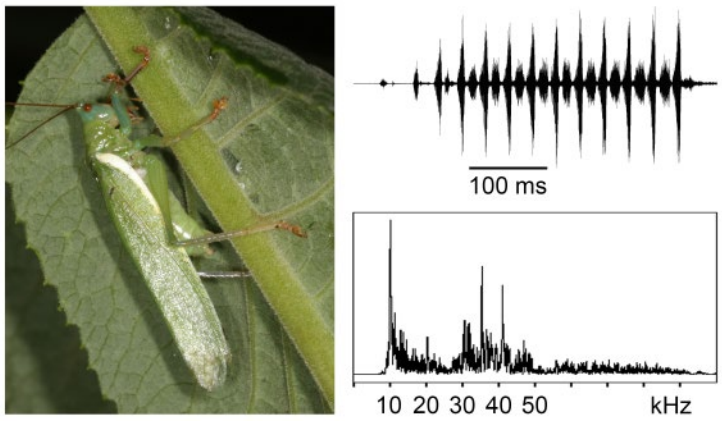

Figure 3. Male of an undescribed species of *Moncheca* (Copiphorini), rain-protected on underside of a leaf; oscillogram and linear spectrogram of one call (cage recording, 21ºC).

Collecting in Gorongosa National Park, Mozambique

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Introduction

Gorongosa National Park is a natural paradise located in the central part of Mozambique and extends over approximately 4,000 km^2. It is composed of savanna, woodland, and grasslands. The savanna is a particular closed-canopy savanna called miombo, with dominant trees of the genus *Brachystegia*. After wildlife endured heavy blows during the civil war (1977-1992), it is now recovering. Management and conservation is a joint effort between the Government of Mozambique and The Carr Foundation/The Gorongosa Restoration Project (for more information visit www.gorongosa.org). The park is also the main focus of a large scale biodiversity-survey, making it one of the better-studied areas in Africa. We, two Ph.D. students from the Song laboratory of Insect Systematics and Evolution at Texas A&M University,

Figures 1-3. Some pyrgomorphs. 1. *Atractomorpha acutipennis acutipennis*. 2. *Chrotogonus hemipterus* (fully-winged form). 3. *Chorotogonus hemipterus* (short-winged form).

Figures 4-15. Some Caelifera. 4. *Hemiacris fervens*. 5. Catantopinae. 6. *Loboschmidti milleri*. 7-8. *Thericles* sp. 9. Eumastacoidea. 10. *Mesopsis laticornis*. 11. *Acorypha pallidicornis*. 12. *Oxycatantops spissus*. 13. Pamphagidae. 14 *Abisares viridipennis*. 15. *Lobosceliana* sp.

visited Gorongosa for two weeks during last July in the middle of the dry season. Our trip was in line with the Ph.D. project of RMP, who is working on the systematics of Pyrgomorphidae. The National Park is home to 10 species of this interesting grasshopper family, making it an optimal locality to study their behavior.

A quest for pyrgomorphs

This turned out to be harder than expected because most species of pyrgomorphs were nowhere to be found. While our first day yielded two species of pyrgomorphs, *Atractomorpha acutipennis acutipennis* (Guérin-Méneville, 1844)(Fig. 1) and *Chrotogonus hemipterus* Schaum, 1853 (Fig. 2-3), this good luck completely stopped after that. Every suitable location for other species of pyrgomorphs led to no results, while the two mentioned species could be found at basically all localities in which their habitat was present. Interestingly, we found both long-winged (Fig. 2) and short-winged (Fig. 3) forms of *Chrotogonus* and both forms even sometimes coexisted at

Figure 16. *Ornithacris cyanea.*

the same locality. It is hard to know exactly why we only found two species of Pyrgomorphidae. Probably several factors were at play here, including the extremely dry rainy season this year. Luckily for us, collecting other Orthoptera was easier.

General collecting

Apart from Gorongosa National Park, the orthopteran fauna of Mozambique is not well-studied and Orthoptera Species File contains records for only 99 species of Orthoptera from this country. We found several species not included in this list during our relatively short stay and were surprised by the amount of atypical grasshoppers we encountered. Some of our favorites were *Hemiacris fervens* of the subfamily Hemiacridinae (Fig. 4) and immatures of the family Lentulidae (not pictured), which were both quite commonly encountered on small branches of brushy plants and trees. Another species, living on the bark of trees, was the unidentified, and very unusual, catantopine in Figure 5, of which we only found one specimen. These were certainly not the only unusual grasshoppers we collected; we also encountered several members of the Eumastacoidea, including *Loboschmidti milleri* (Descamps, 1964) (Fig. 6), *Thericles* sp. (Fig. 7 & 8), and an unidentified immature (Fig. 9). Of course,

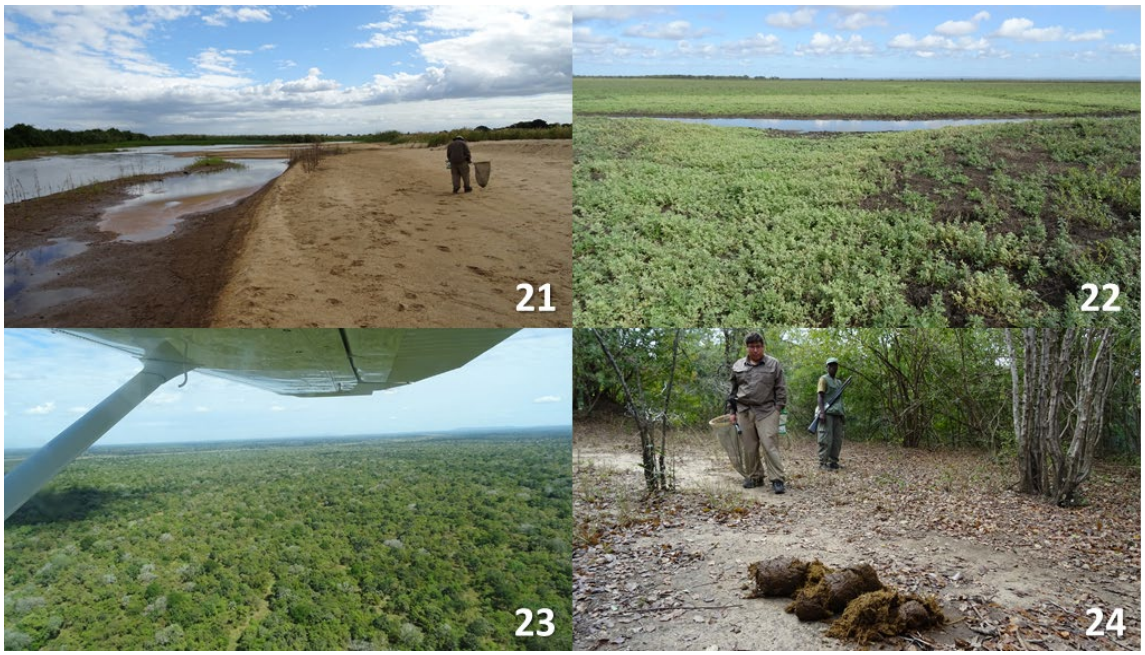
Figures 17-20. Some Ensifera. 17. *Zabalius ophthalmicus*. 18. *Tylopsis* sp. 19. *Enyaliopsis* sp. 20. *Gryllotalpa africana*.

the subfamily that was ever present in all habitats was Gomphocerinae. Even they sometimes came in unusual forms, like this rather convincing grass-mimic, *Mesopsis laticornis* (Krauss, 1877) (Fig. 10). Some typical old world groups we commonly encountered were Calliptaminae, represented by the single species *Acorypha pallidicornis* (Stål, 1876) (Fig. 11), and Catantopinae, of which we found several species, including *Oxycatantops spissus* (Walker, 1870) (Fig. 12). Another target during our trip was Pamphagidae. Four species of these huge grasshoppers are recorded for Gorongosa National Park, but our early search efforts yielded only immatures of both Pamphagidae (Fig. 13) and *Abisares viridipennis* (Burmeister, 1838) (Fig. 14). The latter can easily be confused with a pamphagid at first sight, but is actually a catantopine. Only on the very last day did we finally find an adult female of the genus *Lobosceliana*, which can sadly not be identified to the species level (Fig. 15). It was very amusing to see flying members of Cyrtacanthacridinae while driving in the jeep, after which we often quickly stopped, got out, and tried hard to catch the specimens; we usually succeeded after some minutes. Their size was remarkable as in the case of *Ornithacris cyanea* (Stoll, 1813) (Fig. 16). We also collected *Cyrtacanthacris tatarica* (Linnaeus, 1758) (not illustrated).

Furthermore, we collected several species of katydids, like *Terpnistria* sp. (not pictured), *Zabalius ophthalmicus* (Walker, 1896) (Fig. 17), *Tylopsis* sp. (Fig. 18), and the scary *Enyaliopsis* sp. (Fig. 19). This last one was present in large numbers at the campsite, but we were nevertheless unable to find an adult. The remaining groups of Orthoptera were well-covered too, with an immature specimen each of both Gryllacrididae and Stenopelmatidae, several specimens of Tridactylidae and Tetrigidae, and around 10 mole crickets of the species *Gryllotalpa africana* Palisot de Beauvois, 1805 (Fig. 20).

The African experience

Having collected orthopterans before in, respectively, the Americas and Europe, collecting in Africa was a new experience for both of us. Since the civil war in Mozambique ended, antelopes, lions, elephants, hippos, and crocodiles are thriving in the park. This means that every body of water, every grassy field, and every small bush becomes a potential hiding place for predators and big four-footers (Figs. 21-23). Having a ranger with us at all times was an assurance we quickly learned to appreciate. At one of the known localities for *Dictyophorus griseus griseus* (Reiche & Fairmaire, 1849), we not only came across ridiculously-fresh elephant stool (Fig. 24), but we also



Figures 21-24. Some habitats of Gorongosa National Park.

had a visit from three lions a mere 200 m in distance away from us while collecting outside our vehicle. Another noteworthy encounter happened on our final day when we saw a black mamba sliding away from the general area in which we collected the adult pamphagid. This snake is the most dangerous in African, but, luckily, it seldom attacks people. Gratefully, none of these close encounters spoiled the fun of collecting in an environment so rich in mammals, birds, and insects, where every day brought a new surprise.

Acknowledgements

We are very grateful to Piotr Naskrecki who has been working on an inventory of insects and other animals in Gorongosa National Park in recent years. He was the main reason why we chose Gorongosa as a destination above other localities in Africa and he made our field work easier by guiding us towards the best locations. Additionally, Naskrecki helped us to identify the great majority of the species that we collected. We would further like to thank all other personnel working at the Chitengo campsite who helped us with the logistics of travel and field work in the park, including, but not restricted to, Marc Stalmans, Jason Denlinger, Ricardo Guta, Anne Marchington, Vasco Galante, and the whole team of park rangers.

Collecting in Costa Rica: in search of Orthoptera

By RICARDO MARIÑO-PÉREZ, DEREK A. WOLLER, BERT FOQUET, & RYAN T. SELKING

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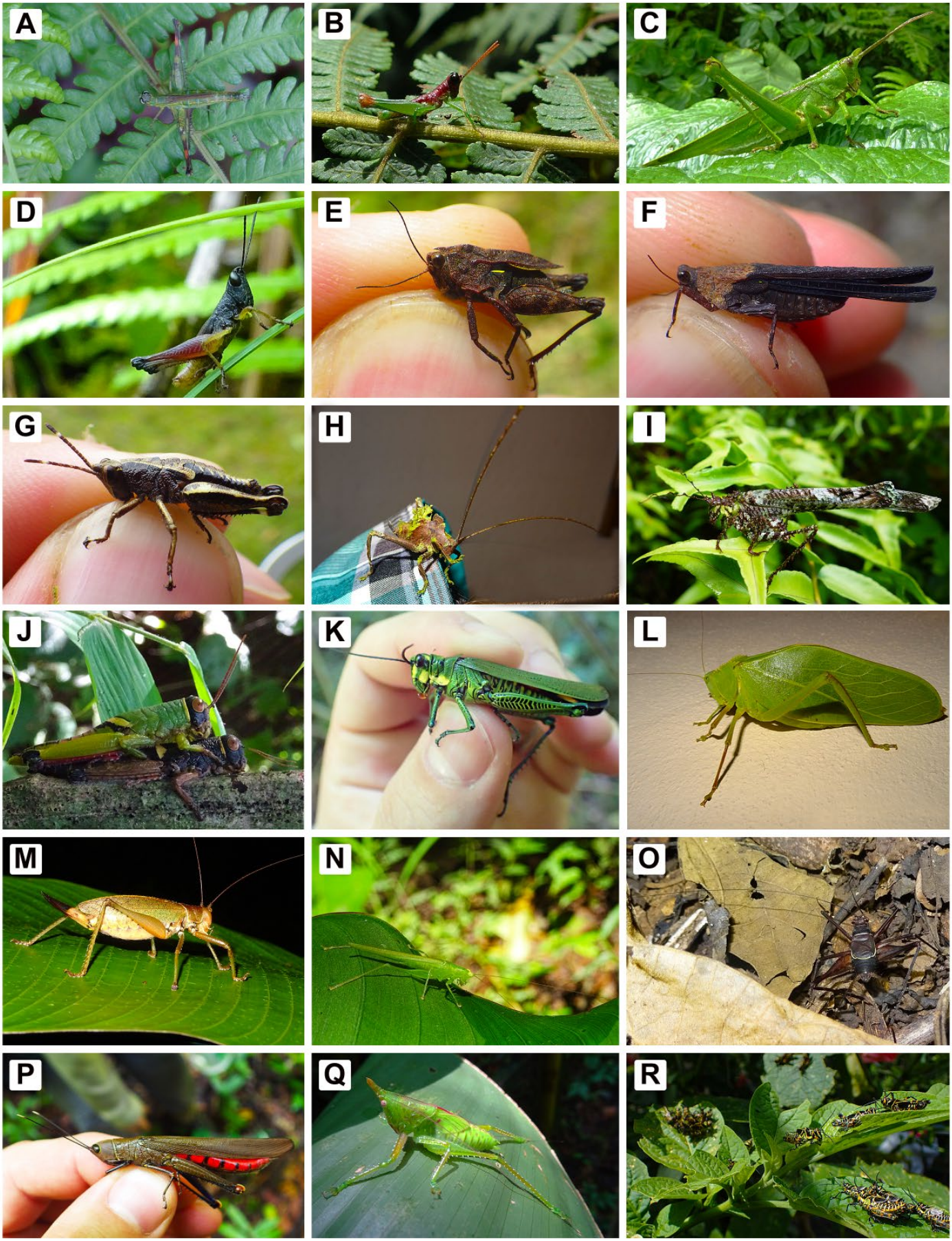
Introduction

Costa Rica possesses a high diversity of species of Orthoptera considering its relatively small size (only 51,100 km^2 or 0.034% of the total land mass on Earth!). There are 190 species of Caelifera and 291 species of Ensifera reported (OSF, 2016), which combined, make up 1.75% of the orthopteran diversity of the world. As a part of an ongoing research project, our advisor Dr. Hojun Song took the four of us, his graduate students, on a magnificent two-week expedition to multiple National Parks in Costa Rica. The primary goal of the trip was to collect local *Schistocerca* species in 100% ethanol for DNA-preservation purposes. However, other goals included collecting other orthopterans for later DNA extraction, preserving particular grasshopper species in RNAlater to examine gene expression, and simply drying numerous species of interest to pin upon returning. For identification purposes we used Hugh Rowell's highly helpful *Grasshoppers of Costa Rica and Panama*. Each day we got an early start and basically collected Caelifera until dusk, took a short dinner break, and went right back out to collect Ensifera at night.

Site 1: Tapantí National Park (580 km^2)

This park, located close to Cartago City and only 35 km away from San José, consists of humid mountainous forests at an elevation between 1,300 to 2,500 m.a.s.l. Furthermore, it has one of the highest precipitation levels (7,000 mm per year) in Costa Rica. These factors have a very clear influence on the humidity-loving flora that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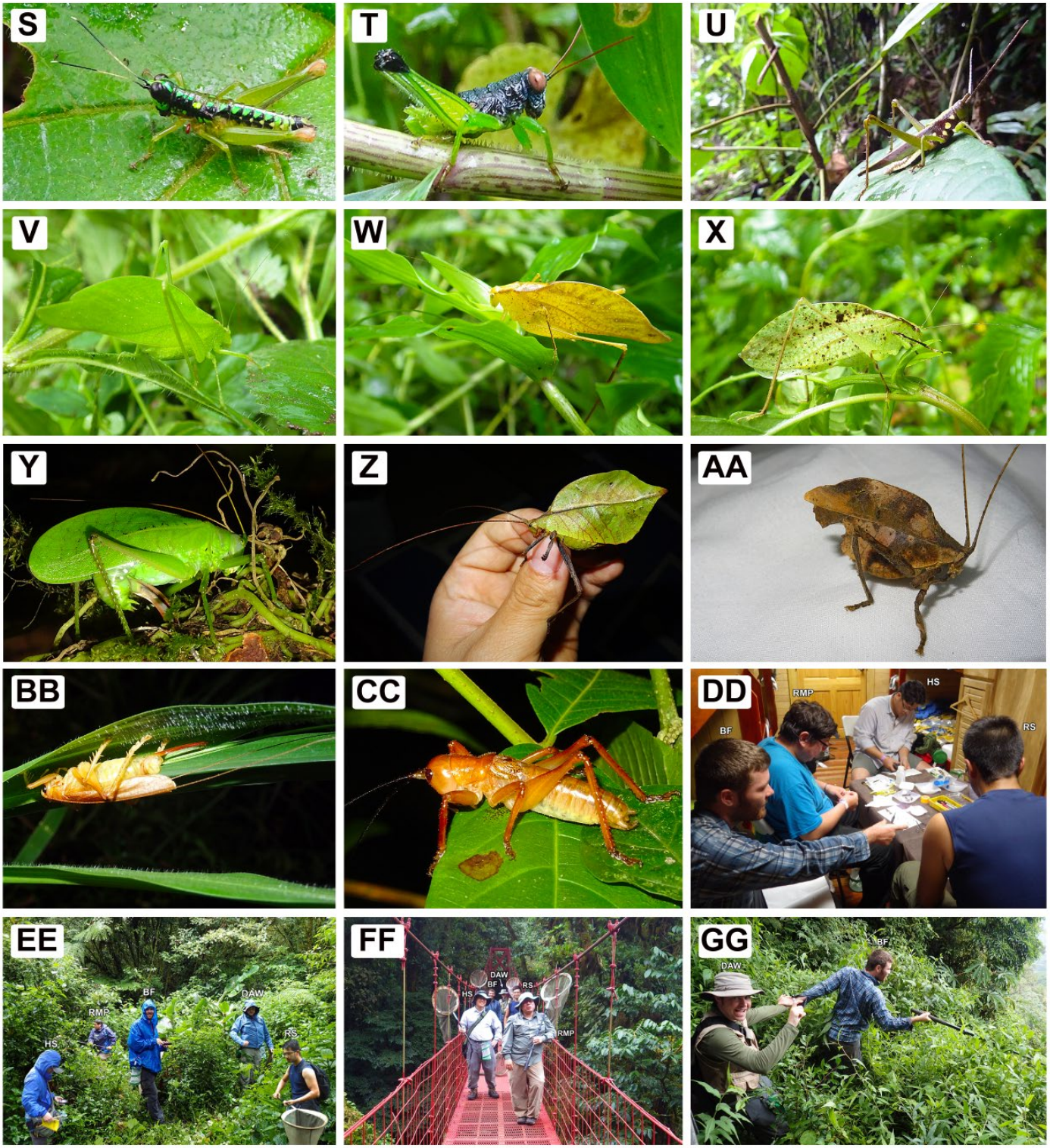

Plate 1. Some Orthoptera encountered during our expedition to Costa Rica: **A.** *Homeomastax* sp.; **B.** *Hylopedetes cruentus*; **C.** *Munatia* sp.; **D.** *Silvitettix cf. communis*; **E.** *Plectronotus scaber*; **F.** prob. *Chiriquia serrata*; **G.** *Microtylopteryx fusiformis*; **H.** prob. *Mimetica* sp.; **I.** *Anaphidna rubricorpus*; **J.** *Rhicnoderma humilis*; **K.** *Chromacris trogon*; **L.** *Steirodon* sp.; **M.** prob. *Schedocentrus* sp.; **N.** *Phlugis* sp.; **O.** Phalangopsidae; **P.** *Copiocera specularis*; **Q.** *Copiphora cf. hastata*; **R.** *Chromacris* sp.; **S.** *Lithoscirtus tesselatus*; **T.** *Rhachicreagra melanota*; **U.** *Munatia punctata*; **V.** prob. *Orophus* sp.; **W& X.** *Orophus cf. conspersus*; **Y.** prob. *Lophaspis hebardi*; **Z&AA.** *Mimetica cf. incisa*; **BB.** Gryllacrididae; **CC.** *Melanonotus powellorum*; **DD.** Processing orthopteran material at night; **EE, FF & GG.** Members of the expedition hard at work in the field.

dominates the park, which in turn, influences the orthopteran fauna in the park. The first thing we collected were some eumastacoids sitting on ferns, such as *Homeomastax* sp. (Fig. A). We also collected *Hylopedetes cruentus* Rehn, 1929 (Fig. B) of the subfamily Rhytidochrotinae on ferns. Then, as we were driving by some interesting-looking plants, the keen eyes of our newest lab member (RS) managed to spot a female of the big,

beautiful romaleid *Munatia* sp. (Fig. C) on the plant's enormous leaves. These plants were growing in a very humid bend of the main unpaved road near a small stream, where we managed to find a few more well-camouflaged *Munatia* specimens. One of the most commonly encountered species in this park was the gomphocerine *Silvitettix cf. communis* (Fig. D). Furthermore, we were surprised to find that the seemingly endless moss beds that lined the main road, enabled by the high humidity, contained impressive levels of Tetrigidae. Among them were *Plectronotus scaber* Morse, 1900 (Fig. E) and probably *Chiriquia serrata* (Fig. F). Additionally, *Microtylopteryx fusiformis* Rehn, 1905 (Fig. G) of the subfamily Ommatolampidinae was quite abundant. Moving on to Ensifera, the amazing finds continued. For instance, when looking at the nymph in Figure H, probably belonging to the genus *Mimetica* of the tettigoniid subfamily Pterochrozinae, you have to appreciate the abdomen extensions that resemble lichens. In fact, one night for almost an hour (and using a microscope and forceps), we debated whether or not these lichen-like pieces were truly part of its body or if they were true lichens just growing on its body; this level of mimicry goes far beyond our expectations! The very next day, we were amazed even further when we found *Anaphidna rubricorpus* (Cadena-Castañeda, 2012) (Fig. I) of the phaneropterine tribe Dysoniini. As you can see, the mimicry even extends into the spiraling antennae! Lastly, we also feel compelled to mention that we were privileged to see a very rare sight during our first night of collecting: a tapir! We came around a curve in our vehicle and this mesmerizing mammal was suddenly in front us, walking towards our vehicle and then into the woods; unfortunately, we were all too excited to take a single photograph.

Site 2: Carara National Park (52 km²)

This park is located only 1 km from the Pacific Ocean, with an elevation between 100 to 640 m.a.s.l. Forest types include tropical rainforest, tropical wet forest, and tropical moist forest. While it is known by most tourists as a prime locality for seeing the magnificent scarlet macaws (which we saw!), it should now also be known as a prime locality to see (and collect, if you have the proper permit, of course) *Rhicnoderma humilis* Rehn, 1905 (Fig. J) of the romaleid tribe Bactrophorini. Once again, the excellent eyes of RS found the first specimen, and much to our delight, we then found more and more. Believe it or not, after many hours of collecting them, we saw so many that we decided to stop collecting the *Rhicnoderma*. In the end, this turned out to be one of the best-collected series of the entire trip. It is a remarkable species due to its striking sexual dimorphism in terms of color. Clearly, it was mating season because of how frequently we saw them copulating. Contrastingly, we collected only a single specimen of each of the romaleids: *Chromacris trogon* (Gerstaecker, 1873) (Fig. K), and *Colpolopha bruneri* Rehn 1905 (not pictured). Once we switched to night-collecting mode we found an enormous *Steirodon* sp. (Fig. L) of the subfamily Phaneropterinae, a pseudophylline, probably *Schedocentrus* sp. (Fig. M), a very small meconematine, *Phlugis* sp. (Fig. N), and an unidentified species of the family Phalangopsidae (Fig. O). Lastly for this area, we found one of the strangest tetrigids of this trip: a tree-dweller with yellowish-white longitudinal stripes (not pictured), of which we sadly, only managed to collect a single specimen.

Site 3: Manuel Antonio National Park (20 km²)

This park is quite small and runs alongside the Pacific Ocean, which is the reason it is the most touristic park of Costa Rica (well that, and you can easily see sloths and various monkeys here, which we did!). Although we only spent one day here, our visit yielded great things, like a new subfamily of Acrididae: Copiocerinae, represented by a single specimen of *Copiocera specularis* Gerstaecker, 1889 (Fig. P). Also, even though it was daytime, we found a conocephaline nymph, *Copiphora cf. hastata* (Fig. Q) near a beautiful waterfall not long after we encountered a rather large snake hiding in front of us just off the main trail.

Site 4: Monteverde Cloud Forest Biological Reserve (105 km²)

In the final destination of the trip (and one of the greenest places we've ever seen!), we spent three days in a very specific cloud forest habitat, filled with epiphytes, ferns, and lichens. Strikingly, despite this abundance of seemingly-excellent flora, our first and last day in the park were almost without grasshoppers. Our second day showed us why this might be: sunny, open spots are rare in Monteverde due to the dense forest and resident grasshoppers seem to flock to them. Thus, if you know where to find such spots, you can find the grasshoppers, and thanks to two of the local rangers, Randall and Néstor, our second day really stood out because that's exactly where they took us: to several excellent spots inaccessible to tourists. Fortunately, being open seems to be more important than being sunny because it rained very hard on us for most of the day (Fig. EE), but we still caught lots of incredible taxa. The habitats consisted of grass, ferns, and brushy plants, and we found about ten different species of grasshoppers in them that we had not seen anywhere else on the trip. Among them, a green metallic *Lithoscirtus tesselatus* Rowell, 2000 (Fig. S) of the subfamily Proctolabinae and the ommatolampidine *Rhachicreagra melanota* Jago & Rowell, 1981 (Fig. T). We also found a male of the ro-

maleid *Munatia punctata* Stål, 1875 (Fig. U) and an unidentified *Pararhicnoderma* (not pictured). Finally, to our surprise, in a coffee plantation outside Monteverde, Song found an aggregation of nymphs and adults of *Chromacris* sp. (Fig. R). He was on a tour with his family, which just shows you that orthopterists always have to be ready for anything. Near-by, we also found 2nd and 3rd instars of the only Pyrgomorphidae recorded for Central America, *Prosphena scudderi* Bolívar, 1884 (not pictured).

Regarding Ensifera, in Figures W and X it is possible to see different morphs of *Orophus cf. conspersus* that were found within a few meters of each other. A possible third morph, also found near-by, can be seen in Figure V, but we are currently unsure if it is the same species; regardless, the diversity within such a small area is astounding! At night, as always, we saw terrific ensiferans, such as a probable *Lophaspis hebardi* Rehn, 1947 (Fig. Y) and two specimens of the vastly polymorphic *Mimetica cf. incisa* (Figs. Z & AA). As with the lichen mimics mentioned earlier, the ability of these katydids to have their wings mimic leaves so well (even to the level of texture) is simply remarkable and the evolutionary processes that led to this ability are difficult to imagine. We also saw lots of unidentified Gryllacrididae (e.g. Fig. BB) and *Melanonotus powellorum* Rentz, 1975 (Fig. CC), a pseudophylline of the tribe Cocconotini, and the small leaf mimic *Pycnopalpa bicordata* (Saint-Fargeau & Serville, 1825) (not pictured) among several other species of ensiferans. We must also point out that, despite targeted search efforts, we failed to find the katydids from this region that mimic lichens from the tribe Dysoniini, like members of the genera *Markia* and *Lichenomorphus*. All of us were very excited to see one in person, so it will remain a goal for the next expedition.

Final Thoughts

If you have ever been on a field expedition such as this one, then you will understand the extraordinary lengths you must often go through to process all the material for a safe return. We often spent 2-4 hours each night doing this, and got very good at turning anything in the room into a makeshift processing center as shown in Figure DD. Specimens were all collected alive into "Port-A-Bugs" for Song to examine in order to determine which preservation route each specimen would take. First, the material for RNAlater was processed, followed by putting the rest of the material into cyanide killing jars to preserve color. Next, all specimens were sorted to morphospecies; some material went into 100% ethanol while the remaining material was processed for eventual pinning. For the big specimens, this was done via evisceration followed by filling them with stuffing powder and cotton. After this, all material was put into paper envelopes and kept inside plastic containers with desiccant.

As mentioned earlier, rain was prevalent in Monteverde, but a true orthopterist keeps on collecting (and taking detailed field notes) as you can see in Fig. EE. We even tried searching the canopy for the more elusive orthopterans using a metal suspension bridge hanging high above the forest floor, but all we found was this great photo (Fig. FF). Lastly, BF should win an award from the Orthopterists' Society for "Most Dangerous Catch" because he leaned far out over a cliff (hidden inside all the green) and narrowly avoided death thanks to DAW's helping hand. The good news is that he caught it (*R. melanota* in Fig. T)… and he's still alive!

Overall, we were extremely impressed with the quantity and quality of the material that we collected in only four areas in two weeks. We can only imagine the number of species that could be collected during systematic collecting events throughout the year. We collected far more species than the ones we mentioned here and we are excited to sort through our preserved specimens and pin our dry material in order to identify them all. Perhaps we will write again when we have updates to share.

We thank CONAGEBIO for permit R-034-2016-OT-CONAGEBIO, all the National Park rangers for their kind assistance, and a special thanks to Randall Zamora Castro and Néstor Guevara, Research Assistants in Monteverde Cloud Forest Biological Reserve, for their excellent guidance in locating amazing orthopterans. Also, special thanks to Oscar Javier Cadena-Castañeda, Hendrik Devriese, and Josip Skejo for the identification of several species of Ensifera and Tetrigidae. If you would like to see more photos from our expedition, follow this link to the Costa Rica photo section of Song Lab's website: http://tinyurl.com/zbtul2s.

The Song Lab and Family in Costa Rica

Editorial

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The summer of 2016 flew by so quickly and it's hard to believe that it's already the middle of September. For those of us who are living in the northern hemisphere, summer is often the busiest time of the year filled with fieldwork, grant writing, and travel, and my summer was no exception. In May, I visited Dan Otte at the Academy of Natural Sciences in Philadelphia to discuss a collaborative project on South African lentulids. In June, I visited Maria Marta Cigliano and Martina Pocco in Argentina to start a collaborative project on the South American locust, *Schistocerca cancellata*. July was mostly spent writing a grant proposal and working with visiting student researchers in my lab. In August, I took my four graduate students (in fact, you can read about their experience in this very issue) and my family to Costa Rica for two weeks to collect Orthoptera.

Now, it is the beginning of the fall semester here in College Station and I find myself struggling to teach two graduate-level courses, simultaneously writing multiple manuscripts, editing a couple of journals and this newsletter, while also closely working with my students on their upcoming presentations at the International Congress of Entomology (ICE) in Orlando as well as the International Congress of Orthopterology (ICO) in Brazil! After that, I will probably struggle to work on multiple grant proposals to meet the January deadline. Very busy, and certainly tiring, but we academics somehow manage to go on and actually have fun along the way (at least once in a while). Well, I did not mean to rant, but it sure seems so.

This year is special for our Society because we will meet in Brazil for the 12th ICO. Based on the roster of people who will be presenting, it is likely to be a small meeting, but I certainly hope that we will be able to discuss big ideas about the future of orthopterology, our society, and how best to move forward. This will be my fifth ICO, after Montellier, Canmore, Antalya, and Kunming, and I am very excited about this Congress.

As always, this issue is full of interesting contents and it certainly conveys the correct impression that orthopterists are a busy and active group of scientists. I was particularly excited to see the OSF grant reports. Our society has invested in the OSF for quite some time and it is fantastic to see that numerous people are working hard to continue to improve it.

I would like to thank all those who have contributed to this issue as well as 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]. 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. Please do not embed figures in the Word document, but send along separate figure files. The next issue of *Metaleptea* will be published in January of 2017, so please send me content promptly. I look forward to hearing from you soon!

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