METALEPTEA

THE NEWSLETTER OF THE ORTHOPTERISTS' SOCIETY

President's Message

For those in the Northern Hemisphere, I hope you enjoyed your summertime and field work, for those in the Southern Hemisphere who are still struggling with the end of wintertime, we have our hopes that spring has almost arrived and flowers will soon blossom and the trees will be covered with green leaves once again.

Following, are some news concerning the life of our Society that I wanted to share with you.

NEW OS WEBSITE

Thanks to the efforts and hard work of Piotr Naskrecki the OS Website has been entirely redesigned. The entire website is database-driven, which means that people other than the website manager will be able to add content to it.

Also, the PayPal payment system has been implemented, so members will be able to pay their dues online (using their PayPal account, or a credit card). For those who prefer not to use the online payment system a PDF form is provided. Also, new members will be able to fill in a membership application and pay their fees online.

Besides, the BioOne online access to JOR is working, and has been set up so that those members who subscribe to JOR (print and/or online versions) will be able to use it.

Details on the main features of the website are given in Piotr´s report elsewhere in this issue of Metaleptea.

Some coordination between Piotr, Charles Bomar and Ted Cohn is still needed regarding the member's database to make the website public. Nevertheless, the plan is to launch it after September 15th.

JOURNAL OF ORTHOPTERA RESEARCH

JOR 19(1), 2010, is out (both online and print versions). It was available in its online version through BioOne from the last week of July. This issue includes some papers arising from the ICO Symposia of 2009 in Antalya, Turkey.

JOR Website-Subscription

JOR will be available online to members of the society via BioOne who pay for the subscription of JOR (U$ 30: print and online version); or either chose to pay only for the online version of JOR (U$ 15).

JOR´s visibility and International Publisher

According to what was decided during the Board meeting in Antalya, with the help of Michael Samways and Glenn Morris we have

explored different possibilities and costs of an International Publisher. However, after several inquiries and contacts with some Publishers (i.e. Springer) we decided that it would be better for JOR to stay as it is.

Co-Editor for JOR

I am extremely glad to announce that Doug Whitman, who acted as an Associate Editor of the Special Issue on Body Size in Orthoptera: JOR 2008-17(2), and presently our Associate Treasurer, has accepted to serve as Co-Editor of JOR. He will help Glenn Morris with the editorial work. He will start with this new "challenge" (using his own words) with next year´s first issue, JOR 20 (1), 2011.

With best wishes,
María Marta Cigliano
President

OS New Website

The main new features of the website are:

1. The entire website is database-driven, which means that people other than myself will be able to add content to it. It also means that updating the content of the site will be much easier and faster.
2. The members database is now secure, which means that members can update their (and only their own) profiles.
3. The Bulletin Board is now dynamic, and all members of the society will be able to post announcements and requests there. I am working now on allowing guest access, and the ability to add comments and upload images to it (I can imagine that a lot of people would like to post images of various insects to be identified by the Society's members).
4. The "Just Published" list is also dynamic, and members can themselves add their papers to it. Papers can now be sorted by topic (e.g., taxonomy, genetics etc.), but I will also add the ability to narrow the display to only certain taxa.
5. The BioOne online access is live and working and I set it up so that those members who subscribe to JOR (print and/or online version) will be able to use it.
6. The PayPal payment system for existing members is working, and members can pay their dues or make donations to the Society online using their PayPal account, or a credit card. For those who prefer not to use the online payment system a PDF form is provided.
7. New members can now fill in a membership application and pay their fees online.

Things that I want to implement in near future:

1. The ability to purchase the Society's books and other publications online.
2. The ability to pay JOR page charges online .
3. The ability for members to post interesting links to our Links page.
4. The ability to upload photos to the Bulletin Board and individual member profiles.

Piotr Naskrecki
OS Website Manager

The Natural History Museum, London's Orthopteroid Collection Database is now Online

The collection of Orthopteroidea (Polyneoptera) housed at The Natural History Museum, London, UK is one of the largest and most type-rich collections of its kind in the world. This collection is curated by one full-time curator, assisted by volunteers, and for historical reasons it excludes the three small orthopteroid orders Plecoptera, Embioptera (Embiidina) and Zoraptera, the collections of which are managed by other curatorial staff. What I say below about the 'orthopteroid' collection does not include these orders.

The NHM's orthopteroid collection contains an estimated 785,824 specimens belonging to 13,313 valid species (34.1% of all described species), including 5567 primary and 15,051 secondary type specimens (Tables 1

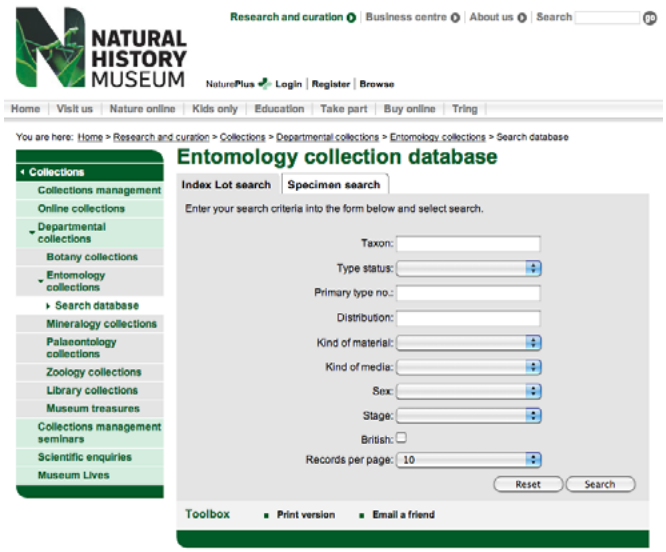

Figure 1. *View of the Darwin Centre 2 Cocoon which contains the store rooms which house the entomological and botanical collections. Copyright the Natural History Museum, London.*

& 2). The majority of the collection consists of dry pinned specimens, but most of the termites and a small proportion of the other groups are stored in alcohol (70% industrial methylated spirit). The pinned specimens are housed in 4,639 drawers, of which 3,940 hold the main identified series and 699 contain unidentified or partly identified specimens.

In 1996 a computerised catalogue of the species and type specimens in the orthopteroid collection (except for the termites) was begun by Judith Marshall (the Curator of Orthopteroidea at that time) in Paradox for DOS and this was completed by her a few years later. In 2004 George Beccaloni (the current curator) transferred this database into an MS Access database of his own design and he and Judith spent much time correcting the data and updating the taxonomy and higher classification of the taxa using the Species File databases for Blattodea (Blattaria), Phasmida (Phasmatodea) and Orthoptera (http://software.speciesfile.org/Files/Files.aspx), plus Steinmann's world catalogue of Dermaptera (Steinmann, 1989). In 2009 George oversaw the migration of these data into the NHM's new collections management system, KE EMu. Recently an online interface to these data was made available at http://www.nhm.ac.uk/research-curation/collections/departmental-collections/entomology-collections/search/index.php?action=indexLot . This is notable, since for the first time researchers outside the Museum can find out for themselves what species and types the NHM's collection actually contains. The termite collections index is still to be corrected, updated and migrated to EMu as we have been waiting for Krishna, Engel & Grimaldi's world catalogue of termites to be published.

It is also worth noting that the NHM's orthopteroid collection, plus most of the NHM's other pinned insect collections and many of its botanical specimens, are now housed in a state-of-the-art building called Darwin Centre 2 (see http://www.nhm.ac.uk/visit-us/darwin-centre-

Figure 2. *The 7th floor store room in Darwin Centre 2 in which the orthopteroid collection is now housed. Copyright the Natural History Museum, London.*

visitors/index.html and Fig. 1). The orthopteroid drawers were moved into this new building in November 2009 and they are now housed in compactorised metal cabinets in a climatically controlled store room (Fig. 2). During the move we took the opportunity to rearrange the collection into a more logical order and we have ensured that space has been left in appropriate places in the collection to allow for the future expansion. We have been preparing for this move since about 2003 and between then and 2009 we transferred pinned specimens housed in 312 wooden store boxes into unit trays and drawers, and moved the specimens out of about 700 large 'accessions' drawers into unit trays

Table 1. *Number of specimens, types and drawers in the NHM orthopteroid collection. [1]Housed in 12704 tubes in 1722 jars.*

Order	Estimated # specimens	# species (valid and not valid) with types in NHM	# type specimens 1° types	2° types	# drawers
Blattodea (termites)	317000	651	?	?	3 (most are in spirit[1])
Blattodea ('true' cockroaches)	26300	660	611	1400	256
Dermaptera	21800	549	450	1200	129
Grylloblattodea	20	1	0	1	1
Mantodea	29000	294	280	650	338
Mantophasmatodea	4	0	0	0	1
Orthoptera	378000	4410	3854	11000	3399
Phasmida	13700	390	372	800	512
TOTALS	***785824***	***6955***	***5567***	***15051***	***4639***

and smaller drawers which would fit into the new metal cabinets.

The collection is open to researchers on weekdays by prior appointment with the curator. We look forward to your visit!

References

Krishna, K., Engel, M. S. & Grimaldi, D. A. (In Press). Termites of the World. Oxford: Oxford University Press.

Steinmann, H. (1989). World Catalogue of Dermaptera. London: Kluwer Academic Publishers. 934pp.

George Beccaloni
Curator of Orthopteroid Insects
The Natural History Museum

Table 2. *Numbers of world orthopteroid species and number of species represented in the NHM collection. [1]Largely taken from http://software.speciesfile.org/Files/Files.aspx with help from David Eades*

Order	# valid species in world[1]	# valid species in collection	% described world species
Blattodea (termites)	2600	1345	51.7%
Blattodea ('true' cockroaches)	4583	1226	26.8%
Dermaptera	1876	855	45.6%
Grylloblattodea	27	5	18.5%
Mantodea	2404	946	39.4%
Mantophasmatodea	16	3	18.8%
Orthoptera	24598	8141	33.1%
Phasmida	2958	792	26.8%
TOTALS	***39062***	***13313***	***34.1%***

Regional Report - What is happening around the world?

Japan

Members of the Japanese region are quite active in working with orthopterans. We do not have a meeting to get together regularly, but many meet at other entomological meetings and exchange information.

Here are the activities of some of our members:

- Emeritus Prof. Sinzo Masaki (Hirosaki University) has been rearing his *Nemobius* crickets in the laboratory at home to study seasonal adaptation in crickets.
- Emeritus Prof. Yoshikazu Ando (Hirosaki University) has also owned his laboratory at home where he rears hundreds of mantises and their prey insects to study the overwintering biology and behavior.
- Akihiko Ichikawa leads the Japanese Society of Orthoptera and he is actively organizing various programs throughout Japan to investigate the fauna and behavior in mantises, crickets, katydids and grasshoppers with members of the society as well as general participants. Some of his publications can be found at http://www.mnhn.fr/oseb/robillard/TR_fichiers/Page448.htm.
- Gen Ito, who stuided sexual selection in grasshoppers at Hokkaido University, is working at an environment census company.
- Kouichi Moroi is a member of the Japanese Society of Orthoptera and interested in katydids.
- Takashi Murai is an amateur entomologist specializing in orthopterans and is actively involved in the publication of books related to this group of insects. He is an excellent photographer of insects (http://jbkk.at.webry.info/).
- Hiroshi Tanaka (Osaka*) controlled the increased population of migratory locusts at the Kansai International Airport in 2006, and now he is writing a paper to publish the results. [*Research Institute of Environment, Agriculture and Fisheries, Osaka Prefectural Government]
- Seiji Tanaka (National Institute of Agrobiological Sciences at Ohwashi) studies phase-polyphenism in desert locusts and migratory locusts. He and his colleagues recently found that the migratory locust, *Locusta migratoria*, distributed worldwide may be divided into 2 major groups based on a molecular study.
- Haruki Tatsuta (University of the Ryukyus) is interested in the phylogeography and speciation process especially in orthopteran insects. One of his recent studies includes the evolution of karyotypic variation in melanopline grasshoppers.

Meloimorpha japonica. (Photo Credit: http://jbkk.at.webry.info/)

In writing this report, we contacted each other for the first time and made a list of members with e-mail addresses. We are going to communicate with one another more often and contribute to the Orthopterists' Society.

Seiji Tanaka
Regional Representative

Southern and Eastern Africa

In 2010, while South Africa hosted a seamless and thoroughly captivating soccer World Cup, southern Africa's Orthoptera arena was looking decidedly less hopeful, with crises looming in Zimbabwe and Madagascar. Zimbabwe's national insect collection at the Natural History Museum of Zimbabwe at Bulawayo (NMZB) was severely damaged by a museum beetle infestation. This collection, formerly one of the most extensive in the region, includes 10,400 accessioned specimens of Orthoptera including 120 type specimens[1]. The experienced curatorial staff was unable to control the infestation due to an alarming lack of funding for resources, equipment and salaries, caused by an ongoing economic crisis in Zimbabwe. Separating and quarantining infested specimens proved ineffective, and staff was forced to dispose of many duplicate specimens as a means of crisis management. Odonata and Sphingidae were most affected by the infestation but 10-15% of the Orthoptera collection was also lost.

As of June 2010, thanks in part to donations of fumigants, the infestation was brought under control. However, in order to avoid resurgence or new outbreaks, the museum still requires many more materials to be donated, including insect repellants and fumigants, Rotring pens and inks (for manual accessioning of specimens), microscopes and computers. If you would like to learn more about this situation, or if you have materials to donate, please contact: corinna.bazelet@gmail.com.

In other news, Madagascar faces an outbreak of the Madagascar migratory locust, *Locusta migratoria capito*, with the potential of causing a humanitarian crisis. Weather conditions from October 2009 to June 2010 were favorable for migratory locust swarm development. Populations were seen to increase in density and gregariousness between January and April 2010, forming swarms of up to 8 km in length and causing as much as 50% damage to crops in some regions[2]. From October 2009 to June 2010, 115 110 ha of infested land were treated for locust invasion, with an additional 8000 ha still in need of treatment[3]. In July 2010, many swarms were reported to have split and dispersed north and northwest of the outbreak area[4].

Swarm of Locusta migratoria capito in Madagascar (Photo credit: Mohamed Abdallahi OULD Babah)

Madagascar lacks aerial capacity for treatment of locusts, so all treatments were done from the ground with backpack sprayers, the least effective method for large-scale invasions. This problem is further compounded by political and economic instability leading to a lack of funding, equipment, technical expertise, organizational capacity, and international cooperation. Furthermore, extensive breeding is likely to occur during the upcoming breeding season following the spring rains in October/November 2010. The locust season of 2010-2011 promises to be extremely difficult and will most likely require large-scale control interventions.

On a more positive note, a Red List Assessment of southern African Orthoptera is in the initial phases of planning as one of the objectives of the IUCN's new Grasshopper Specialist Group (GSG). The assessment is getting off to a slow start but aims to finalize a list of contributors and participants and an action plan within the next few months. Southern African Orthoptera have recently been the focus of renewed interest, but the region is still home to many poorly-understood species with unresolved taxonomy. The assessment promises to present many challenges to the participating orthopterists, and will help to highlight the areas of greatest research need and form an excellent basis for future collecting trips and projects.

Acknowledgements

Thanks to Shepard Ndlela, curator of entomology at NMZB, who provided me with facts and figures of the crisis in the insect collection, and to Dr. Mohamed Abdallahi OULD Babah who informed me of the crisis in Madagascar, sent me photographs and proofread this report for accuracy.

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Corinna Bazelet
Regional Representative

Western and Northern Africa

Anti-locust development projects and their progress in western Africa

The three projects described in Metaleptea Special Issue 2007: African Symposium on Orthoptera, have been completed or are near completion:

1. The Locust Control Support Project funded by USAID and executed by Centre Régional AGRHYMET in Niamey, Niger was completed in 2009.
2. The African Emergency Locust Project funded by the World Bank for seven countries in western and central Africa (Chad, Mali, Mauritania, Niger, Senegal, Gambia and Burkina Faso) will end in May 2011.
3. Emergency Prevention System for Transboundary Animal and Plant Pests and Diseases (EMPRES) Program: the western region desert locust component funded by multiple donors (ABfD, FRANCE, USAID, CLCPRO) will end in June 2011 and a second phase is planned.

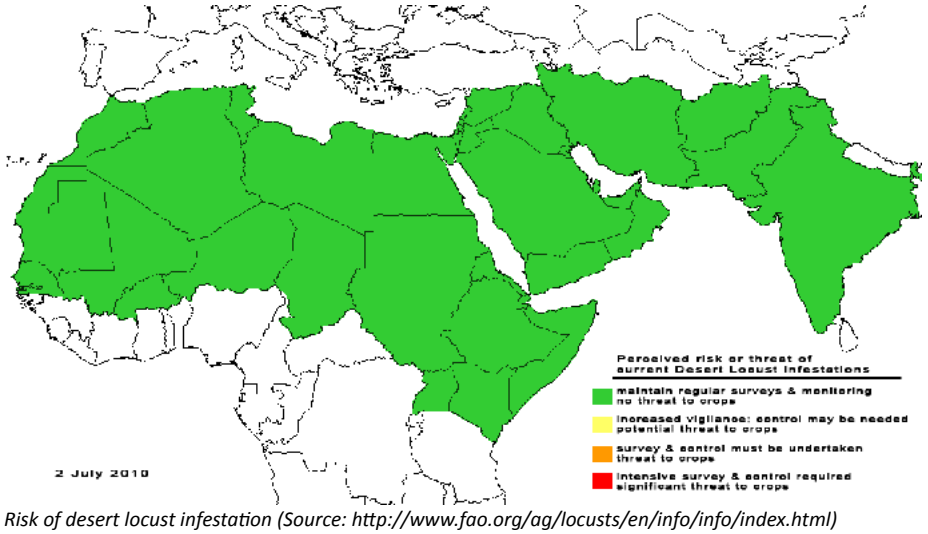
These three projects have positively impacted the capacity development of preventative control in the four desert locust (DL) frontline countries of Sahelian West Africa: Chad, Mali, Mauritania and Niger. These countries have successfully established autonomous national locust control units (CNLA) to reduce the economic impact of damage caused by DL and to minimize/prevent adverse environmental effects of control actions. Donor organizations and countries enabled the frontline countries to equip CNLAs with necessary tools, materials, and infrastructure as well as train staff and technicians to prevent and respond to outbreaks and invasions and the threats they pose to vulnerable communities. The overhaul of the CNLAs is considered a significant improvement over their condition during and prior to the 2003-2005 upsurges. It is worth noting that the CNLAs have since been able to avert a potentially devastating DL outbreak that began developing in Mauritania in 2009 (Belayneh 5/2010). Three additional countries which are not on the frontline: Senegal, Gambia, and Burkina Faso, have also developed preparedness and proactive reactions.

Reference: Belayneh, Y.T. (August 5, 2010) Emergency Transboundary Outbreak Pest (ETOP) situation report for July with a forecast till mid-September, 2010. Available at: http://www.usaid.gov/our_work/humanitarian_assistance/disaster_assistance/locust/

Acridology education and training in western and North Africa

According to the records of the Western Region Commission for Desert Locust (CLCPRO), the DL outbreak region of western and North Africa has only twenty acridologists, ten of whom are considered 'experienced'. The average age of these acridologists is 45 years and most will retire within the coming 10 to 15 years, affecting the region's capacity to contend with future locust invasions. For this reason it is imperative to reinforce the long term education policy already in place. CLCPRO and the Desert Locust Control Committee (Comité FAO de lutte contre le Criquet pelerine, DLCC) each annually finance one fellowship for postgraduate studies (Doctorate/Ph.D.). However, this funding remains insufficient, as it only allows for the training of two postgraduates every 4 or 5 years. CLCPRO is convinced that it is absolutely necessary to put in place a consistent high-level training program in acridology and its related disciplines in order to allow every affected country to have an appropriate number of graduated staff. The execution of this program will target 40 postgraduate students in western and northwestern Africa. Priority will be given to students from countries currently experiencing a shortage of locust specialists.

Several universities in Europe and the Maghrebian region offer a program of higher education in acridology. In Europe, most Maghrebian and Sahelian postgraduates studied in France (Paris XI, Paris VI, Sorbonne Universities or CIRAD) or in England (Oxford University or NRI). In western and North Africa, students studied at agricultural institutes such as El Harrach (Algeria), I.A.V. Hassan II (Morocco) and INAT Tunis (Tunisia) often as part of a plant protection specialization.



Risk of desert locust infestation (Source: http://www.fao.org/ag/locusts/en/info/info/index.html)

The Institut Agronomique et Veterinaries (I.A.V.) Hassan II of Morocco, in collaboration with the Centre National de Lutte Antiacridienne d'Agadir (Morocco), has for the past four years, offered a two-year post-graduate program to train specialized engineers in acridology. Many Sahelian countries have already benefited from this program.

Training and program costs vary. In Europe, the annual fee per student is 20 000 to 30 000 USD and the training duration is between 4 to 5 years (Doctorate/ Ph.D.). In North Africa, programs cost between 10 000 to 20 000 USD per year, and last 4 to 5 years for a Doctorate and 2 years for a Masters degree or Agricultural Specialized Engineer diploma. The cost of the new CLCPRO program, not yet funded, will be between 2 to 3 million USD for 5 to 10 years.

Edited and translated from French: http://www.clcpro-empres.org/fr/formation_longue_10.html

Desert locust situation in Africa: ecological conditions favourable in the summer breeding areas

The DL situation continues to remain calm in all countries. Small infestations of solitarious adults were treated in central Algeria in early July. During the remainder of the month, only scattered adults were reported in northern Sudan. Widespread good rains fell in the summer breeding areas of the northern Sahel between Mauritania and Eritrea during July. Although surveys have yet to commence in West Africa and in the interior of Yemen, low numbers of solitarious adults are likely to be already present and perhaps breeding in some areas. During August, small-scale breeding will occur in these areas, causing locust numbers to increase slightly but remain below threatening levels. All efforts should be made to conduct regular surveys during the next few months to monitor the situation.

Source: http://www.fao.org/ag/locusts/en/info/info/index.html

Announcement by Mohamed Abdallahi OULD Babah

It is my pleasure and honour to announce the publication of my thesis on Desert Locust biogeography in Mauritania as a book published by Hermann in Paris by October 2010 (www.edition-hermann.fr). Thanks to the great honour and kindness of Prof. Courel from CNRS who has prefaced it and Prof. Simpson, Prof. Tanaka and Prof. Lecoq who co-presented it. This edition is co-funded by FAO/DLCC. Thanks to all of them.

Mohamed Abdallahi OULD Babah
Regional Representative

The Orthopterists' Society Grant Reports

Been there, done that: Investigating cuticular hydrocarbons as proximate cues for facilitating chemosensory self-referencing in decorated crickets (*Gryllodes sigillatus*)

In many animals, females mate more often than is necessary to ensure fertilization of their eggs. The benefits of multiple mating to female fitness have been well established empirically. However, in order to maximize any genetic benefits, the most reliable female multiple-mating strategy is to mate with several different partners (polyandry), rather than mating with the same male repeatedly. Accordingly, females should discriminate against previous mates in favor of novel mating partners. Indeed, empirical studies have demonstrated a female mating preference for novel males over previous mates in pseudoscorpions (Zeh et al., 1998), crickets (Bateman, 1998; Gershman, 2009; Ivy et al., 2005), hide beetles (Archer and Elgar, 1999), dung flies (Hosken et al., 2003), and guppies (Eakley and Houde, 2004). However, the mechanisms facilitating these female mating preferences remain unclear for many species. How do females from across such a wide diversity of taxa recognize previous mating partners without having to learn and remember the phenotype of each individual mate they encounter over their reproductive lifetime?

Recent experiments in our laboratory involving the decorated cricket, *Gryllodes sigillatus* were the first to suggest a mechanism by which females "tag" males with their own unique chemical cues at mating to facilitate later recognition and discrimination against previous mates via chemosensory self-referencing (Ivy et al., 2005). In these experiments, "familiar" males were mated to an inbred sister of the focal female 24-hours prior to mate choice trials. Subsequently, the focal female was allowed to choose between the "familiar" male and a novel male, and showed a marked preference for the novel male. Females had no prior experience with either male, and males were

of comparable sexual experience at the time of experimental trials. Individual females within a genetic line were presumed to share a high degree of phenotypic similarity in the chemical cues that might be used in mate recognition.

Our results suggest that the focal female perceived the chemical cue left on the male by her inbred sister as her own, and consequently identified the familiar male as a previous mating partner. This type of chemosensory self-referencing would not necessarily require any learning on the part of the female, as the female's own phenotype would always be available for reference. Instead, it would only require a simple, but reliable form of "online" processing in which females compare their own scent with that of the individuals with whom they interact. This leads to the question, just what types of chemicals might be used in this unique recognition system?

Cuticular hydrocarbons (or CHCs) are lipid compounds that are present on the surface of the insect epicuticle. These compounds often play an integral role in insect chemical communication, functioning as recognition signals to facilitate species recognition, kin recognition and sex recognition in a variety of insect species. There is also evidence that CHCs can be transferred between individuals through direct physical contact. Successful copulation in *G. sigillatus* requires that the female physically mount the male, and that the pair remain in direct physical contact for 2-4 minutes until the male successfully transfers a spermatophore (Fig.1). CHCs therefore, seem likely candidates for the cues females use to "tag" males with their own unique chemical signature during mating. However, in order for these cues to provide an effective means of chemosensory self-referencing for mate recognition, they must possess a sufficient amount of genetic variation to allow individual females to detect their own unique chemical signatures during contact with another individual.

Figure1. *Female (above) and male (below) decorated crickets in copula. (Photo Credit: Scott K. Sakaluk)*

We have recently shown that females within inbred lines share a high degree of phenotypic similarity in CHC profiles relative to unrelated females. Using gas chromatography/mass spectrometry, we have identified 15 distinct CHC compounds in hexane extracts from the epicuticle of female decorated crickets. These CHCs range from 33 to 41 carbons in length and consist of branched alkanes, alkadienes and alkenes. Comparison of 13 of these hydrocarbons across genetic lines revealed substantial genetic variance in the cuticular hydrocarbon profiles of females, with an average heritability (± 1 S.E) of 0.978 ± 0.008. Discriminant analysis based on CHCs alone was able to correctly assign to genetic line 100% of females in six of nine inbred lines, while correctly assigning 84-97% of females in the remaining three lines. The homogeneity of CHC profiles within inbred lines demonstrates that these genetically unique chemical cues are available to females for use in the chemosensory self-referencing mechanism evidenced by our previous work.

Additional evidence for CHCs as the underlying proximate cues facilitating chemosensory self-referencing comes from a recent behavioral assay involving direct, external application of female-derived CHC extracts to the epicuticle of males. In mate choice trials, focal females mated significantly more often with males bearing the CHCs of an unrelated female than with males bearing the CHCs of an inbred sister of the focal female. Females had been previously mated to a random male from our outbred, panmictic colonies 24-hours before mate choice trials. Both males within a trial were from the same genetic line (different than that of the focal female) and of comparable sexual experience.

Having established that CHCs can indeed provide genetically unique chemical cues for use by females in self-referencing, and that direct external application of female-derived CHCs to males can effect female mate choice decisions, I am also interested in detecting any differences in CHCs between mated and virgin males due to the presence of female-specific hydrocarbons that are transferred during copulation. Thus far, I have been unable to detect any differences in mated and virgin male CHCs using whole body extracts. However, I am currently employing a more sensitive chemical technique using solid-phase microextraction (SPME) which does not require the use of solvents. This method allows me to sample live animals before and after mating, and to obtain samples from specific regions of the animal's body rather than using whole body extracts. I am also planning a series of ex-

periments over the next year that are designed to examine whether female decorated crickets also use chemosensory self-referencing as a mechanism of kin recognition to facilitate inbreeding avoidance.

Although the evolutionary significance of polyandry has been widely examined both theoretically and empirically, the proximate mechanisms by which female mate choice decisions are facilitated remain unclear for many mating systems. Indeed, while there is ample evidence that females of many animal species prefer novel mating partners over previous mating partners, the underlying mechanisms mediating this type of mate recognition remain unknown. The results of Ivy et al. (2005) are the first to suggest a possible mechanism by which females recognize and discriminate against previous mating partners, thereby maximizing the genetic benefits of polyandry. Continued research on this fascinating system will attempt to further establish cuticular hydrocarbons as the proximate basis to the self-referent cues implicated in our earlier work, identifying a potentially ubiquitous mechanism of mate recognition in arthropods. I am extremely grateful for the generous support of the Orthopterists' Society in both 2006 and 2007, which helped make this research possible.

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Carie B. Weddle
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Association Costs in the Female Variable Field Cricket (*Gryllus lineaticeps*)

Female animals often have mating preferences for males with conspicuous traits [1]. These preferences are thought to evolve because of benefits provided to females by these males [1]. Males with conspicuous traits often have an increased risk of predation, and females who associate with these males may also be preyed upon and thus incur association costs [2]. Additionally, females may be at risk of being injured when they approach males engaged in competition for mates. Females with stronger preferences are more likely to associate with the most conspicuous or most aggressive males, thus increasing their association costs. Therefore, the costs of preferences might also affect the evolution of female preferences. However, we know far less about the costs of preferences (see [3] for review) than we do about their benefits.

I study costs of preferences in the variable field cricket, *Gryllus lineaticeps*. Male field crickets sing to attract females. Singing males also attract the lethal phonotactic parasitoid fly, *Ormia ochracea* [4]. Females, who do not sing and thus do not directly attract flies, are also sometimes parasitized [5]. The fly shoots larvae at its host [6]. Some larvae fall on the host and infect it, while some fall on the ground near the host and can potentially infect other crickets that contact them. Females may be at risk when in association with males who are being or have been visited by flies. In *G. lineaticeps*, females prefer males with high chirp rate calls [7]. *Ormia ochracea* also prefer high chirp rate calls [7], [8]. Because high chirp rate males attract more flies, female crickets that associate with them should incur greater costs. In a previous field study, I found that female crickets are at an increased risk of parasitism when in association with high chirp rate song [9]. This suggested that females incur association costs in my system. With the cost established, studies of the details and effects of that cost become more relevant.

Field Parasitism Rate

Background: It is important to know that female crickets are at least sometimes parasitized in the field. Higher rates of parasitism indicate a more substantial risk. Lower rates of parasitism could indicate that the risk to females is not that severe or that females have already evolved behaviors that reduce their risk of parasitism.
Methods: I collected female crickets from Rancho Sierra Vista (part of the Santa Monica Mountains National Recreation Area near Thousand Oaks, California) to determine parasitism rates in the field. All crickets were collected by visually searching with a headlamp. Field collected female crickets were

Variable field cricket Gryllus lineaticeps (Photo Credit: D. A. Gray, http://entnemdept.ufl.edu/walker/buzz/467pf.htm)

brought to an indoor space away from flies and housed in individual plastic containers with shelter, substrate, water, and food. The containers were checked daily for the presence of parasitoid pupae to determine parasitism status. Additionally, to determine if collections were biased based on lower probabilities of collecting parasitized crickets, I conducted an experiment to determine if activity levels differed between parasitized and non-parasitized females. In the laboratory, I placed hand-infected (parasitized) and mock-infected (non-parasitized) females in a sand arena, and recorded how often they were hidden under shelters. Crickets were tested both two days (early in parasitism) and six days (late in parasitism) after hand/mock infection. I tested ten parasitized and twelve non-parasitized females.
Results: 6.1% of female crickets were parasitized (3 of 49). Parasitized and non-parasitized female crickets did not differ in the number of samples in which they were hidden under shelters, either two days following parasitism (Mann-Whitney U-test: z20 = 1.051, p = 0.293) or six days following parasitism (Mann-Whitney U-test: z20 = 0.840, p = 0.401). Furthermore, neither parasitized females (Wilcoxon matched-pairs signed-rank test: z8 = 0.255, p = 0.799) nor non-parasitized females (Wilcoxon matched-pairs signed-rank test: z10 = 0.237, p = 0.813) showed changes in their shelter use from day two to day six.
Conclusions: Parasitism rates were somewhat low but not inconsequential at approximately six percent. In the lab, we found that parasitized females did not have lower activity rates than non-parasitized females; therefore, our estimate of female parasitism rate should not be negatively biased by the inability to collect immobile parasitized individuals. However, once we remove a female from the population to collect her, she could have been later parasitized had she remained in the field; this could slightly negatively bias the estimate of female parasitism rate. In conclusion, we know that females are at least sometimes parasitized in this species at the Rancho Sierra Vista population.

Field Responsiveness Experiment

Background: The risk of becoming parasitized could have several effects on female mating behavior. To avoid parasitism, females could develop risk sensitive behaviors; they could change their preferences, becoming less interested in more risky call types, or they could become overall less responsive to male song, mating less frequently and thus exposing themselves to flies less often. In this experiment, I investigated whether females were less responsive to male song in places and times when flies were present. Females should be less responsive to male song when and where flies are present because every time a female goes to mate with a male when flies are near she has the potential to become parasitized.
Methods: I conducted this field experiment at Rancho Sierra Vista, a heavily parasitized population, and at Sedgwick Reserve (a UC Reserve near Santa Ynez, California), a non-parasitized population. I tested females for responsiveness to male song by placing them in a 3-meter long wooden arena with average male variable field cricket song being broadcast from a speaker at one end and the female placed at the opposite end. Females were acclimated under a cup for 5-min, the cup was removed, and then the female was given 5-min to move around the arena. Females were collected from the field, held in isolation, and ran through one of these trials on the next night. Data collected consisted of female response (yes/no), latency to respond, and time spent near the song. There were four treatments in two time periods. From both the parasitized (Rancho Sierra Vista-RSV) and non-parasitized (Sedgwick Reserve-Sedgwick) populations, I tested some females in their home location and some females in the other location (treatments: RSV@RSV, RSV@Sedgwick, Sedgwick@Sedgwick, Sedgwick@RSV). This was done to investigate whether females could detect the presence/absence of flies and alter their behavior in response to it. The two time periods were before the flies appeared at RSV and during fly activity at RSV. This was done to investigate whether any pattern in female responsiveness was a set evolved response (RSV females would have low levels of responsiveness in both time periods) or if there was some level of behavioral plasticity (RSV females would be less responsiveness during fly activity than before fly activity). Ap-

proximately 40 trials of each treatment were conducted before flies, and approximately 20 trials of each treatment were conducted during flies (except RSV@RSV where only 8 trials were conducted; fewer crickets were available at RSV by time the flies appeared).

Results: For latency to respond to song, there was a significant effect of population (Cox proportional hazards regression: p = 0.005), but not for location (p = 0.228) or time period (p = 0.975). Females from Sedgwick responded more quickly than females from RSV. For the time spent near song, there was a significant effect of population (Cox proportional hazards regression: p = 0.005), but not for location (p = 0.146) or time period (p = 0.287). Females from Sedgwick spent an average of 70.7 seconds near song whereas females from RSV spent an average of 43.7 seconds near song (means are averaged over location and time period). No interactions between population, location, and time period were significant, so they were dropped from the model. The only uncontrollable factor that may have affected the experiment (time, temp, etc.) that was significant was wing morph; however, upon further analysis it was only significant for RSV females where most females had short wings and very few had long wings, so it was dropped from the model. Therefore, the only variables in the model were the main factors of population, location, and time period.

Conclusions: Overall, females from Sedgwick were more responsive than females from RSV; they responded sooner and spent more time near the song. The location where females were tested and the time period in which they were tested did not matter for either latency to respond to song nor time spent near song. However when examining the averages for time spent near song for each of the eight treatments (using zero seconds for females that did not respond), some interesting patterns emerge. Females from Sedgwick spent similar amounts of time near song when tested at RSV before flies and when tested at home and at RSV during flies (78 to 92-s). Sedgwick females tested at home before flies spent about half as much time near song than the other treatments (44-s). Females from RSV spent similar amounts of time near song when tested at home and at Sedgwick before flies and when tested at Sedgwick during flies (38 to 42-s). RSV females tested at home during flies spent almost twice as much time near song than the other treatments (85-s). Overall, Sedgwick females did spend more time near song than RSV females, but each population had one odd treatment. The difference for RSV is especially odd. I expected females from parasitized populations (RSV) to be less responsive during fly activity. The obtained result could be explained by the dwindling opportunities to mate at RSV. Within two weeks of the flies coming out, most adult males are killed and there are very few crickets calling at RSV. At this time, the need to mate may outweigh the cost of getting parasitized, so females become more responsive. This is further evidenced by low levels of responsiveness for RSV in the other treatments. Plenty of males were calling (signaling plenty of mating opportunities) before flies and at Sedgwick, so the cost of getting parasitized (if females have an evolved risk-sensitive behavior but cannot physically detect the presence/absence of flies) outweighed the need to mate. The low amount of time spent near song at Sedgwick before flies could also be explained by the number of males calling; the largest number of males were calling there at that time, so there may have been less pressure to mate. In conclusion, the lack of significance for location and time period indicates that females are not able to directly detect the presence/absence of flies and change their behavior accordingly. However, because of the significant population effect, there is some indication that other things that change because of the flies (density of males) or that cues to fly activity (environmental factors) may affect female responsiveness to male song. An experiment examining the effect of chorus density on female responsiveness to male song was conducted in the laboratory in spring 2009 to determine if the number of males calling could be a possible explanation for the patterns in this field experiment.

Osmia fly on Gryllus sp. (Photo Credit: Ronald R. Hoy, http://nelson.beckman.illinois.edu/courses/neuroethol/models/fly_hearing/fly_hearing.html)

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In Memoriam

Christiane Amédégnato-Loisele (21 January 1945 - 20 June 2010)

The Orthopterists' Society lost one of its prominent members recently. Christiane Amédégnato passed away on June 20, 2010, leaving behind a lifetime of dedication to Orthoptera research.

Christiane was born in Morocco and spent her childhood in the Dordogne region, France, where she had her family roots. In 1968, she graduated in Natural Sciences-Animal Biology at the Faculty of Sciences, University of Toulouse/Paul Sabatier, and in 1977 she obtained her Ph.D. at the University Pierre et Marie Curie, Paris VI.

Since 1979 she was a researcher with CNRS (Centre National de la Recherché Scientifique) and since 1982 responsible for the Caelifera collection at the Département Systématique et évolution, Entomologie, at the Museum national d'Histoire Naturelle, Paris, France. Her thesis partially published in *Acrida*, "Etude des Acridoidea centre et Sud Américains (Catantopinae sensu lato): anatomie des genitalia, classification, repartition, phylogenie" laid the foundations for the classification of Neotropical grasshoppers (Acridomorpha). She conducted numerous long-lasting field trips and field observations in South America, mainly in Amazonia and in the forest regions of Brazil, Peru and Ecuador, as well as in dry regions in Northeastearn Brazil, Nicaragua and México and highlands of Ecuador. She described numerous genera and species of acridids (mostly Romaleidae and Acrididae: Copiocerinae, Leptysminae, Ommatolampinae, Proctolabinae, Rhytidocrotinae) many in collaboration with Marius Descamps and Simon Poulain, and documented the lifestyle and evolution of their communities especially related to diversity in canopy grasshopper assemblages in Amazonia in relation to resource partitioning and phylogeny. The scientific work she made on the acridid fauna of the Americas is certainly notable.

The reference collection on Neotropical grasshoppers that she left is outstanding in its diversity and species richness wonderfully curated and preserved thanks also to Simon Poulain.

Many Society members are undoubtedly familiar with Christiane´s scientific works and with the priceless collection of Caelifera that she left so rather than writing about these, we thought we would share with the Society members some of our personal memories of Christiane.

Carlos Carbonell remembers her:

I met Christiane in 1970, in one of my visits to the Natural History Museum of Paris. She was then working in the preparation of her Ph.D. thesis. Marius Descamps introduced us and said to me that he had given her as subject for her thesis the study and classification of the acridoid fauna of Central and South America. Our knowledge of that fauna was at that time limited to a great number of species names classified to the family level. Sometimes not even to that level. I remember that on hearing about that subject, I thought that Marius might dislike her. Otherwise he would not have given a student, such a difficult subject for her thesis.

During the following days, I did a lot of talking with her. She asked me many questions on the subject of her thesis that I was unable to answer for the most part. But because of her questions I saw that Descamps had found the right person to study that subject. Christiane's questions were about the most important points of the subject. Many of them I had made to myself at a time when I had thought of working myself on that subject, which I had finally decided was out of my possibilities. So, my collaboration to her work, after I went back to Uruguay, was limited to sending her specimens of some species which were not in the collection of the Paris Museum. In 1974 it appeared in the journal '***Acrida***' an extract

of her thesis work "***Les genres d'acridiens néotropicaux, leur classification par familles, sous-familles et tribus***". That publication had many misprints, because Christiane was at that moment very ill, and unable to correct the proof. As a consequence of that illness Christiane had for life certain limitations of her motility. Fortunately her mind was not damaged, and her intelligence remained as brilliant as ever. A long time afterwards I was able to obtain a copy of her thesis (that was never published in its entirety) that I have used ever since to find answers to doubts in my own work.

Her physical limitations never kept her for leading a normal life. She was even capable of activities that many persons with the whole use of their natural capabilities are unable to do. She had a knob put on the steering wheel of her car, so she was able to drive it with one hand. She drove me to places in Paris, and in the intense transit of that city she drove notably well. I remember one instance when she noticed that she had driven past a corner where she should had made a turn. In the middle of a block of one of these wide Parisian avenues, after looking to the car mirrors to see what was behind her, rapidly made an utterly forbidden u-turn to go back to the place where she should have left the avenue. But, as a difficult performance for a person with her physical limitations, much more notable were her missions of study and collection in the Americas. Travels to the regions that had particular interests for her research projects in Mexico, Nicaragua, Peru, Ecuador and Brazil, and certainly not in tourist circuits but most of them hard-to-reach places. The help and protection of Simon Poulain during these trips was instrumental for obtaining good results. I had the chance of going along with them in part of one of their trips in Brazil. Then I saw that Christiane's activities were not limited to the study and collecting of insects. Her observations and her very acute comments on the country and its people were always worth hearing. Like in her scientific work, she was able to notice in her surroundings many things that others could not see or understand.

María Marta Cigliano remembers her:

The first time I met her was during a brief visit to the Museum in 1999. My first impression about her was of somebody extremely helpful and open to share her knowledge to anybody who had her same scientific interests or love for grasshoppers.

For the last four years we had a collaborative project and I was fortunate to spend long stays at the Museum working closely with her. She had an incredible knowledge on Neotropical grasshoppers, and was able to switch from one group to another and had a complete picture of them all, including anatomy, behavior, life styles and biogeography. She had an extraordinary memory, and would know the exact place of each specimen in the collection, as well as the exact site where she had collected every single grasshopper. She could give specific details on the vegetation and community of every collecting site. We had wonderful conversations on field observations and she could spend hours talking about the Andes and its fauna, a place she missed so much and wanted to go back. She had interesting stories of the time she was working on canopy grasshoppers and stayed with the natives sharing their huts. One of the stories I liked best, was the one when she was sleeping in one of these huts. She picked a spot far from the center of the hut, close to one of the openings, beside a bunch of bananas. While she was in her sleeping bag she was feeling something crawling on her body. But she was so tired that she snuggled inside of her bag, and went back to sleep. When she woke up she realized that the "crawlers" were bats lying on her body!! She also realized that the bunch of bananas was left on purpose in an attempt to keep the bats out of the hut!

She was a very warm and kind person, always willing to help, and aware of the peoples' necessities. Unfortunately, she left us too soon and she took with her a great amount of knowledge on the Neotropical grasshopper fauna.

Her death has left us desolated. As a scientific worker we would have liked for her a much longer life. As a human person, we know that somebody who cannot be replaced is no longer with us. We are going to miss her for the rest of our lives.

She was buried in Daglan, near Sarlat, Dordogne, France.

Carlos S. Carbonell
& María Marta Cigliano

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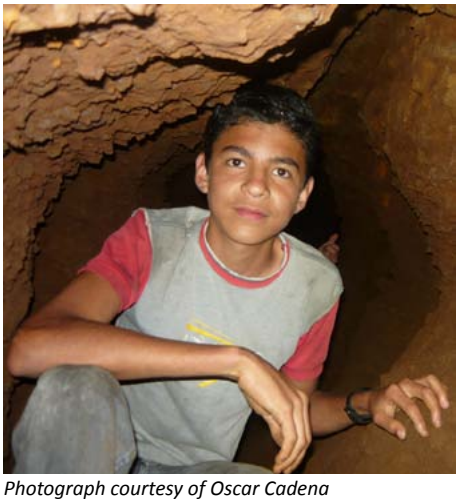
Miguel Antonio Ríos Guevara (1990–2010)

It is with great sadness that I report the death of Miguel Antonio Ríos Guevara, who was killed in a tragic road accident on the morning of Saturday 14 August 2010. Miguel - a student at the Universidad Incca in Bogotá, Colombia - was on his way to visit family in Ibagué, Tolima when the bus on which he was travelling left the road and rolled into a ravine.

Miguel was born 24 February 1990 in Ibagué, a town in the Andean department of Tolima, Colombia. Following the death of his parents in 2001, Miguel moved to Bogotá where he lived with his uncle and attended school, eventually enrolling as an undergraduate in the Department of Biology at the Universidad Incca. It was here that he developed his passion for insects and, having formed close friendships with entomology students at the nearby Universidad Distrital Francisco José de Caldas, decided to focus his studies on this subject. Miguel soon became interested in Orthoptera and in particular, New World Tridactyloidea and Tetrigidae. Ever the dedicated student, he spent most of his spare time in the field or exploring the university insect collection, most often accompanied by his close friend Oscar Cadena. During the course of his most recent investigations, he discovered a new species of the genus *Neotridactylus* and had started compiling notes for a paper in which he would describe it. At the time of his death, Miguel was also working closely with Oscar on a large collection of Colombian grouse locusts.

My first contact with Miguel came



Photograph courtesy of Oscar Cadena

a year before the accident that claimed his life. He had written to me outlining his interests in Neotropical tridactyloids and requesting copies of Kurt K. Günther's many important papers which he had been unable to locate in his university library. His enthusiasm

was clearly conveyed in his letter and so, I copied my entire collection of tridactyloid literature and mailed it to him in Colombia. When the package arrived, I received a jubilant e-mail in which he thanked me profusely and explained his excitement at finally having copies of the many sought-after papers! So began a frequent correspondence in which Miguel would send me regular messages with updates of his progress, photographs of interesting specimens, requests for literature and numerous questions concerning the morphology, taxonomy and relationships of tridactyloids. His intelligence and dedication were always apparent during our exchanges and although I never had the opportunity to meet Miguel in person, it was clear that he had a bright future ahead of him.

With Miguel's passing we have lost not only a kind and courteous young man, but also a most promising young orthopterist. The death of one so young is a painful loss in so many ways and I am sure I speak for the entire orthopterological community when I convey my deepest sympathy to Miguel's family and friends during this sad time. I would also like to express my gratitude to Oscar Cadena who clarified biographical details and kindly provided the photograph used here, taken during their last field excursion.

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Franz Gustav Straube (1802-1853) and His Contributions for Entomology

The majority of readers perhaps do not know about Franz Gustav Straube, the insect collector from western Anatolia (Turkey), who among other things collected the type-specimens of *Paranocarodes straubei* (Pamphagidae) and *Isophya straubei* (Phaneropteridae), two species of orthopterans endemic to the region between the Mediterranean and Black seas. Just a few years ago I did not know much about my great grandfather's life, except perhaps that he was a naturalist like me. My quest to learn more about him began in 2007 with a search on the internet for the word "*straubei*". With the help of collaborators from Brazil and Europe, I searched for information about Franz Gustav Straube's legacy and his contributions to entomology, especially to our knowledge of Lepidoptera and Orthoptera. The results of my search are documented here in this brief biographical sketch, as suggested by Drs. Mustafa Ünal (Abant izzet Baysal Üniversitesi, Bolu, Turkey) and Michael Ohl (Museum für Naturkunde der Humboldt-Universität, Berlin, Germany), so that this information can become a resource for historians and biographers of the natural history of Europe.

Franz Gustav Straube (or simply "Gustav Straube" as he preferred according to old records) was born in Altenburg, east of Turingia (Germany) on February 6, 1802. He was the son of Samuel Sigmund Straube (b. Schneeberg, 1761; d. Altenburg, 1808) and Christiane Concordia Bach (b. Buchholz, 1761; d. Altenburg, 1808) and he transfered to Dresden (Germany) in an unknown year of the second decade of the 19th century. There in 1843, he married Ernesthine Wilhelmine Hübschmann (b. Dresden: March 21, 1822; d. Cerro Azul, Brazil: October 24, 1909) (Straube, 1992).

Figure 1. *The posthumous (circa 1930) portrait of Franz Gustav Straube painted by Brazilian artist Pedro Macedo*

Some of rare and brief biographical comments from the entomological literature are: "*Straube, Gustav, früher in Dresden, nach Brasilien ausgewandert*" [Straube, Gustav, after being in Dresden, emigrated to Brazil] (Hagen, 1863:200; Horn & Schenkling, 1919) and "*Straube, Gustav (-), Ins.-Händler in Dresden (1851! 1854!), später in Brasilien. Vereinzelte alles*" [..., insect trader in Dresden (1851, 1854). Isolated contributions] (Horn &

Kahle, 1937).

Franz was interested in insects and subsisted on the trade of specimens for entomological collections, scientific and amateur collections alike. At this time, Straube's profession carried significant prestige, because any good naturalist had to be a true taxonomist and biogeographer as well, especially to ensure accuracy in supplying species of commercial interest.

Franz Gustav Straube lived during the stormy period between Linnaeus' "Systema Naturae" (1758) and Darwin's "On the Origin of Species" (1859), a time during which a revolution in biological concepts related to the system of scientific nomenclature and the principles of organic evolution was sweeping through Europe. The region where he lived was an important center of philosophical discussion, established through the initiative of the German pharmacist Johann Bartholomaeus Trommsdorff. In the first decade of the 19th. century, Trommsdorff was the owner of Swann Pharmacy (*Schwanenapotheke*), an stablishment located in Erfurt that was a point of convergence for distinguished researchers (for example, Alexander von Humboldt and Ernst W. von Martius) who met frequently for several kinds of theoretical discussions.

Other naturalists or scientists from this time included the Count of Hoffmannsegg, (1766-1849), Johann K.W. Illiger (1775-1813), Karl Hermann von Burmeister (1807-1892), Karl A. Dohrn (1806-1892), Johann G.F. von Waldheim (1771-1853), Christian F. Freyer (1794-1885), Ernst A. von Kiesenwetter (1820-1880), Johann C.F. Klug (1775-1856), Ferdinand Ochsenheimer (1767-1822), Phillip C.Zeller (1808-1883), Friedrich Treitshke (1776-1842) and several others living contemporaneously in this same region of Germany. All of these individuals lived during an important period of zoological research, especially entomological studies, when many insects were sent to various natural history collections. It was a period of extensive searching for and description of new insect species.

On July 19, 1851 Franz emigrated to Brazil using the facilities of the Hamburg Colonization Company on board the Danish ship *Gloriosa*. He arrived in São Francisco do Sul (state of Santa Catarina, southern Brazil) two months and eight days later. Beyond his interests in the new German colony in Brazil, he was also invited with an official charge to research the plague insects that had been destroying the crops in the agricultural regions of Santa Catarina.

He established himself in Joinville (originally called "Colonia Dona Francisca", northeastern Santa Catarina: 26°18'S, 48°50'W), where he built a very simple house on the banks of the Mathias River. Because of its location, his home was quite susceptible to damage from seasonal flooding and it was even possible to fish from his window during the rainy period!

On July 19, 1852 his wife Ernesthine and four children arrived in Brazil to join him (the youngest and fifth son died at sea, perhaps because of a measles outbreak). She had sailed on the same voyage (on the ship Florentin) as the famous German naturalist Fritz Müller who had corresponded extensively with Charles Darwin and was one of the most important naturalists contributing to our understanding of evolutionary theory.

Straube lived in Joinville until his death on December 19, 1853. Soon afterward, his wife and four children moved to Cerro Azul (24°49'S, 49°15'W), a small city in eastern Paraná. Some of the subsequent branches of their family, for example my grandfather Guido Straube (1890-1937), a dentist and also a naturalist, ended up in Curitiba (southern Brazil: 25°25'S, 49°15'W).

The three most important topics of Straube's scientific life were: 1. his expedition to Turkey, where he dedicated two months to the collecting insects; 2. the articles he published; 3. his amazing and innovative techniques for conserving butterflies.

The Trip to Turkey

At 45 years old (June-July 1847), and only a few years before his defining trip to Brazil, Gustav had realized a short-term expedition to the Anatolia region (east of Turkey) to collect certain species of insects, mostly Coleoptera and Lepidoptera but also other objects of *naturalia*, like plants. The details of this trip are not clear but it appears to have been related to his professional interest in looking for rarities in a region that still had not been explored by any entomologists. An extensive revision of the 252 specimens of Lepidoptera collected there was published by Assmann (1854) and there are several other citations in the contemporary literature (Schaum, 1850; Assmann, 1854 in Gerstäcker, 1855:247).

During the trip Straube visited János Frivaldszky, a coleopterist and curator of insects at the newly created Hungarian Museum of Natural History (HNHM, 2007). His colleague asked about the correct place to find a certain species of butterfly (*Bombyx dryophaga*), and explained some areas of uncertainty in the known geographical distribution of this rare species. Fortunately, Straube really did find this species, but not in the Dalmatian region as formerly supposed (E.D., 1845) but rather near the city of Bursa, eastern Turkey. In an article specially published for this occasion he described the challenges involved in finding the larvae and adults, the host plant, and several other as-

pects of its breeding cycle (Straube, 1849).

Some specimens of insects collected by Straube had been studied by European entomologists, for example Assmann (1854) in his revision of Straube's butterfly collection from Bursa and İstanbul (Rigler, 1852). It is quite possible that among these specimens there exist other interesting or new taxa (M.Ünal, 2009 *in litt.*), thus providing a really interesting direction and endeavor for new researchers, especially involving old museums or literature.

The most celebrated use of the material collected by Straube was the description of two species of orthopterans named in his honour. The first, presently *Paranocarodes straubei* (originally *Pamphagus straubei*), is a species in the family Pamphagidae that comprises small grasshoppers with the appearence of thorny and mimetic sticks. The nominal subspecies lives in southeastern Bulgaria, in the southern region of the Black Sea, in European Turkey (Küçük-Çekmece region, near İstanbul and adjacent to Bosphorus Strait) and northwestern Anatólia (from south of Bosphorus to the Uludağ mountains to 2000 m u.s.l.) (Eades et al., 2007).

The other new species, *Isophya straubei* (originally *Barbitistes straubei*) is a member of the tribe Barbitistini of the subfamily Phaneropterinae (Tettigoniidae) and belongs to one of the largest genera of Orthoptera, comprising 85 species (45 in Europe), showing restricted ranges defined by particular topography and exhibiting a high rate of endemism (Warchalowska-Sliwa et al., 2008). The species belongs to a morphologically primitive group of middle to large size insects with long tegmina and a well-developed stridulatory file (nominal subspecies). Actually, it comprises a clade called the straubei-group with a few cryptic species living from the Eastern Balkan Peninsula to Asia Minor (Warchalowska-Sliwa et al., 2008).

Both species were described by Franz Xavier Fieber (1853a:26; 1853b:185) based on the specimens collected by Straube in Bursa in 1847, and the type series originally assumed to be housed in Wien Museum, are probably lost (Alfred P. Kaltenbach in litt., 2005); two syntypes of *P. straubei* however, are in the Berlin Museum.

Scientific Publications

Although Straube was considered primarily an insect trader, he was also an entomologist and he published some results of his discoveries in German scientific journals. According to Hagen (1863) and Horn & Schenkling (1929), there are at least five articles published by Straube:

1. **Alphabetisch geordnetes Verzeichniss der europäischen Schmetterlinge nach Ochsenheimer und Treitschke nebst den neueren Entdeckungen Zur Benutzung der neuern systematischen Verseichnisse** [Checklist in alphabetic order of the europeans lepidoptera according Ochsenheimer & Treitschke including the most recent discovers for the use in the new systematic classification]. Published in Berlin, Germany, by Louis Filitz, with 10 pages, 1846.
2. **Systematisch geordnetes Verzeichniss der europäischen Schmetterlinge nach Ochsenheimer und Treitschke nebst den neueren Entdeckungen bis 1845** [Checklist in alphabetic order of the europeans lepidoptera according to Ochsenheimer & Treitshcke with the most recent discovers until 1845]. (Published in Berlin, Germany, by Louis Filitz, with 11 pages, 1846.
3. **Bemerkungen bei der Zucht von *Bombyx Dryophaga*** [Notes on the reprodution of *Bombyx dryophaga*]. Published in *Stettiner entomologische Zeitung* vol.10, n°1, pages 156-160, January 1849 (see below).
4. **Entomologische Beiträge I: Entomologischen Bemerkungen: gesammelt auf einer Reise im Orient in den Monaten Mai bis September 1847** ["Entomological contribution: collection on a trip in the Orient during the months of May and September 1847]. Published in *Abhandlungen des Naturwissenschaftlichen Gesellschaft Saxonia zu Gross und Neuschönau* vol.1, pages 9-14, 1853.
5. **Entomologische Beiträge II: Bemerkungen bei der Zucht von *Bombyx Dryophaga*** ["Entomological contribution: Notes on the reproduction of *Bombyx dryophaga*]. Published in *Abhandlungen des Naturwissenschaftlichen Gesellschaft Saxonia zu Gross und Neuschönau* vol.1, pages 14-19, 1853. This is the same content of the 3 (see above) but Straube includes an explanation.

It appears to be clear that his main occupation was the butterflies as I concluded after analyzing the two checklists of european Lepidoptera, which are really a concise revision of Ochsenheimer and Treitshcke's catalographic work (Ochsenheimer, 1806-1816; Ochsenheimer and Treitshcke, 1825).

Straube's Catalogues of Butterflies

Franz Gustav had a unique technique for conserving butterflies, not like museum specimens but into a book, like dry specimens of plants (Figure 2). Two volumes of these magnificent books belonging to our family were completely preserved until today, and the others (perhaps another four volumes, judging the species sequence from Straube

Figure 2. *Examples of the Straube's Catalogue of Butterflies from Europe: a selected page (the genus Daphne) and detail of the same plate, showing the specimens in dorsal (bottom left) and ventral (bottom right) view. (Photos: Cila Rocha).*

1846a,b) may have been destroyed. This technique is know as "nature printing" and the person attributed with the invention of the process, called *Naturselbstdruck* in German, is the austrian naturalist Alois Auer in 1853 (Auer, 1854), therefore several decades before Straube's initiative.

Each genus of butterfly from Europe was presented, following the nomenclature and sequence from his two articles of revised names (Straube, 1846a,b). The wings, shown in two views (dorsal and ventral), were carefully detached from the specimens, glued and pressed onto an absorbant paper. Each body was drawn with great perfection and in great detail, as was the morphology of the larvae.

The most important remark upon examining Straube's collections today is that the original appearance and colours are completely preserved, which is quite amazing considering this preparation was made in the middle of the 19th century!

I am not able to understand if Gustav Straube produced this catalogue for commercial or scientific use (perhaps as a fieldguide?), or both. In fact, there are two volumes with incomplete plates of adult and larval forms, i.e. there are some pages with larvae and adult (front and cover) examples, others with only larvae but with space reserved in the pages (using the scientific name in the upper left corner) for future specimens that were still to be obtained. I suppose that this incomplete presentation is because the author was waiting for collected specimens of all European species of butterflies.

Acknowledgements

My father, Ernani C. Straube, provided me with many biographical materials, documents and especially inspiration. I am also indebted to Michael Ohl, Alexi Popov, Zdravko Hubenov, Mustafa Ünal, Ulrike Aspöck, and Alfred Kaltenbach who contributed information from European museums and specimens. Kátia Matiotti, Dione Seripierri, Olaf H.H. Mielke, Marilaine Schaun Pelufê, Seyrap Dormos, Michaela Starke, Rodrigo Lingnau, Franzeska Lorke and Thiago Mariano sent me relevant information and helped me with translations. I am grateful to Cila Rocha and Cláudio Roney Straube for the photos and Cila and David Morimoto, Alberto Urben-Filho, Renato S. Bérnils, Gledson Bianconi and Paulo Labiak for comments on the early draft of the manuscript.

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A long term study to disentangle cricket behaviour in the wild (Orthoptera: Gryllidae)

Plenty of studies on crickets have shown that these insects are well suited to investigations concerning animal behaviour and sexual selection. Most of those studies have been undertaken in the laboratory, where these insects are easy to rear and manipulate. A few have been done in the wild, where their potential for field research has also became evident. However, field studies have never taken a multi-generational approach. Six years ago we realised that developing long-term studies on ecology, behaviour and sexual selection in a genuinely natural environment, might be possible by using field crickets.

The field cricket *Gryllus campestris*, is one of the more emblematic insects in Europe and one of those commonly used in field studies. In Spain, this species lives in all sorts of grasslands, from the green meadows of the north to the dry cereal fields of the centre and south. Nymphs and adults excavate burrows to hide from predation and weather. Each individual defends its burrow against other crickets, and burrow sharing is usually restricted to adult pairs. Although the adults move frequently among burrows, they spend the vast majority of their lives in the close vicinity of a burrow. This peculiarity, together with its univoltine life cycle and the lack of flying wings, makes this species a perfect candidate to carry out field studies across multiple generations.

In 2005, we had the opportunity to start working with a semi-isolated population of *G. campestris* living in a small meadow in North Spain. We thought it could be possible to use CCTV equipment to monitor burrows continuously during the breeding season, so we carried out a preliminary trial using a 16 camera digital video recording system. Despite numerous technical problems, it proved to be very useful, and in 2006 we started a long-term study of the population.

Our system is based on day/night cameras provided with a source of infrared light and a microphone. Each camera is connected to a box placed at the centre of our study site through an ethernet cable. This box supplies power to the cameras and collects the audio and video streams from them. It also allows us to move cameras around which would otherwise rapidly result in a knotted mass of spaghetti wiring. A laptop inside it records the audio coming from every camera at customizable intervals. The video is sent to a group of computers located in a house, 40m away, where it is recorded through commercial security software. Each computer can record video from up to 16 cameras, so six computers are required to work with the 96 cameras we are using at present. The software has features that allow for a single person to watch the recordings of the 96 cameras on a day per day basis, i.e. one day of recordings requires around one day of watching.

Every year, by the end of the winter, late instar nymphs complete diapause and re-open their burrows to resume growth. At 2-3 days intervals, we search for newly opened burrows across the meadow and mark them with numbered flags. By the end of April all burrows are marked and the adults have started

From left to right: Cameras on meadow, weather station and cabling pipe sending the video stream to the computers, recording computers (Photo credit: www.wildcrickets.org).

Tagged male (Photo credit: www.wildcrickets.org).

to emerge. This is the time when we collect them. Shortly after emergence, every individual is trapped, measured, weighed, labelled with a unique 1 or 2 character code and sampled for a small portion of their right hind leg, before being released in their source burrow. We use that leg tissue to extract DNA that Amanda Bretman (now at the University of East Anglia) amplifies for 14 microsatellite loci. This genetic screening allows us to build a pedigree, so that we can assign parents and offspring to each individual. By the time we collect the adults, we have already placed 96 cameras over a random sample of the burrows across the meadow, and the system has started to record all the events happening around them 24h a day. Registered events include adult emergence, cricket movements in and out the burrow, arrivals and departures, matings, fights, predation, etc. This monitoring does not stop until the last cricket dies late in July, although during that time we move the cameras very often from abandoned burrows to those still active.

Using this system, we have already recorded over 300,000h of video covering five years of the life of this population, from 2006 to 2010, and the project is funded to keep collecting data until 2013. The first three years have already been watched and show that this system can provide interesting insights into the behaviour and ecology of this population (Rodríguez-Muñoz et al. 2010). We have started to analyse the data and found that attractive and dominant males do not always produce more offspring. Males that lost more fights got more mates than dominant males, but they left a similar number of offspring. We also found that the number of offspring increased with the number of mating partners for both males and females. However, all these findings are based on a single generation, and we are looking ahead to find out whether these patterns are stable over the years, and to investigate the role of cricket density, weather and other environmental factors on the behaviour and fitness in this population. The future looks promising, and we trust this system will provide new information on how natural and sexual selection operate in nature.

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On the genera *Caribacris* Rehn and Hebard, 1938 and *Leurohippus* Uvarov, 1940 (Orthoptera: Acrididae: Gomphocerinae: Amblytropidiini)

The history of these generic names is as follows. Caudell (1922:32) described a new species from St. John's, on the Island of Antigua (Leeward Islands of the Lesser Antilles, approx. 17º 07'N, 61º 50'W) which he names *Amblytropidia stoneri*. Later Rehn and Hebard (1938:202) erected the genus ***Caribacris***, with *A. stoneri* Caudell as the type species.

Rehn (1906:374) described *Cocytottetix linearis* from the Chapada dos Guimarães in Mato Grosso, Brazil. This locality is a low plateau situated NE of the City of Cuiabá, on the divortium aquarum of the basins of the Amazonas and the Paraná-Paraguay rivers, approx. 15º 27'S, 55º 44'W. Then Bruner (1911:24) erected the genus ***Leurocerus***, with *Cocytotettix linearisas* its type species. However, Uvarov (1940:176) found that *Leurocerus* Bruner, 1911 was preoccupied by *Leurocerus* Crawford, 1911 (Hymenoptera), published before Bruner's paper, and proposed the new name ***Leurohippus*** for Rehn's species *linearis*.

The next author involved in the use of these names was Jago (1971:238-9). With reference to the genus *Leurohippus* of Uvarov, he mentioned as the species studied by himself, *L. linearis* (Rehn), *L. chapadensis* Bruner and *L. stoneri* (Caudell). Of these three, the combination *L. chapadensis* seems to be a new one for *Amblytropidia chapadensis* Bruner, although he does not say so, nor does he writes the author's name in parenthesis. Jago indicated that the combination *Leurohippus stoneri* was new, but did not mention that it had been transferred to *Caribacris*. Moreover, he also placed the generic name *Caribacris* Rehn and Hebard 1938 as a junior synonym of *Leurohippus* Uvarov 1940, which is obviously erroneous.

With reference to *Leurohippus linearis* (Rehn), examination of its type suggests that it should be

called *Caribacris linearis*, and it is so labelled in the collection of the Museum of Natural History in Washington D.C. However, I don't know that this combination has ever been published.

It must be noted that the two species of *Caribacris* (*C. stoneri* and *C. linearis*) come from widely separated places. The distance north-south between these localities (the Island of Antigua and the Chapada dos Guimaraes) is of 32 meridian degrees, roughly 3600 km. and includes a good part (700 km) of the Caribbean sea. A disjunct distribution like this has been recorded for some genera like *Schistocerca* and *Orphulella*, but these genera have many species, some of them good fliers, and large populations. This is not the case for the genus *Caribacris*. *C. stoneri*, as far as I know, is known only by its type. Of *C. linearis* there is a small series in the collecton of the Academy of Natural Sciences of Philadelphia. I have collected at the Chapada dos Guimarães, without finding a single specimen. These are indications of their being rather rare species. A more detailed taxonomic study of these species might prove that they belong in different genera. If such be the case, the generic name ***Leurohippus*** would be available for the southern species.

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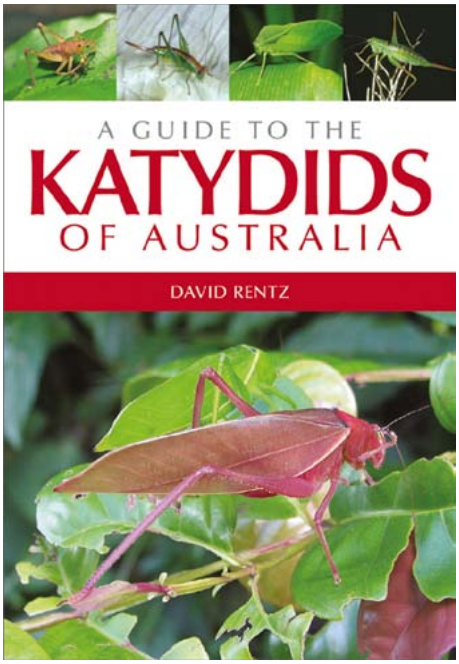
Book Review:

A Guide to the Katydids of Australia

David Rentz, CSIRO Publishing

To say that there is nobody more qualified to write a book about the katydids (bushcrickets) of Australia than David Rentz would be an understatement. Close inspection of the useful list of Australian tettigoniids at the end of "*A Guide to the Katydids of Australia*" reveals that Rentz has described about 230 (and I may well have lost count) of the 1000 or so Australian species that have so far been named, not to mention various genera, tribes and entire subfamilies. In the case of at least six of the katydid subfamilies (the Microtettigoniinae, Tettigoniinae, Austrosaginae, Listroscelidinae, Meconematinae and Zaprochilinae), the vast majority of the Australian species owe their descriptions to Rentz. Although he has now retired from his post as Curator of Orthopteroid insects in the Australian National Insect Collection, Canberra (CSIRO), Rentz is continuing to produce numerous works on tettigoniid taxonomy.

David Rentz has produced previous books on the diverse katydid fauna of Australia, most notably, three volumes of "*A monograph of the Tettigoniidae of Australia*", also published by CSIRO, which have covered eight of the 14 katydid subfamilies that occur in this region. The Guide to the Katydids of Australia is a very welcome complement to the series. It is clearly designed to be much more accessible to non-specialists than the monographs, and is distinctly more portable, so it could be used in the field. Furthermore, all the Australian subfamilies are covered. In addition to the species guide, necessarily brief, but informative and well-illustrated sections are included on the general biology of katydids, sound and hearing, collecting and studying katydids, katydid habitats and the conservation of katydids. Appendices also give useful tips on keeping



katydids in captivity and on preserving specimens.

This book strikes exactly the right balance between scientific detail and accessibility. Consequently, it will interest not only dedicated orthopterists, but anyone with an interest in the animals of Australia, or anyone interested in learning more about the amazing world of katydids. The guide to katydid species is well structured. Each subfamily is dealt with in its own sec-

tion and a useful and user-friendly key to katydid subfamilies is provided. The text covers key features of each subfamily, the main tribes, genera and an impressive number of species. The Australian katydid fauna includes most the 19 recognised katydid subfamilies, five of which are endemic. I found it a real treat to be provided with a concise overview of so many interesting subfamilies, many of which do not occur in my part of the world, richly illustrated with excellent colour photographs of key species. The use of photographs of whole animals rather than drawings of body parts certainly helps to broaden the appeal of the book and, given the diversity of katydid form and colouration, makes the book very visually interesting. The five endemic katydid subfamilies are particularly interesting. As their name suggests, the Phasmodinae, or stick katydids, show extraordinary convergence in body form with the true stick insects and are also unusual in that the males are wingless and therefore mute. The Zaprochilinae, or pollen-feeding katydids, possess unusual forward-facing mouthparts, adapted for insertion into flowers; the Microtettigoniinae, or micro-katydids, include the world's smallest katydids, measuring only 5mm in adult body length in some species; the Austrosaginae, or sluggish katydids, include both predatory species and seed and pollen feeding species with curiously over-sized heads; the Tympanophorinae, or balloon-winged katydids have a very distinctive appearance, with prominent eyes, wingless females and males with unusually expanded tegmina which house more than the usual complement of sound producing stridulatory files. Interestingly, it remains unknown how, in the latter subfamily, the sexes actually manage to get together for mating: the males regularly change perches, singing for only a short time from each, seemingly giving the wingless females little time to find them.

Despite Rentz's immense contribution to the taxonomy and knowledge of the Australian katydids, the book makes it very clear that there is still a very long way to go. Many sections make tantalising references to as yet undescribed species and genera, unusual structures with unknown functions and unusual behaviours which require further study. In the preface, Rentz states that although he has completed three volumes of the monographic series on the Australian Tettigoniidae, at least another three would be needed to cover the family thoroughly. I share Rentz's hope that this excellent book will stimulate a new generation to explore further the rich katydid fauna of Australia.

Karim Vahed

Orthopterists' Society Statement of Income and Expenses for 2009 (in US$)

Income (much additional income deferred to 2010)	**2008**	**2009**
Membership dues	3,135	1,440
Publications (subscriptions, page charges, back issues)	14,380	14,423
Non-designated contributions	12,295	16,980
Research grant contributions (matched by an anonymous donor included in non-design. contrib. above)	630	3,050
Sponsored membership contributions	315	0
Credit card fees	42	22
Contribution from AAAI for investment in Uvarov Award Account	2,000	0
Investment income (about 2/3 reinvested in Vang. Total Stock Market Index Fund)	3,485	2,552
Total Income	***36,282***	***38,467***

Expenses	2008	2009
Officers remuneration [including one 2008 check cashed in 2009]	2,300	3,800
Editorial assistant	18,156	9,078
Assistance for Executive Director plus miscellaneous small expenses	1,149	544
Airfare for officers to Turkey International Meetinng of the OS	0	3,181
Printing costs JOR 17 (2), JOR 18(1), Otte's "Crickets of the Caribbean"	6,849	16,289
Research grants (one deferred until 2009)	4,410	4,000
Miscellaneous bank fees (wire transfer)	287	27
Credit card company fees	274	311
AAAI Uvarov Award	0	1,500
Total Expenses	***33,425***	***38,730***
Deficit (Income-Expenses)	**2,857**	**-263**

Orthoptera Species File

The Society receives a yearly payment from the Orthoptera Species File endowment at the University of Illinois Foundation. Such funds are disbursed entirely as grants by the Treasurer as determined by the OSF Officer of the Society who is aided by a committee of Society members.

Income	**14,200**	**25,850**
Expenditures	**21,220**	**25,850**

Orthopterists' Society Fund Balances 2009

	Fair Market Value Begin. of Year	End of Year
Checking Account	5,908	9,290
Securities		
Vanguard Total Stock Market Index Fund (Operating Account)	24,054	30,957
Vanguard Total Stock Market Index Fund (Grant Account, restricted)	10,882	14,005
Wells Fargo Advisors (Operating Account)	11,667	12,575
Wells Fargo Advisors (Endowment Account)	12,456	12,773
Wells Fargo Advisors (AAAI Uvarov Award Account, restricted)	7,565	7,101
Total Securities	*66,624*	*77,411*
Total Assets	***72,532***	***86,701***

- *The Vanguard accounts are invested in a mutual fund for growth with the small dividends reinvested quarterly.*
- *The Wells Fargo accounts are largely invested in bonds and preferred stocks for income.*

Theodore Cohn
Treasure

Editorial

Time flies fast. About a year ago this time, I started as a new editor of Metaleptea and put together my first issue, volume 29 (2). At that time, as I was learning how to use desktop publishing software, I began to wonder if my goal – publishing more issues in a regular basis – would even be possible. Now a year has passed, and I have been able to publish three issues in 2010 in a regular basis, on January, May, and September. I could not have done it without the members and officers who contributed great articles each time and my associate editor Sam Heads who provided excellent editorial support. So, my sincere thanks to all.

From this issue, readers will notice a slight change. PDF pages will load much faster and smoother. This is because I changed the software from Scribus to InDesign. This new change will let me publish a more user-friendly newsletter.

As always, I am keenly interested in featuring topics like new collecting techniques, distribution maps, new ideas and controversies, travel logs, personal reflections, stories about famous orthopterists, short stories and poems, or anything you want to share with the members of the Society. I am also very interested in publishing photographs of our favorite insects.

To be published in Metaleptea, please send me articles/photographs at song@mail.ucf.edu with a subject line starting with [Metaleptea]. 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 images into a word document, but send me as separate files. The next issue of Metaleptea will be in January 2011 and please send me the articles promptly. Also, please do not hesitate to send me feedback regarding Metaleptea. I look forward to hearing from you soon.

Hojun Song
Editor

Orthoptera Photograph of This Issue

Hemisaga denticulata (White) (Tettigoniidae: Austraosaginae). Cape LeGrand National Park, Western Australia, Australia. (Photo Credit: Hojun Song)

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