THE NEWSLETTER OF THE *ORTHOPTERISTS' SOCIETY*

Metaleptea

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Society News

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Orthopterists' Meeting in Antalya, Turkey

Fellow Members,

I have the pleasure to inform you that our next international meeting will be held in Antalya, Turkey, in 2009, an area rich in Orthoptera and in human history. For this conference we have been invited by our colleague Battal CIPLAK, from Akdeniz University, who informs us that the best collecting time for Orthoptera is in early summer. We have time to make suitable plans to make this meeting one of our best. Please send your suggestions for length of the meeting, plenary speakers, symposia, scheduling, field trips, or ideas for improving our meeting to myself or to our Executive Director, Professor Charles Bomar. We shall continue to keep you informed of our plans via this newsletter and the Society website.

Michel Lecoq, President

Illustrated Checklist of Acridomorph Species from Argentina and Uruguay Released in a CD-ROM Format

An illustrated checklist of Acridomorph species from Argentina and Uruguay published by The Orthopterists' Society, under the Publications on Orthopteran Diversity series has been recently released in a CD-ROM format. This is the first checklist of this fauna for these countries for which there were no regional species catalogs, nor any comprehensive keys that could help in the identification of the species. Names of genera, species, and subspecies have been listed. This illustrated checklist is intended to be useful not only to systematists but to a wider audience including general public.

The checklist was originally compiled by the senior author, but the CD-ROM version has grown considerably with new information obtained from research studies and field trips conducted by the three authors. The CD-ROM contains two versions of the illustrated catalog, in Spanish and in English. Searches for species can be done by their "geographical distribution" (where the list of species by provinces is given following the current classification), by "alphabetic order" (either by their specific or binomial names) or following the "classification".

For each species, full synonyms, information on host plants, complete references, economic importance, and relevant observations are given. Most of the species are illustrated with images of specimens in the wild or if unavailable, a photograph of a Museum collection specimen was included. The geographic distribution of the species in the different provinces of Argentina and in Uruguay is indicated on maps, as well as the general distribution, if outside from these countries.

The CD-ROM is developed for PC and Macintosh compatible computers.

Carbonell, C.S., Cigliano M.M. & Lange, C.E. 2006. Acridomorph (Orthoptera) species of Argentina and Uruguay/Especies de Acridomorfos (Orthoptera) de Argentina y Uruguay. Publications on Orthopteran Diversity. CD-ROM. The Orthopterists' Society at the Museo de La Plata, Argentina.

Orthopterists' Society Supports a Workshop on Biopesticides for Desert Locust Control

by Michel Lecoq,

In case of a locust invasion, chemical pesticides are currently mainly used to control the plague. During the recent Desert Locust invasion in Africa, from end 2003 to early 2005, some 12.9 million ha were sprayed with over 13 millions litres of pesticides. More than 6.3 million litres were left over at the end of the campaign, and these are not always stored under the best conditions. In developing countries such a large quantity of pesticide used is a main concern, both for man and the environment. Hopefully, pest locust operations are being more aware of human and environmental health aspects nowadays.

The introduction of biopesticides in locust control could offer a better possibility to preserve biodiversity in affected areas. Such a biopesticide (the "Green Guard®") is currently being used in Australia in locust control by the Australian Plague Locust Commission. In Africa, another biopesticide (the "Green Muscle®") has been developed during the past years; it is also theoretically available, is "recommended" by FAO as one of the products which can be used for locust control.... but has not been used at all during the last Desert Locust campaign.

FAO has decided to organize a scientific meeting in West Africa in 2006 concerning the possible use of biopesticides in locust control in order to replace - at least partly - conventional pesticides. One of the objectives is to study why biopesticides were not used recently to control Desert Locust populations, and to predict if possible when and where they will be used in the future, by whom, for what and in what quantities. The meeting will gather some key actors such as scientists, technicians, users (national locust control units), donors, industry and regional/international institutions involved in locust control. The meeting must lead to the identification of the factors currently preventing the use of mycopesticides in Africa (efficacy, slow action, availability, price, registration, production, integration in the current control strategies...). The recommendations should be followed by short-term actions in order to quickly allow a broader use of these biological products less harmful for man, the environment and biodiversity.

The Board of our Society has agreed to support such an initiative. The meeting, organised by FAO and funded by the World Bank, will be held under the aegis of the Orthopterists'Society. Of course, such a support does not have any cost value. For the Society it is mainly a moral support. It is an opportunity to show that we are not avoiding responsibilities in these important issues and that we adhere to and support those initiatives on locust/grasshopper control that aims trying to preserve biodiversity. I think that - as a scientific Society devoted to Orthoptera – we are all concerned by the environmental aspects of locust/grasshopper control and that we have to support initiatives trying to find a realistic issue, taking care both of biodiversity and of people living in the African areas affected by locusts, and specially Desert Locust. Two or three members of the Society involved in locust control and biopesticides will represent the Society during this meeting. They will report to all members - via Metaleptea – about the main results and recommendations obtained from the meeting.

Brazil (Mato grosso) spraying mycopesticide, Michel Lecoq (CIRAD and Marcos Faria (EMBRAPA) preparing a mycopesticide application in Mato Grosso to control locust hopper.

Brazil (Mato grosso) locust (*adult of Rhammatocerus schistocercoides*) killed by a mycopesticide. (Submitted by Michel Lecoq.)

It is always difficult to say goodbye to one of your own. Our deepest sympathies to family and friends.

Seiroku Sakai (1924-2004)

IN MEMORIAM

Dr. Seiroku Sakai peacefully and permanently closed his eye on August 2, 2004, in Tokyo, while being warmly attended by his wife, Toshiko Sakai.

For 30 years from 1966 to 1996, Dr. Sakai was professor in Daito Bunka University near Tokyo, and taught basic courses of biology and chemistry in the Department of General Education. In the laboratory, he was enthusiastically involved in studying Dermaptera, with which he was fascinated from his boyhood. He decided to gather all the original descriptions of new species of Dermaptera scattering among various research journals, and also to take photographs of all the existing type specimens. This was indeed an enormous job far beyond what most research workers could achieve even if they had worked hard for life. To fulfill this goal, Dr. Sakai traveled around all over the world to visit museums, entomological laboratories and private collections. His wife Toshiko always traveled with him and efficiently assisted him in the hard works abroad.

Dr. Sakai compiled the results of his survey and published them as a long series of books under the title Dermapterorum Catalogus: A Basic Survey for Integrated Taxonomy of the Dermaptera of the World. The first book of the series appeared in 1970 and the last one in 1996. This was succeeded by another series of books entitled Forficula, which was completed in the year 2000 by the sixth volume. Thus, Dr. Sakai reached his goal 30 years after the start of his life work. The total of these publications exceeds 15,000 pages! Needless to say, this is a most useful source of information on Dermaptera. Vast amounts of effort, knowledge, time and funds invested by Dr. Sakai are all condensed in these publications, which have been widely distributed to major museums and entomological institutes all over the world.

Some of these books also include Dr. Sakai's original studies, i.e., descriptions of new forms, and reconstructions of phylogenetic relationships in some groups of Dermaptera, based on not only morphological but also numerical and chemical taxonomic techniques. He wanted to draw a concrete picture of the systematics of Dermaptera by integrating as much information as possible as indicated by the title of his books.

Dr. Sakai had a sound basis for adopting various methods of approach. He was graduated from Kyoto University in 1948, where population ecology and insect toxicology were the two major fields of research activities. One might be surprised that his doctorate thesis was entitled "Toxicological Studies on Joint Action of Insecticides". The Japanese Society for Applied Entomology and Zoology awarded him a prize for this outstanding contribution in the year 1961. Dr. Sakai thus started his professional career as a promising toxicologist, not as a systematic entomologist. His skill of chemical and statistical methods was undoubtedly developed through this work, and later most profitably adopted to his systematic study of Dermaptera.

Dr. Sakai left Kyoto to take a job as assistant professor in Nagoya University in 1952 and promoted to associate professor in 1953. However, he resigned the university two years later, and founded a pest-control firm by himself and, at the same time, worked for Yashima Chemical Industry as a technical adviser. This was to earn enough not for himself but for supporting the family of his brother who died some years ago. His talent enabled him to run the business successfully, and thus he could achieve his humanitarian purpose. Then he returned to research in 1966, being appointed as professor in Daito Bunka University, and devoted the rest of his life to the study of Dermaptera as described above.

Dr. Sakai took important parts in administration of university and scientific societies. He was elected as the president of Biogeographical Society of Japan in 1994 and served out three terms until 2003. Also, he was in the Council of Japanese Society of Applied Entomology and Zoology for a long time from 1963 onward. The Dean of the Faculty of General Education, the Chairman of the Department of Student Affairs and Councilor were among the posts he served for the university.

Dr Sakai and Mrs Sakai were present at every International Congress of Entomology and every meeting of the Orthopterists' Society that it was possible for them to attend. They easily made friends and had many colleagues as house-guests. They visited many foreign countries meeting colleagues, collecting earwigs and photographing collections. Their pleasant and outgoing personalities were highlights of every one of these meetings. On the fieldtrip following the Orthopterists' Society meeting in Australia, Mrs Sakai sang part of an operatic aria in the Undarra Caves. She was applauded not only by the orthopterists but also by the other visitors to the caves.

Dr. Sakai gave himself a posthumous name while he was alive, though such a name was usually given by a Buddhist priest after death. His posthumous name may be translated as “Pure and Undefiled Man Who Studies Dermaptera and Enjoys Drinking Sake”. No other name would indeed express him better.

Submitted by Sinzo Masaki
12-13 Matsubara Higashi-1, Hirosaki, 036-8141,Japan
David Rentz
19 Butler Dr, Kuranda, Qld. 4881, Australia

It’s about our future — for the love of undergraduates and grasshoppers

Charles R. Bomar, Executive Director

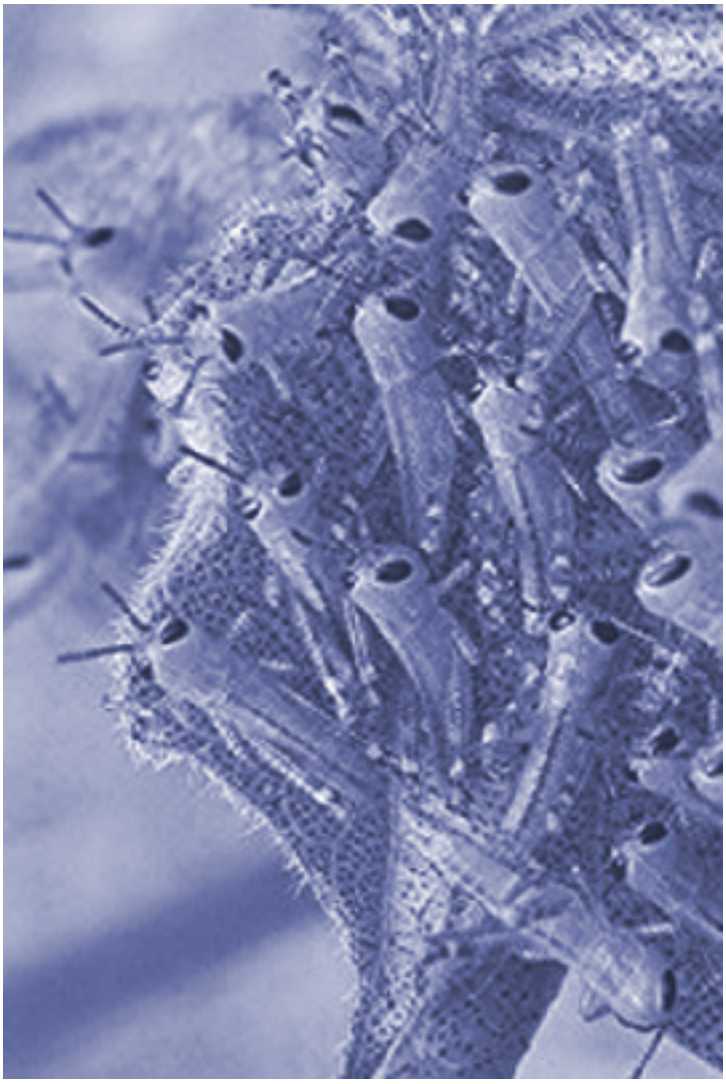
As the new executive Director of this Society, the first six months of this assignment have been very eye-opening. As I scroll through the membership rolls, long histories of orthopteran icons sit before me, including such greats as Nick Jago, George Popov and Jerry Onsager. In the past 6 months, I have had numerous senior members –in their 70’s and 80’s—request for various reasons, that they no longer be included in the Society. It is unfortunate that we will lose these members and the contributions they have made to the field. Unfortunately, we have not had nearly the number of replacements with new members to the society. The few new members that have come are generally graduate students from US institutions.

To keep our society strong we need to expand our membership to maintain vitality as a society. I realize members will come and go, but we need to work on creating members who come and stay, and minimize those who want to go.

So how do we go about cultivating new members to make us a thriving organization? First, we continue to support the Sponsored Membership program; I think it is a great idea to promote this global initiative. Professional scientists and graduate students in developing countries with restricted economies provide great value to the society. If you have a colleague in another part of the world, this would be a great opportunity to expose them to the society.

Second, we mentor undergraduates. From my experience in teaching in the sciences, students who want to major in biology and chemistry are already interested in doing research. The “hands on minds on” approach already appeals to these students, and they often just need an outlet to focus their energy. Speaking for myself, it was undergraduate research that opened my eyes to the possibilities of a career in science. Now as a professor at a small university with no access to graduate students, undergraduate researchers are my only option.

Mentoring undergraduate research is a collaborative cultivation. It is generally slower in progress, but more productive in the number of students exposed to research with orthoptera, and in the impact we have on the lives of future scientists. The Council for Undergraduate Research considers this to be “the pedagogy of the 21st Century,” and I believe rightfully so. Consider using all of the tools in modern science (molecular biology, biotechnology, bioinformatics, nanotechnology), for they can all be applied to Orthoptera just as well as to bacteria and furry mammals. With the waning of classic fields like entomology and zoology, we need to redouble our efforts to recruit, train, and encourage young scientists to explore the wonders of orthopterans. I challenge each of you this year to ask one person to join our society. Only through personalized, individual cultivation of human resources will our field and society remain strong into the 21st century.



Orthopterists' Society 2005 Financial Report (p. 1)

(In US Dollars)

Income

Membership Dues	5,105.00
Publications (subscriptions, publications, page charges)	8,771.80
Non-Designated Contributions	1,852.60
Sponsored Membership Contributions	220.00
Research Grant Contributions (includes 890.00 fr. anonym. donor (to match membership contrib.)	5,890.00
Credit Card Fees	198.00
Checking Account Interest	34.82
Investment Income	2,308.00
Miscellaneous (contribution in honor of N Jago, applied to memorial lecture, and paper in JOR)	250.00
Total	**24,630.22**

Expenditures

Officer's Remuneration	2,260.00
Editorial Assistant	6,875.00
Printing (JOR 13 (1 & 2), Metaleptea, CD Tucuras)	6,311.06
Research Grants*	*900.00
Miscellaneous (returned checks and returned check fees)	69.50
Canmore Conference Expenses (including first Uvarov Award from AAAI)	4,063.76
Credit Card Company fees	442.16
Total	**20,921.48**
Apparent Surplus	***3,708.74**

*Checks for four research grants (3,577) awarded in December, and three checks for officer remuneration (2,300) written in December, were not cashed until January 2006. The total of these costs thus exceeds the "apparent surplus" above.

Orthopterists' Society 2005 Financial Report (p. 2)

Fund and Checking Account Balances

	31 Dec. 2004	31 Dec. 2005
OPERATING FUND		
Vanguard (Total Stock Market Index Fund*) (Restricted to Research Grants Program)(income reinv.)	13,383.00	14,183.82
Vanguard (Total Stock Market Index Fund*) (income reinvested)	29,683.00	31,352.49
Morgan Stanley Dean Witter (Pfd. Stock, Money Mkt. Fund)	5,976.00	6,018.13
Interest Checking Account**	11,719.00*	10,985.29**
Total Operating Fund	**60,761.00**	**62,538.73**
ENDOWMENT and RESTRICTED ACCOUNTS		
Morgan Stanley Dean Witter (Founders' Endowment) (Preferred Stock, Index Fund, Money Market Fund)	18,033.00	16,429.93
Morgan Stanley DW (AAAI Uvarov Award Fund)	7,661.00	8,379.46
Total Endowment and Restricted Accounts	**25,694.00**	**24,809.39**
***OS 2 DATABASE ACCOUNT (Restricted) (All income reinvested)		
***Vanguard Total Stock Market Index Fund	274,628.00	-0-***
***Vanguard Prime Money Market Fund	6,032.00	-0-***
**Total Database Account	280,660.00	-0-**
TOTAL NET WORTH OF THE SOCIETY	**367,115.00**	**87,349.12**
[Total net worth less OSF2 Endowm. transf. to U.Illinois Found.	86,465.00	87.349.00]

*Our investments in stock funds are still below the level at which we can extract profits under the policies adopted at Cairns in 1997 (half of each 10% increase over the last 10% increase so as to keep our investments growing). All dividends and capital gains distributions from these funds are reinvested

** The large amounts in the checking account at the end of 2004 and 2005 were held for large payments made respectively in January 2005 and January 2006 for officer remuneration and grants (see explanation for the "apparent surplus" above).

*** The OS2 Database Endowment was transferred from the Orthopterists' Society to the University of Illinois Foundation. There it was combined with a larger OSF2 Endowment from which the Society receives a large portion of the annual income by the terms of the endowment. This income is disbursed by the OSF2 Committee of the Society. The first income payment to the Society was received in 2006, and the first disbursements were made in 2006)

Reports

Recent Advances in South-African Orthopterology

by Michael J. Samways

A recent paper (Gebeyehu, S. and Samways, M.J. 2006 Conservation refugium value of a large mesa for grasshoppers in South Africa. Biodiversity and Conservation 15: 717-734) describe the role played by a large mesa, so characteristic of the southern African landscape, for determining local grasshopper distribution. The number of grasshopper species and individuals on the summit, slopes and flatlands varied significantly in relation to various environmental variables. The summit, through inaccessibility to livestock grazing, was effectively a conservation refugium for one highly responsive grasshopper species, Orthochtha dasycnemis. There was no significant difference in species richness between years of sampling, although there were significant variations in grasshopper abundance between years, and linked to rainfall. In summary, a mesa can act as a conservation island and refugium for a grasshopper assemblage that would otherwise be altered by heavy livestock grazing at the more accessible elevations. The summit assemblage was very similar to that on the slopes, and is determined by low grazing intensity, and associated soil and vegetation structure.

Richard Kinvig completed his PhD on 'Biotic indicators of grassland condition in KwaZulu-Natal, with management recommendations'. Richard found that the South African grassland biome is disappearing rapidly through advancing development and change in agricultural land use. One of the most threatened grassland types, Midlands Mistbelt, in the KwaZulu-Natal Midlands is an extremely diverse and home to many endemic species across an array of taxa. Three taxa, namely, grasses, grasshoppers and butterflies represent various trophic levels, which are important to the functioning of the grasslands. Ten grasslands were sampled by walking ten fifty metre transects for a twelve-month period. The grasslands were selected as they represented a range of management practices and varying environmental conditions. Using Indicator Species Analysis (ISA) twenty-two species of grasshopper were identified as indicators of environmental variables and management practices. The abundances of the various species indicated the intensity of the management regimes or disturbances. Using the twenty-two grasshopper species abundances and a three hundred point sampling assessment of the grasses creates an assessment tool that can rapidly appraise the management of the grassland, but due to lack of data for other taxa, cannot assess whether management practices for the focal taxa create congruent results for non-focal taxa. Two of the three taxa proved to be good indicators of grassland health, whilst the third, butterflies were ineffectual, due to low abundance and richness.

From the results it was concluded that burning was taking place to frequently, and required a reduction to every four years, as this would improve butterfly richness and abundance, and increase abundance of endemic and flightless grasshopper species. A rotational grazing system needs to be implemented at sites where continual grazing takes place, wildlife or livestock, impacts on the grassland condition and species diversity. Increasing habitat heterogeneity increases species diversity, and allows for later successional species to be included in the grasshopper assemblage. Management of the grasslands in the KwaZulu-Natal Midlands needs to be more responsive and adaptive. In addition, small fragment management needs to be intensified to provide a range of habitats and refugia that will suit all species. This study advocates the use of grasshoppers and grasses as suitable biotic indicators of grasslands in the KwaZulu-Natal Midlands.

Submitted by Michael J. Samways.

Research

Population Genetics of an Outbreaking Insect: The Migratory Locust, *Locusta migratoria*

by Marie-Pierre Chapuis, chapuimp@ensam.inra.fr

Some forest and crop pest insects (locusts and some grasshoppers, for instance) are subject to pronounced and unpredictable fluctuations in population density. Studies of population evolution, focusing on neutral markers and density-dependent phenotypic traits, are recurrently cited as promising candidates to assess (i) the population dynamics and structure of outbreaking populations and (ii) the populational and environmental processes driving outbreak events, of these harmful species. These questions remain, however, largely unstudied in pest insects, in part because of the high prevalence of null alleles at microsatellite markers in these species. By using computer simulations, we measured the population differentiation overestimation and the within-population genetic variation underestimation due to the presence of null alleles. We suggested an unbiased FST estimator, restricted to visible allele states once genotype frequencies had been corrected. This work on null alleles enabled us to better describe the genetic variation at microsatellite markers within and among populations of the migratory locust, Locusta migratoria L., that displays, at irregular intervals, huge increases of population densities with actively aggregating and swarming individuals typical of a high density distinctive form, the gregarious phase.

The worldwide genetic structure among populations of this cosmopolitan species was found to be substantially incongruent with the current taxonomy in eleven subspecies based on morphometric criteria. Geographical and ecological barriers to gene flow as well as historical events are likely to drive patterns of genetic variation among populations at the worldwide scale. On the other hand, the neutral population structure did not show imprints of contrasted propensities to outbreak of L. migratoria populations. At a regional scale, our microsatellite survey provided strong evidence of an homogenizing effect of recent outbreak events at large spatial scales. We also carried out laboratory experiments to provide evolutionary and demographical insight into the phase change in historically outbreaking environments. We found non ambiguous evidence that an historically outbreaking Malagasy population of L. migratoria expressed larger behavioural and morphometrical phase changes than a historically non-outbreaking French population, presumably as a result of a genetically-based adaptive process. Moreover, the historically outbreaking Malagasy population invested more in first reproduction when gregarized, by both earlier reproduction and higher offspring quality, suggesting that gregarization may be a population regulating process that could explain the formation and/or duration of outbreaks in L. migratoria.

In conclusion, our study prevents for the lack of resolution of molecular approaches for inferring the origin of nascent outbreak populations of L. migratoria and their subsequent movements due to low genetic differentiation between populations in historically outbreaking areas. However, it opens possibilities for engineering a genomics based locust control, by silencing the expression of genes implied in the ability to gregarize, and in particular to grow, to aggregate, and to migrate, of outbreaking populations.

This work has been submitted recently as PhD thesis in the University of Montpellier 2. It has been realised under the supervision of Yannis Michalakis, Arnaud Estoup and Michel Lecoq (respectively from IRD, CBGP and CIRAD, Montpellier, France). Several articles have been published or are in press.

All photographs submitted by Michel Lecoq.

Top left: Swarm of *Locusta migratoria capito* in Madagascar during the last invasion (1999).
Mid left: *Locusta migratoria manilensis* gregarious adults and nymph.
Bottom left: Indonesia, fried cassava cookies prepared with young nymphs of Migratory Locust (un délice!).

Top right: Behavioural studies device.
Bottom right: Breeding room for solitary locust.

Please submit articles to Metaleptea via email: mnfeaver@ unity.ncsu.edu