METALEPTEA

THE NEWSLETTER OF THE ORTHOPTERISTS' SOCIETY

President's Message

XI International Congress of Orthopterology

As previously announced, the XI International Congress of Orthopterology will be held in Kunming, China in August 2013 under the chairmanship of Dr. Long Zhang. This will be the second time that our Society meets in Asia and it is a good opportunity for members and future members to meet with our colleagues in that part of the world. It is also a golden opportunity for the Society to reach out many of our young Chinese colleagues. The "XI International Congress of Orthopterology" will run under the theme "Culture and Science in Orthoptera". The full title of the Congress reflects our international research scope and we hope, will provide a clear statement of what participants can expect when they attend the meeting. Besides, according to Dr. Zhang´s expectation "this Congress should help people to understand exchange and share the colorful culture of Orthoptera from different countries and continents of the world".

I am very glad to announce that several interesting themes for symposia have already been proposed by our Regional Representatives and members covering the most recent progresses in Orthoptera functional genomics, conservation, sex, systematics, species concepts, communities in biomonitoring research, communication, grasshopper and locust control and education. We hope these symposia and the meeting as a whole will attract a large audience of participants and serve the dual purpose of advancing scientific knowledge in orthopterology, while at the same time promoting international collaboration and reinforcing friendships. Although we still have a long way to go for the Congress I am glad to let you know that the organization is well underway and that soon the meeting website will be opened.

Website and Newsletter

Communication is a very important aspect of every Society. Although our Newsletter, *Metaleptea*, and our Website are convenient conduits for exchange of information, we need the help of all our members to provide both the website and the Newsletter with information. I also would like to encourage individuals just to contribute to *Metaleptea* with some news from their research or institute. Besides, our website is usually the first mode of contact with the Society and its activities, so it is important to keep it in good shape.

Membership

The membership is a major concern these days for any Society, but it is nice to see that the number of our Society is slowly increasing. Our Regional Representatives have among their duties the responsibility to trace lapsed members and invite them to rejoin. This seems a successful strategy as many did respond. The majority of our membership increase should come from personal action of our members to ask others to join. Therefore, I would like to encourage our members to contact their Regional Representative and ask them to approach potential members.

Successor Treasurer

I am glad to announce that the OS Executive Board has already approved Dr. David Eades, currently the Orthoptera Species File Officer, Illinois Natural History Survey, University of Illinois, as the successor Treasurer of the Society. Currently, Ted Cohn is working closely with David on the transfer of this extremely important office that will take place in a few months.

Sincerely,

Maria Marta Cigliano

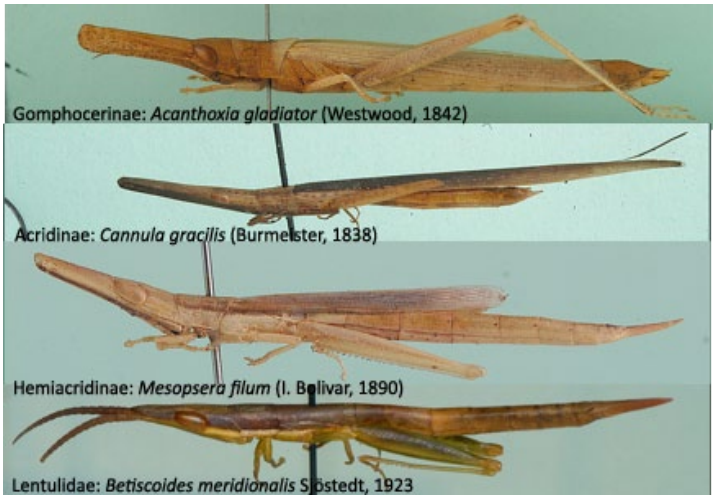
Regional Report - What is happening around the world?

Sub-Saharan Africa

On January 12th, 2011, the first ever South African Orthoptera Workshop was held in Stellenbosch, South Africa. The aim of the workshop was to assemble scientists and stakeholders with expertise and experience relevant to South African Orthoptera in order to review the current state of knowledge, identify and prioritize gaps in knowledge, and to discuss a way forward in the development of Orthoptera research in South Africa, a field which has been neglected for decades. The event, funded through a German-South African bilateral agreement grant to Paul Grant and Michael Samways of Stellenbosch University (South Africa) and Klaus Riede of the Koening Museum (Germany), included 11 delegates from three countries. Three main themes were addressed: 1) Faunal status and red-listing of South African Orthoptera; 2) Ecological research and applications; and 3) New techniques in acoustic monitoring.

In the first session, Piotr Naskrecki and I presented overviews of the South African Tettigoniidae and Acridoidea faunas, respectively. Approximately 225 species of Tettigoniidae have been described from South Africa and 1150 species of Acridoidea from southern Africa. Both groups have important centers of endemism in the southwestern Cape region, which boasts a fascinating fauna in great need of taxonomic and ecological research. A detailed faunal assessment of South Africa's Orthoptera will greatly contribute to the red-listing process, the goal of which is to assign a "threat status" to each orthopteran species, thereby prioritizing the species in order of their conservation significance. Towards this purpose, Axel Hochkirch, founder and chairperson of the IUCN's Grasshopper Specialist Group (GSG), presented a detailed explanation of red-listing procedure and suggested a way to advance the red-listing of South African species, on the basis of the European GSG experience.

Besides taxonomic research, most recent work on South African Orthoptera has focused on ecological phenomena. Dan Otte contributed an informative letter outlining some interesting observations of South African grasshopper ecology, such as the diversity and prevalence of grass-mimicking species across acridid subfamilies. Michael Samways presented a detailed overview of ecological research undertaken recently on grasshopper response to landscape elements, such as topographical features, and management strategies such as grazing intensity and grazer identity. Finally, James Pryke outlined an ongoing, large-scale ecological research project to investigate the efficacy of ecological networks of grassland among exotic timber plantations. In my recently completed Ph.D. dissertation, grasshoppers were shown to be effective bioindicators for the ecological network context, laying the groundwork for more detailed research into grasshopper dynam-



Diversity of South African grass or restiad mimics

ics in ecological networks.

In the final session of the workshop, Paul Grant presented his work and recent findings on acoustic monitoring of Tettigoniidae, along an altitudinal gradient in South Africa, a vertical tropical forest profile in Borneo, and as a monitoring tool for South Africa's ecological networks. Klaus Reide presented an overview of the history and future of acoustic monitoring techniques, with a focus on new and emerging technologies. An acoustic database for Tettigoniidae and other groups such as the Gomphocerinae is lacking for South Africa and would be beneficial as a starting point for the development of acoustic monitoring programs. The workshop concluded with a fascinating exchange of ideas regarding the development of South African Orthoptera Red-Lists, the ecological networks research program, and design and development of acoustic monitoring technologies. The workshop may be followed up next year by a student workshop to provide training to the next generation of South African Orthopterists.

Corinna S. Bazelet
Regional Representative

North and Sahelian Africa

The Superior National Agronomic School of El-Harrach, Algiers (Algeria) (formerly the National Institut of Agronomy, INA), more than a century old (created in 1905), has a very great history in acridology. It was, at the beginning of the past century during the colonial period and even after, the principal research center on the desert locust for North and sub-Saharan Africa. Several famous orthopterists worked there, such as B.N. Zolotarevsky, M. Murat, L. Chopard and R. Pasquier. Several locust-related scientific newsletters were regularly produced there until the beginning of the fifties such as the Newsletter of the National Anti-Locust Service (Bulletin de l'Office national anti-acridien), the Newsletter of the Society of Natural history of North Africa (Bulletin de la Société d'Histoire naturelle de l'Afrique du Nord), the Annals of the INA (Annales de l'Institut national agronomique) and AGRIA. Since the disappearing of Professor Pasquier in 1973, the school continues to make dozens of research works on orthopteroids, in most cases under the supervision of Professor Doumandji Salaheddine and of his wife, Professor Doumandji-Mitiche Bahia, whom have both played a key role in research and training on orthopteroid insects in Algeria. They have regularly organized, during the last 20 years, an annual scientific event called "Locust days" ("Journées acridiennes" in French). These days they serve for the presentation of various research works on Orthopteroids and more specifically on acridid insects, in the field of biology, ecology, physiology and control methods. The papers and talks are presented by teachers, scientists, graduated Ph.D. and M.Sc. students. Thanks to this event, orthopterists dispersed in the whole Algerian territory get an opportunity to exchange ideas and the results of their most recent works. This year, this event was held on 18-21 April. Around 32 Algerian universities and agronomic institutes participated, as well as INRA (National Institut of Agronomic Research), INRF (National Institut for forestry research) and the Institut Pasteur. The National Institute for Plant Protection (INPV), which is in charge of locust control in Algeria, also participate to present some operational results related to locust control. Even if this meeting was, this year and for the first time, enlarged to all aspects of plant protection, most of the time was dedicated to acridology and Orthoptera, with a total of 21 oral presentations and 12 posters. The summaries of these presentations are joined below [at the end of the newsletter]. The representative of the Orthopterists'Society in Northern Africa had the honor to be invited to this important manifestation. He expresses his deep gratitude to the organizers for their warm hospitality and availability. In the future, it would really be interesting for our Society to support such an event.

Participants of the "Journées acridiennes" in Algeria (April, 2011)

Mohamed Abdallahi Ould Babah
Regional Representative

The Orthopterists' Society Grant Reports

Nutritional landscapes: redefining plant quality and its effects on grasshopper community structure

Understanding the assembly rules that govern a community of organisms is of primary importance in community ecology. The species diversity observed in generalist herbivores is however, especially problematic. By Gause's postulate two or more generalist herbivores with broadly overlapping diets could not coexist. Grasshoppers are a prime system in which to investigate this coexistence as many grassland communities will have 20 to 40 species of Acrididae, many of which have overlapping diets. In laboratory experiments (Behmer and Joern 2008) demonstrated that seven coexisting generalist *Melanoplus* species with broadly overlapping diets had species-specific nutrient requirements with respect to ratios of protein and digestible carbohydrates. The authors hypothesized that these nutrient targets could represent nutrient niches. Therefore, differences in nutrient requirements may provide another level for niche partitioning by organisms and could be a mechanism that allows generalist herbivores with overlapping diet to coexist. Although many nutrition studies have been conducted on grasshoppers with artificial diets under laboratory conditions (reviewed by Behmer 2009), little is known of how digestive protein and nonstructural carbohydrate ratios of plants in the field affect grasshopper communities. Therefore, I have been working to identify correlations between grasshopper community structure in natural sites and the available protein:carbohydrate ratios in the most abundant plants at these sites.

Sampling was conducted on the Balcones Canyonlands National Wildlife Refuge (BCNWR) northwest of Austin, Texas, which covers parts of Burnet, Williamson and Travis Counties. The area is ideal because it supports a diverse grasshopper community: 53 species were recorded during this sampling alone.

From the months of June to September in 2009, 16 sites (four per month) were sampled for plant nutrient content and grasshopper community composition. In June to September of 2010 14 sites were assaying across the BCNWR. Sites were approximately 60 m2 and located in open restored mixed-grass prairie tracts.

To determine plant macronutrient content I clipped leaves from three individuals of three abundant forbs and three abundant grass species found within each site. These samples were flash frozen in the field and subsequently lypholized. Green plant material was removed and ground to a fine powder using a Wiley cutting mill. Total nonstructural carbohydrates and soluble protein were analyzed using the methodology of Clissold et al. (2006). Protein was extracted from 20 mg samples and assayed using the Bio-Rad micro assay based on the Bradford assay (Bradford 1976). Total non-structural carbohydrates were extracted from 20 mg samples and determined colourimetrically using the phenol–sulphuric acid assay (Dubois et al. 1956).

Grasshopper community composition was sampled at each site by sweep netting transects. Four parallel sweep transects of 80 sweeps (covering 60 m) were made per site and grasshoppers collected were frozen and sorted in the laboratory. Overall grasshopper density at each site was sampled using the standardized ring technique (Onsager and Henry 1977; Joern 2005) whereby all the grasshoppers within the $0.1m^2$ area of a ring left in the field are counted. Twenty rings were placed along each transect, marked with flags and left undisturbed for >2h before counting. Grasshopper densities were counted prior to sweeping. Differences in protein and carbohydrate range (max-min values) were tested using a matched pair test in JMP. Correlations between plant nutrient content and grasshopper species richness and density were assessed using linear regression in JMP.

The Balcones Canyonlands ecoregion supports a diverse community of grasshoppers including this Texas endemic, Phaedrotettix concinnus (Scudder, 1897).

To date 10 samples have been processed including 8 from 2009 and 2 from 2010. Herein, I am reporting on the results from June and July of 2009 consisting of eight sites. Representations of the nutri-

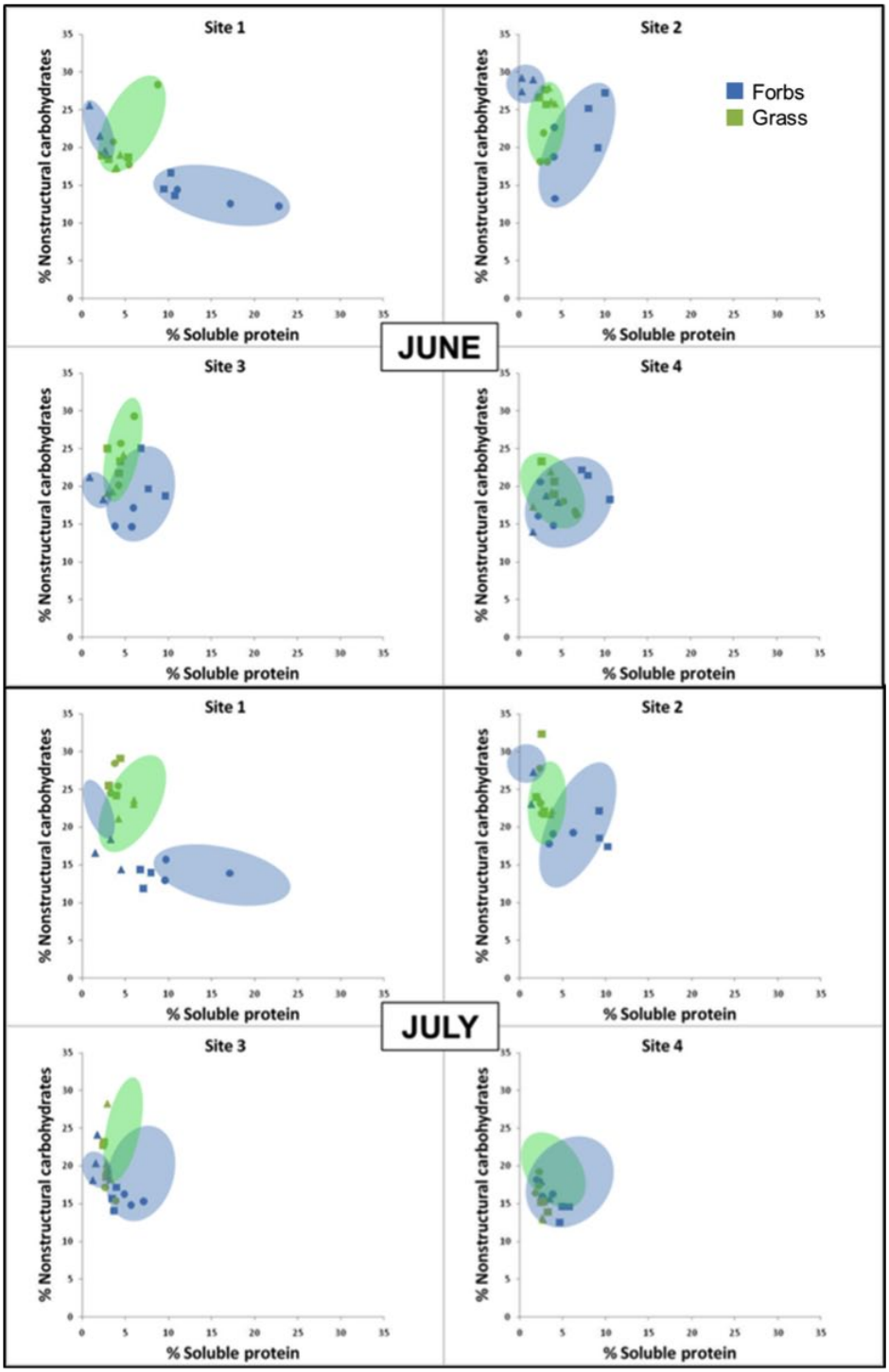


Figure 1. *Nutrient landscapes of four sites at the Balcones Canyonlands NWR sampled in June and July, 2009. Content of individual forbs (blue) or grasses (green) are illustrated by points with three different shapes designating the three most abundant species at any given site. Approximate range of macronutrient content of forbs and grasses for June has been shaded in both panels to illustrate the changes between months.*

ent landscape from June and July of 2009 are presented in Fig 1. Grasses and forbs were generally equivalent in terms of total nonstructural carbohydrates, however digestible protein was lower in grasses. Interestingly there is a range of variation across both temporal and spatial scales. 2009 was actually a severe drought year for central Texas and by June and July many plants were wilting. The associated change in plant macronutrient content can be seen in the contracting breadth of the nutrient landscapes at the four sites between June and July. The range of protein and carbohydrates in July was significantly smaller than June (protein $p = 0.0398$, carbohydrate $p = 0.0492$).

When overall site plant quality is compared to grasshopper density several significant correlations can be made. Both the mean and range of % protein content were positively correlated with grasshopper density (protein mean: $R^2 = 0.06373$, $p = 0.0175$, protein range: $R^2 = 0.6241$, $p = 0.0197$). No relationship was found with respect to the mean or range of % carbohydrate content and grasshopper density (carbohydrate mean: $R^2 = 0.0225$, $p = 0.07229$, carbohydrate range: $R^2 = 0.3252$, $p = 0.1399$). However, there was a positive trend and the lack of significant correlation may be due to the small sample size at this point.

When plant quality is compared to grasshopper species richness no correlations existed with any of the plant nutrient landscape parameters used. Again, this may be due to the small sample size.

These results are very preliminary as the processing of these nutrient landscape samples is still ongoing, but it seems that grasshopper populations are closely tied to macronutrient content, especially protein, of the plant community as a whole. This preliminary data fits in well with ideas about nitrogen as a limiting nutrient, however carbohydrates may also play a role and could be limiting for at least some of the herbivore community. When processing of the nutrient content is complete I will also conduct more in depth analyses of the community using Nonmetric multidimensional scaling (NMDS) and environmental vector fitting. This ordination technique can elucidate the effects of macronutrient content on the community structure and allow me to test if certain taxa are more responsive to changes in plant quality than others.

This method of determining plant quality in terms of both digestible

protein and total nonstructural carbohydrates across a plant community is a new perspective on a lingering question in ecology. Most studies on insect herbivore coexistence have utilized a single host plant and two insects. This study is focusing on an entire community of herbivores that can utilize many of the species in the local plant community. Further studies using this grassland and grasshopper system and plant quality assessments could significantly advance our knowledge of the assembly of generalist herbivore communities.

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Paul Alvarado Lenhart
Texas A&M University

Locust control in Central Asia: Current trends

Five Central Asian countries – Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan – share common acridid pest problems related to three locust species: the Moroccan locust *Dociostaurus maroccanus* (Thunberg, 1815), the Italian locust *Calliptamus italicus* (Linnaeus, 1758) and the Asian Migratory locust *Locusta migratoria migratoria* (Linnaeus, 1758). These locusts threaten agricultural production in the region, which is the main occupation of more than half of the 62 million people living in Central Asia, and an important (often the only) source of people's welfare. For example, locusts destroyed 220,000 ha of grain crops in Kazakhstan in 1999 at an estimated loss of US $15 million. Despite the fact that each of the three locust species produces a single generation per year, the scope of locust management is enormous. Areas infested by the locusts can exceed tens of millions of hectares (Table 2), requiring chemical control treatments on about 9 million hectares per year, as occurred for example in 2000. In recent years, Central Asian countries had to control locusts over an area of about 3 million hectares annually, with the largest areas treated in Kazakhstan and Uzbekistan (Table 3).

Locust management (survey and control) is centrally funded and implemented through national plant protection services. Locust surveys are conducted at critical periods of their developmental cycle (egg-laying, hatching and hopper development). Locust scouts have to survey huge areas (Table 1) and the shortage of means of transport seriously impedes the efficacy of the survey operation.

One of the most serious problems is the fact that historic locust breeding areas are situated across the political borders of the neighboring countries. Trans-border migrations of locust hopper bands and especially adult swarms often occur after all national resources for control have already been exhausted. As a result, political tensions and mutual accusations of insufficient control efforts are very common. Clearly, the locust problem in Central Asia cannot be solved in any single country and a regional cooperative

Figure 1. *Micron Ulvamast V3 sprayer mounted on UAZ truck*

Table 1. Areas surveyed (ha) against locusts in Central Asia, 2006-2010

Country	2006	2007	2008	2009	2010
Kazakhstan	6,413,300	7,328,200	9,678,500	10,321,400	10,238,880
Kyrgyzstan	156,306	154,823	217,553	194,313	124,537
Tajikistan	88,000	146,200	211,500	233,479	275,000
Turkmenistan	76,000	87,100	287,000	300,000	350,000
Uzbekistan	807,222	838,645	1,008,298	1,000,000	2,450,000
Total	***7,540,828***	***8,554,968***	***11,402,851***	***12,049,192***	***13,438,417***

Table 2. Areas infested (ha) against locusts in Central Asia, 2006-2010

Country	2006	2007	2008	2009	2010
Kazakhstan	1,789,200	2,095,700	2,904,900	2,983,400	3,187,900
Kyrgyzstan	90,703	95,769	163,185	149,519	98,722
Tajikistan	88,000	130,000	130,000	104,334	110,000
Turkmenistan	15,000	95,000	250,000	290,000	320,000
Uzbekistan	468,190	486,415	535,789	800,000	860,000
Total	***2,451,093***	***2,902,884***	***3,983,874***	***4,327,253***	***4,576,622***

Table 3. Areas treated (ha) against locusts in Central Asia, 2006-2010

Country	2006	2007	2008	2009	2010
Kazakhstan	1,116,600	1,346,200	1,718,800	1,945,800	1,870,770
Kyrgyzstan	74,500	85,600	157,000	126,912	90,088
Tajikistan	26,000	88,000	105,000	93,268	89,720
Turkmenistan	54,600	86,400	280,000	216,600	288,660
Uzbekistan	455,700	473,300	560,000	621,000	625,400
Total	***1,727,400***	***2,079,500***	***2,820,800***	***3,003,580***	***2,964,638***

approach is essential. The urgent need for regional cooperation was recognized by the Food and Agriculture Organization of the United Nations (FAO UN) which launched a two-year regional project entitled, "Improving management of migratory and other locusts in the Caucasus and Central Asia" in 2009. In addition to the above-mentioned five Central Asian countries, the project also covered Afghanistan, three Caucasus countries (Armenia, Azerbaijan and Georgia), and the Russian Federation (as an observer). This initiative significantly enhanced the cooperation between the countries in all aspects of locust management and especially in the border areas. The first step in this direction was increased information exchange. In 2010, regional locust bulletins were produced monthly based on the information provided by each country. The bulletins, together with a wealth of other useful information were placed on a bilingual (English and Russian) website "Locust Watch in Caucasus and Central Asia" launched by FAO in early 2010 (http://www.fao.org/ag/locusts-CCA/en/index.html). For example, the site contains an exhaustive list of Russian-language bibliography on orthopteroid insects which includes almost 5,000 entries from 1825 till 2010.

Numbers in Tables 1–3 illustrate the growth of locust populations in most Central Asian countries over the last few years. Since 2006, total infested and treated areas increased by 47% and 42% respectively. How are these enormous areas (about 3 million hectares in 2008-2010) treated? Contrary to Africa and Asia, where anti-locust treatments are almost exclusively done with the so-called Ultra-Low Volume spraying technology (ULV), it is making only its first steps in Central Asia. As follows from its name, the ULV uses very low (usually 1 l/ha) volumes of oil-based insecticide formulations which do not need any dilution by water or other solvents. The formulation is sprayed by special atomizers (rotary discs or cages) which produce droplets in the range between 50 and 150 microns. Such droplet spectrum is considered the most efficient for locust targets. As dilution in additional water is unnecessary, ULV technology is particularly appropriate for arid conditions and thus became a standard in controlling the Desert locust, *Schistocerca gregaria* (Forskål, 1775). In Central Asia however, most anti-locust treatments are carried out using water-based insecticide formulations applied at a "full" volume of 200 to 300 liters per hectare. The main reason for this is the lack of appropriate ULV equipment and ULV pesticide formulations registered by national pesticide authorities. The current situation is illustrated by Table 4. According to this table, Uzbekistan presents a sharp contrast in the use of ULV compared to other Central Asian countries. It all started in the early 2000s when, through a locust project funded by the German Agency for Economic Cooperation (GTZ), Uzbekistan began to introduce the ULV technology in locust control. First vehicle-based atomizers such as the Micron Ulvamast V3 and Micron AU8115 were purchased. The sprayers were mounted on Toyota Hilux or UAZ light trucks (Fig. 1). They quickly proved their efficiency: while the traditionally used, tractor-based sprayer can treat only up to 40 ha per day, the daily work rate of a ULV machine is between 200 and 400 ha. As of 2011, there are more than

Table 4. ULV insecticide formulations for locust control in Central Asia

Country	Registered ULV formulations	Active Ingredients	Note
Kazakhstan	6 ULV formulations out of 74 total insecticides registered for locust control	Chlorpyrifos, fenitrothion, malathion, diflubenzuron, teflubenzuron, fipronil	Used on limited areas: 50,000 ha in 2010 (2% of the total treated area)
Kyrgyzstan	3 ULV formulations out of 25 total insecticides registered for locust control	Chlorpyrifos, malathion, teflubenzuron	Applied by ultra-light hang-gliders on limited areas since 2005
Tajikistan	No ULV formulations out of 5 registered for locust control insecticides	-	ULV is not used
Turkmenistan	No ULV formulations out of 3 registered for locust control insecticides	-	ULV is not used
Uzbekistan	2 ULV formulations out of 30 total insecticides registered for locust control	Diflubenzuron, teflubenzuron	ULV use increases: in 2010, almost 50% of all anti-locust treatments were by ULV

30 vehicle-mounted ULV sprayers in Uzbekistan and use of this technology continues to increase. Indeed, if in 2006 the ULV technology was used only on 7% of treated areas in Uzbekistan, in 2008 its proportion increased to 25%. In 2010 the ULV treatments were applied to 309,000 ha (almost 50% of all treated area).

As mentioned before, one of the main obstacles in ULV progress in Central Asia is the lack of registered oil-based insecticide formulations suitable for ULV use. It is interesting to note that in 2010 such formulations (Nomolt, or teflubenzuron ULV) were applied in Uzbekistan on only 43,100 ha. At the same time ULV sprayers treated 309,000 ha. The question is, which insecticides were used then by ULV sprayers on the difference of 266,000 ha? Although the conventional water-based insecticide formulations are suboptimal for use in ULV sprayers, they can be mixed with small amounts of diesel and thereby made more appropriate for ULV. However, this "invention" does not solve the problem of insufficient availability of ULV insecticides in Central Asia.

In November 2010 in Dushanbe (Tajikistan), the FAO conducted a Technical Seminar for 9 countries devoted to the promotion of the most efficient and less environmentally hazardous strategies and techniques of locust control. The seminar illustrated advantages of ULV technology compared to conventional, full-volume water-based insecticides. Another important area of progress in locust control discussed at the seminar is the introduction of the biological control methods. Although current locust control in Central Asia is essentially chemical, all countries realize the hazards of large-scale applications of broad-spectrum insecticides and are seeking new ways to introduce biopesticides. In this area, Uzbekistan is the first Central Asian country to try biopesticides against locusts. There are several local strains of fungal pathogens (e.g., *Metarhizium anisopliae* and *Beauveria bassiana*) which are under development by Uzbek researchers as potential candidates for locust control agents. However, they lack target specificity and are not produced yet at commercial scales. Therefore, Uzbekistan collaborates with the Becker Underwood company which provided its product "Green Guard®" based on the Australian isolate of the *Metarhizium acridum* fungus for testing. Green Guard has a very narrow spectrum of targets confined almost exclusively to acridids. It is a tropical pathogen which performs well at high temperatures and was not found to persist in temperate areas beyond the year of its application. Field tests of Green Guard were conducted in Uzbekistan in 2010 and 2011; further tests are underway later this year. Preliminary results showed high (over 90%) efficacy of the product under operational conditions. The formulation used (Green Guard SC Premium) is versatile and can be used both by ULV and conventional sprayers, which makes it particularly attractive. This biological control agent may become instrumental in managing locust populations in ecologically sensitive areas such as reed wetlands. Such wetlands are situated in the deltas of main Central Asian rivers and along lakes and host breeding areas of the Asian Migratory locust.

Alexandre V. Latchininsky
University of Wyoming, Laramie, WY, USA

Furkat A. Gapparov
Uzbek Institute for Plant Protection, Tashkent, Uzbekistan

Allabergen A. Nurzhanov
Institute of Zoology, Tashkent, Uzbekistan

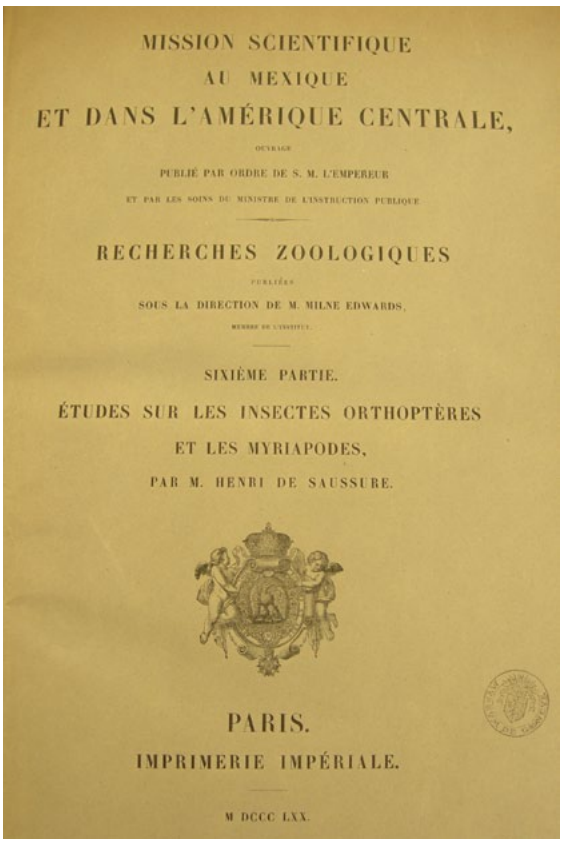
On the title and publication dates of Henri de Saussure's contribution to the *Mission Scientifique au Mexique et dans l'Amérique Centrale*

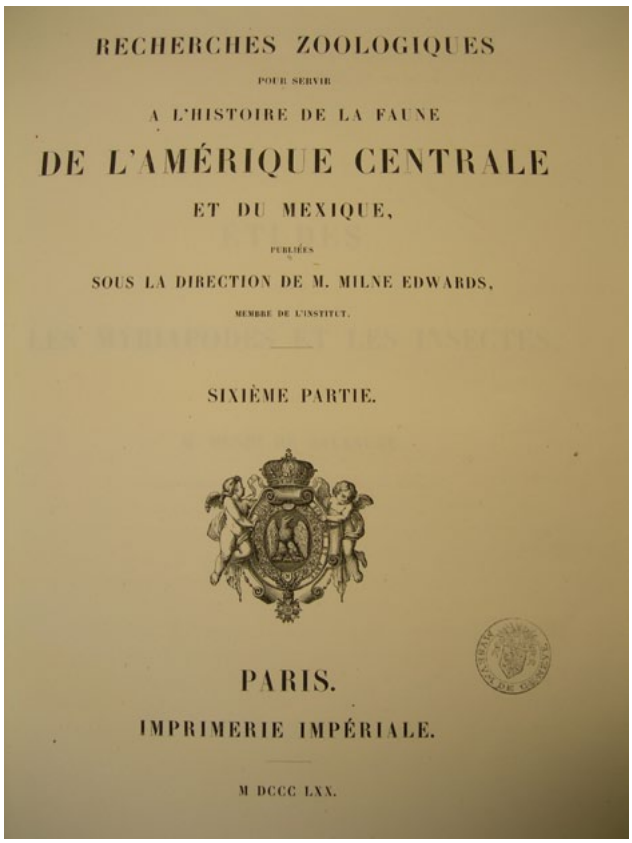
One of the happier consequences of the French military expedition to Mexico between 1862 and 1866 was the publication in Paris of the series *Mission Scientifique au Mexique et dans l'Amérique Centrale*, which appeared irregularly in fascicles published between 1870 and 1909. Instigated by the Emperor Napoleon III, this was probably an imitation of the investigation of Egypt by the savants who accompanied the army of the Napoleon I between 1798 and 1801, published as the *Description de l'Egypte* between 1809 and 1821. Henri de Saussure was an obvious choice to contribute, because he had made an expedition to Mexico and the Antilles between 1854 and 1856 and had published a number of papers on the Orthoptera and Myriapoda of the region (e.g. Saussure 1859, 1861, 1864).

The publication of the *Mission Scientifique* series was disrupted by the Franco-Prussian War and the fall of the Second Empire in 1870, and some confusion has arisen about the date of publication of some fascicles, including Saussure's. In the Orthopera literature (and in OSF) the work is usually cited as "Saussure (1874) Etudes sur les Insectes Orthoptères, Famille des Gryllides. *Mission scientifique au Méxique et dans l'Amérique centrale* 6: 296-515" but Ingrisch & Willemse (2004) cite the work as "Saussure (1870-72 (1874?)) Recherches zoologiques pour servir à l'histoire de la faune de l'Amérique Centrale et du Mexique, publ. sous la direction de M. Milne Edwards. Sixième partie: Etudes sur les Myriapodes et les Insectes Orthoptères. 1-531, pls 1-8; Paris (Imprimerie Impériale) [Myriapodes 1-121, pls 1-6]." In Bedot's 1906 obituary of Saussure the list of references gives the date as 1870. The same date is given in the obituaries by Jung (1906) and Adelunga (1906) but these simply copy the list created by Bedot and are therefore not additional evidence for an 1870 publication date.

The copy in the library of the Muséum d'histoire naturelle in Geneva bears the date 1870 and helps clear up some of the confusion about the correct title and the dates of publication. The paper cover of the first fascicle reads:

"Mission scientifique au Mexique et dans l'Amérique centrale, ouvrage publié par ordre de S. M. l'Empereur, et par les soins du Ministre de l'Instruction Publique. Recherches Zoologiques, publiée sous la direction de M. Milne Edwards, Membre de l'Institut. Sixième partie. Etudes sur les Insectes Orthoptères et les Myriapodes, par M. Henri de Sau-


MISSION SCIENTIFIQUE
AU MEXIQUE
ET DANS L'AMÉRIQUE CENTRALE,
OUVRAGE
PUBLIÉ PAR ORDRE DE S. M. L'EMPEREUR
ET PAR LES SOINS DU MINISTRE DE L'INSTRUCTION PUBLIQUE
RECHERCHES ZOOLOGIQUES
PUBLIÉES
SOUS LA DIRECTION DE M. MILNE EDWARDS,
MEMBRE DE L'INSTITUT.
SIXIÈME PARTIE.
ÉTUDES SUR LES INSECTES ORTHOPTÈRES
ET LES MYRIAPODES,
PAR M. HENRI DE SAUSSURE.
PARIS.
IMPRIMERIE IMPÉRIALE.
M DCCC LXX.


RECHERCHES ZOOLOGIQUES
POUR SERVIR
A L'HISTOIRE DE LA FAUNE
DE L'AMÉRIQUE CENTRALE
ET DU MEXIQUE,
PUBLIÉES
SOUS LA DIRECTION DE M. MILNE EDWARDS,
MEMBRE DE L'INSTITUT.
SIXIÈME PARTIE.
PARIS.
IMPRIMERIE IMPÉRIALE.
M DCCC LXX.

ssure. Paris, Imprimerie Impériale M DCCC LXX."

Another paper cover bound in reads:

"Recherches zoologiques pour servir a l'histoire de la faune de l'Amérique centrale et du Mexique, publiées sous la direction de M. Milne Edwards, Membre de l'institut. Sixième partie. Paris, Imprimerie Impériale. M DCCC LXX."

The latter is the source of Ingrisch and Willemse's citation.

This volume contains the chapters treating the Blattidae, Phasmidae, Mantidae and Gryllidae, and the pagination is continuous. The Myriapoda were treated in a separate volume with an independent pagination and plate numbers. The title page of the latter volume reads

"Mission scientifique au Mexique et dans l'Amérique Centrale, ouvrage publié par ordre du Ministre de l'Instruction Publique. Recherches Zoologiques, publiées sous la direction de M. Milne Edwards, Membre de l'Institut. Sixième partie, seconde section. Etudes sur les Myriapodes, par MM. Henri de Saussure et A. Humbert. Paris, Imprimerie Nationale. M DCCC LXXII."

The Orthoptera volume is therefore, the first section of the 6th part. It is evident that the cover of the Orthoptera volume was at least typeset, if not printed, before the fall of the Second Empire, and probably before the siege of Paris, which started in September of 1870, while the cover of the Myriapoda volume was printed after the fall of the Empire.

At the rear of the Orthoptera volume one of the paper covers bound in reads "VIe partie, 1re Section. 3e Livraison. Texte : Feuilles 38-65 – Planches VII et VIII." making it clear that the fascicle was actually published in three "livraisons" or instalments. The third instalment is the part containing the descriptions of the Gryllids, although it also includes a few pages of the previous chapter. There is also a note that Humbert was erroneously mentioned as an author of the second instalment. This was clearly the result of confusion between the second, Myriapoda section of the fascicle which appeared in 1872, and the second instalment of the first section, which presumably appeared at the same time. Only the first instalment could have been printed by the Imprimerie Impériale.

McLachlan (1874) treats the sections on the Blattidae, Phasmidae and Mantidae in the Zoological Record for 1872 (but gives the date for the first as 1870), and the chapter on Gryllidae appears in the Zoological Record for 1874 (McLachlan 1876). A book review published in Nature on 5 February 1874 (anon. 1874) discusses the *Mission Scientifique* and states that the first parts of three fascicles, including Saussure's, appeared in 1870. It is probable that Bedot, in giving the 1870 date, was misled by the fact that the sections had been bound into one volume without any indication that they were not published in this form.

The publication dates for the various sections are therefore: Section one (Orthoptera): Blattidae 1870; Phasmidae and Mantidae 1872; Gryllidae 1874:
Section two: Myriapoda 1872

For the Gryllidae the reference should probably be cited as Saussure (1874) Family Gryllidae pp. 296-515 in Saussure (1870-1874) *Mission Scientifique au Mexique et dans l'Amérique Centrale. Recherches Zoologiques* 6 (section 1): 1-533, 8 plates.

In this confusion over dates there are more echoes of the *Description de l'Egypte*. Savigny's plates of Orthoptera were engraved between 1809 and 1812, apparently for imminent publication, but were not published until 1822 (or possibly even later), and then without the text (Ingrisch & Willemse, 2004).

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Saussure, H. de 1861. Orthoptera nova americana (Diagnoses praeliminares). II. Revue et Magasin de Zoologie Pure et Appliquée. 2(13):126-130, 156-164, 313-324, 397-402

Saussure, H. de 1864. Orthoptères de l' Amérique moyenne. Imprimerie Ramboz et Schuchardt, Genève, 279 pp.

John Hollier
Muséum d'histoire naturelle, C.P. 6343, CH1211
Genève 6, Switzerland

Anita Hollier
Archive, CERN, CH1211 Genève 23, Switzerland

Insect taxonomy: some ways of doing it

I published my first work on Acridoidea in 1956 and what might be my last one is now in preparation. Since 1961 I have studied the types of Neotropical acridoids in the museums that harbor them. This has given me the opportunity of meeting many of the scientists working in my field (and in others), and learning from them many things which are not found in print. It also causes me to reflect on the different ways in which taxonomists work. Maybe some of my opinions on the subject might be useful to others who are now beginning to work in taxonomy.

A message from a friend let me know that my genus *Rowellia* had been found to be preoccupied in Mollusca and that the new name *Costarica* has been proposed as a substitute. Going to the paper where this change was made I found that *Albrechtia* Carbonell & Descamps has had the same fate, and is now *Peruana*. This is in accordance to the principle of homonymy and as such, no objections can be made to that action. In my published papers I have taken the same course when I have found it to be necessary. I have even had to do it sometimes with generic names of my own authorship. But this makes me think of the different ways in which taxonomists practice their activity.

The International Code of Zoological Nomenclature (ICZN) has other provisions that apply to the above case. I refer to the Code of Ethics, Appendix A-3, where it reads:

"A zoologist should not publish a new replacement name for a junior homonym during the lifetime of its author without informing the latter of the homonymy and allowing him a reasonable interval, of at least a year, in which to propose a replacement name"

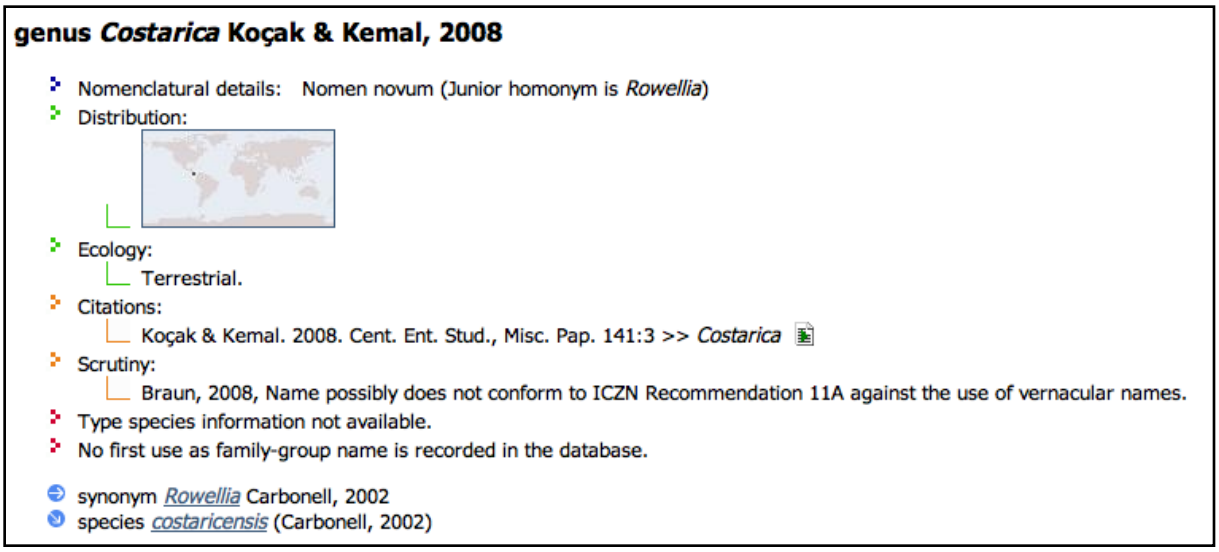
I think that the mentioned Code of ethics refers only to the most important items in that field. But I am sure that the personal code of ethics of most authors is much larger and includes many other items which could not be printed in the ICZN. Also this Code states, referring to its Appendices, that:

"They do not have the force of rules, which are mandatory and are confined to articles 1 to 87 of the Code proper, but rather have the same status as recommendations in the Code"

So, in the hypothetical case of someone urgently desiring to have his/her name attached to that of any zoological group, these recommendations can simply be ignored.

Going back to the now discarded *Rowellia*, as stated in its description (Carbonell 2002:30) this genus is **"named after C.H.F. Rowell, the well known research worker in many aspects of orthopteran systematics, physiology and ecology, who has substantially contributed to the knowledge of the Costa Rican acridid fauna."** Similar reasons could obviously apply to *Albrechtia*. Had I been informed of the homonymy as recommended by the Code, I would certainly have looked for a new generic name that included the name of the person to whom the original name was dedicated. Even the less euphonic *Rowellacris* could have been proposed. The appendix A-3 of the ICZN states, as mentioned above: **"during the lifetime of its author".** Maybe the authors of the new name do not know that I am still alive. But considering that everybody working in science can use e-mail, it would be very easy to find it out. The case of Mark Twain comes to my mind; when he read in a journal a reference to his death, he sent at once a telegram to the journal: **"News about my death greatly exaggerated".**

But I cannot expect other authors to share my own private "code of ethics." Once I found, in the course of my work, that the generic name



Rowellia Carbonell 2002 was synonymized under Costarica Koçak & Kemal 2008

Nuciera Rehn 1916 was a junior homonym of *Nuciera* Bolivar 1906. I had known personally Mr. Rehn during my stays in Philadelphia and had used many of his very valuable papers in my own research and studies. This was in 1969, and Mr. Rehn had died in 1965. My code of ethics finally found an acceptable way, by proposing the name *Rehnuciera* (Carbonell 1969:600) to replace *Nuciera*. Mr. Rehn's name had been used in so many different combinations for generic names, that it was difficult for me to find a new one.

I have a large card file with data related to the acridoid species. I know that now there are more practical ways to store and recover data by using a computer. But these possibilities did not exist when I began gathering the data many years ago. And now (at 93) I feel that I am too old to change my accustomed ways of work. In my files I can see, for instance, that Mr. Rehn (1881-1965) published, alone or with other co-authors, some 45 genera of Neotropical acridoids. Not many, some would think. But when using his papers, it can be seen that they are very carefully made, and his descriptions are lengthy and very detailed. They have been critiziced for being too detailed. Anyway, it is obvious that they imply a good deal of work with the specimens he had in the collection. Also Mr. Rehn carried out much field work, not only in the USA but in Central and South America too, at a time when that kind of work was very difficult, and sometimes dangerous.

Of the direct followers of Linnaeus, the one who described more Neotropical genera, was Carl Stål (1833-1875). He was the author of 35 genera of Neotropical acridoids. He was an excellent taxonomist, one of the best of his time in my opinion. His main interest was in the Hemiptera, about which he published most of his papers. Of poor health, he died at 45, but in his short life he published very many papers of excellent quality. He did not collect his Neotropical insects himself. He left his native Sweden only to travel to Germany and Holland. At that time of sailing ships, to travel to the New World was quite an adventure. And to reach collecting places there was often difficult or impossible. So he obtained his Neotropical specimens from other naturalists, like J.G.M. Kinberg, a physician and zoologist who travelled around the world in the famous frigate *Eugenie*.

The most prolific of all taxonomists of the Neotropical acridoids was my very good friend Marius Descamps. Alone or with co-authors he described 147 genera. I did field work with him in different places, among them in the Peruvian Amazon, and have seen him collecting the insects among the branches, covered with epiphytes, of old trees that we had had cut down by a worker, oblivious of the stings of ants and wasps that swarmed in them. I remember that at night I had to take anti-allergics to be able to sleep, so full of itching spots was my body. I saw him also working in the Paris Museum, where he did not even go downstairs to have his lunch with other members of the staff, but stayed at his work until the time came to go home. He was also able to work with the very large collection of arboreal acridoids in the collection of the Museum of Rio de Janeiro that were due to the activity of Mr. C.A. Campos-Seabra, who had paid collectors all over Brasil to get cerambycids and acridoids. This gave him access to very many undescribed taxa. When a stroke disabled him when he was still relatively young, it seemed to me that in some inexplicable way he had known his future, hence his intense concentration in his work while he was able to do it.

One of the very best taxonomists of acridoids was, in my opinion, Morgan Hebard. I never met him, he was already dead when I visited the Academy of Natural Sciences of Philadephia for the first time. His descriptions are not lengthy like Rehn's, but they are very accurate and always refer to the really important characters. His name is attached only to some 20 Neotropical acridoid genera. But from the quality of his descriptions one can see that he must have spent a considerable time studying his specimens. I know too, from my long talks with Mr. Rehn, that he himself had done much field work in the USA at a time when doing it was considerably more difficult than nowadays. Mr. Rehn knew that very well, because he had been with him on these collecting trips.

As to other ways of working in taxonomy, I have of course seen other and very different methods of doing it than those referred to above. I have now examined in my computer the work of my colleagues in Ankara A.Ö. Koçak and M. Kemal "Replacement names among the genus and and family group taxa in Orthoptera". It has shown me another way of working in taxonomy, legitimate of course, but that I have never thought of before. It could be practised without doing any field work, or even seeing specimens of the species referred to in it. It can be done by just examining the Nomenclator Zoologicus. The said authors will have the authorship of 19 generic names whose species they may have not collected, or even seen. I do not know that this is really the case for all the names in their work, but I know that it is definitely so for many of them. I must thank them for showing me a way of working in taxonomy I didn't know. However, for the short time I may still be able to work, I am sure I will stick to my own way. I have proposed substitute names for junior homonyms only when I have found them in the course of my own work.

When I think that I could do that just by searching for homonyms in the Nomenclator Zoologicus, I am sure that in doing that I might feel that I was unduly taking these generic names from their authors; and I must say too, that the paper by Koçak and Kemal which I refer to here as 'taxonomy', is not considered to belong in this field by others. In the message of my friend that I mentioned above, who has published many good papers in insect taxonomy, he refers to its authors as being simply officious.

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Koçak, A.Ö & M. Kemal, 2011. Replacement names among the genus and family group taxa in Orthoptera. Miscellaneous Papers 141, Centre for Entomological Studies Ankara.

C.S. Carbonell
University of Uruguay

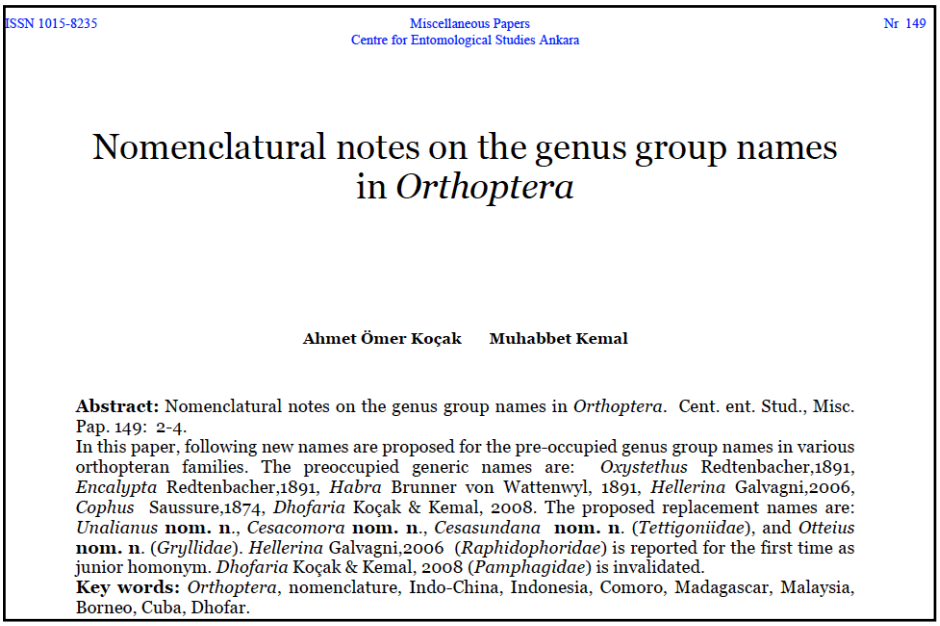
Shady substitute names: Supplementary comments concerning Carlos Carbonell's article on "insect taxonomy"

I am very thankful to Carlos Carbonell, who allowed me to read his article before submission. A conciliatory and wise comment, I think, that leaves little to add. Nevertheless, I would like to take the opportunity to share my displeasure with entering some of the substitute names to which he refers into OSF, and to try to provide a broader picture of the situation, concerning names of orthopterans proposed by the couple of lepidopterists from Turkey.

"Entomofauna of the world" of the Centre for Entomological Studies Ankara, CESA (website: www.cesa-tr.org), actually seems to be an ambitious project. The founders and owners of CESA, Ahmet Ömer Koçak and Muhabbet Kemal, who are also editors of its journals *Miscellaneous Papers* and *Priamus*, seem to be systematically verifying the genus names of arthropods in Nomenclator Zoologicus (which is available online and can easily be searched) with special attention to homonyms, for which they publish replacement names in their above-mentioned journals. According to the CESA website until 8.5.2009 116 new genus-group names for Lepidoptera, and 143 new generic names for other groups, including Orthoptera (this particular page was apparently forgotten during updates – by now there must be many more).

A search in OSF with Koçak as author finds 28 substitute names for genera and two for subgenera. Two of them were proposed by Koçak in 1981, and all the rest by Koçak & Kemal 2008 – 2010. 20 of those names are currently valid and will be mentioned later on.

The origin of my personal displeasure with those poorly-substantiated replacement names was three years ago. We (Braun & Maehr 2008) had just published new names for a genus and a subgenus in the katydid subfamily Pseudophyllinae, when Koçak first requested a copy of our paper, and then immediately informed us that he himself had published a paper on replacement names a few weeks earlier, including the two preoccupied names we treated, thus making ours invalid. Koçak & Kemal 2008 (the very same paper Carlos Carbonell refers to) has ridiculously short accounts consisting of only truncated references for the



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Nomenclatural notes on the genus group names in *Orthoptera*

Ahmet Ömer Koçak **Muhabbet Kemal**

Abstract: Nomenclatural notes on the genus group names in *Orthoptera*. Cent. ent. Stud., Misc. Pap. 149: 2-4.
In this paper, following new names are proposed for the pre-occupied genus group names in various orthopteran families. The preoccupied generic names are: *Oxystethus* Redtenbacher,1891, *Encalypta* Redtenbacher,1891, *Habra* Brunner von Wattenwyl, 1891, *Hellerina* Galvagni,2006, *Cophus* Saussure,1874, *Dhofaria* Koçak & Kemal, 2008. The proposed replacement names are: *Unalianus* **nom. n.**, *Cesacomora* **nom. n.**, *Cesasundana* **nom. n.** (*Tettigoniidae*), and *Otteius* **nom. n.** (*Gryllidae*). *Hellerina* Galvagni,2006 (*Raphidophoridae*) is reported for the first time as junior homonym. *Dhofaria* Koçak & Kemal, 2008 (*Pamphagidae*) is invalidated.
Key words: *Orthoptera*, nomenclature, Indo-China, Indonesia, Comoro, Madagascar, Malaysia, Borneo, Cuba, Dhofar.

One of recent publications by Koçak and Kemal published in Miscellaneous Papers

homonymous names, new names for genera, new combinations for species names, type localities, and in three of the 19 cases etymologies. For our paper we had verified the references for the senior homonyms quite thoroughly: an old damselfly subgenus with confusing publication history (Nomenclator Zoologicus cites the wrong reference and Koçak & Kemal simply copied it) and a fossil fish whose author was lost together with the original manuscript during the Second World War – at first it wasn't obvious whether the Orthoptera names were really unavailable. So I was slightly annoyed and investigated if *Miscellaneous Papers* actually constituted a valid publication as required by the Code of Zoological Nomenclature. The issues were available upon request as PDF copies and printed copies were allegedly deposited in five international institutions mentioned on the CESA website. I did check them all, except a South African Museum that apparently no longer exists: The Natural History Museum in London, the California Academy of Sciences, the Entomological Museum Marktleuthen, and the German Entomological Institute Eberswalde did not receive the last seven issues, in the latter were even missing the last 50 issues (so no issues had been sent for 1-3 years). In a very polite e-mail I informed Koçak about the problem, but did not get a response. He immediately, by then more than three months after stated publication date, sent out copies (as Ulf Eitschberger from the Museum Marktleuthen confirmed). I received a printed copy of issue 141 as well, without any comment or greeting, and in issue 142 Koçak published a prevaricating note about the controversial publication details, declaring our two substitute names as synonyms of theirs. Since late August or early September 2008 *Miscellaneous Papers* are available online through Internet Archive (the references and citations in OSF have corresponding hyperlinks).

Some of the substitute genus names proposed by Koçak & Kemal honour orthopterists: *Danielottea*, *Grandcolasia*, *Kurtharzia*, *Otteius*, *Unalia*, and *Unalianus*. Most others are rather uninspired or downright preposterous. *Costarica*, *Granada*, *Jamaica*, and *Peru* do not conform to ICZN recommendation 11A against the use of vernacular names. Impossible to search the Internet or scientific databases with the name of a rare insect when it is identical to a country or city name! The latest trend is to incorporate the abbreviated institution name CESA: *Amazonicesa*, *Cesabrazilia*, *Caeracesa*, *Cesacomora*, *Cesasundana*, and *Cesatropicalia*. The two first are for the very same preoccupied name *Machaira* Piza 1958, for which the junior synonym *Graminofolium* Nickle 2007 became the valid name (Chamorro & Braun 2010). Another name by Koçak & Kemal referes to a recently synonymized genus of Piza (op. cit.), and in yet another case the junior synonym *Anapolisia* Piza 1980 can be used as the valid name (this we had overlooked in our paper). *Stenoschema* Redtenbacher 1895 appears to be available, since *Stenoschema* Förster 1869 (for an ichneumonid wasp) is most likely a nomen nudum. This makes *Carnavalia* (named after "the famous annual festival" of the type species' home country Brazil), *Tropicophyllum*, and *Cesatropicalia* unnecessary. The following genus names are currently considered valid in OSF:

Old World Acridomorpha: *Bambesiana* Koçak & Kemal 2008 (for *Bambesa* Dirsh 1961), *Granada* Koçak & Kemal 2008 (for *Jacobsiella* Harz 1975), *Khayyamia* Koçak 1981 (for *Dinaria* Popov 1951), *Kurtharzia* Koçak 1981 (for *Navasia* Harz 1973), *Sulawesiana* Koçak & Kemal 2008 (for *Acrolophus* Ramme 1941), and *Unalia* Koçak & Kemal 2008 (for *Goniocara* Uvarov 1953).

Neotropical Acridomorpha: *Costarica* Koçak & Kemal 2008 (for *Rowellia* Carbonell 2002) and *Peruana* Koçak & Kemal 2008 (for *Albrechtia* Carbonell & Descamps 1978).

Old World Grylloidea: *Danielottea* Koçak & Kemal 2009 (for *Uluguria* Otte 1987) and *Jarawasia* Koçak & Kemal 2008 (for *Chopardia* Bhowmik 1969).

Neotropical Grylloidea: *Caeracesa* Koçak & Kemal 2010 (for *Neomorpha* Desutter-Grandcolas), *Grandcolasia* Koçak & Kemal 2010 (for *Smicrotes* Desutter-Grandcolas 1992), *Otteius* Koçak & Kemal 2009 (for *Cophus* Saussure 1874), *Peru* Koçak & Kemal 2008 (for *Tetragonia* Desutter-Grandcolas 1993), and *Saopauloa* Koçak & Kemal 2008 (for *Chopardia* Piza 1974).

Old World Tettigoniidae: *Cesacomora* Koçak & Kemal 2009 (for *Encalypta* Redtenbacher), *Cesasundana* Koçak & Kemal 2009 (for *Habra* Brunner von Wattenwy 1891), and *Unalianus* Koçak & Kemal 2009 (for *Oxystethus* Redtenbacher 1891).

Neotropical Tettigoniidae: *Barraza* Koçak & Kemal 2008 (for *Calodectes* Rentz & Gurney 1985) and *Santandera* Koçak & Kemal 2008 (for *Ocana* Hebard 1927).

By September 2008 *Miscellaneous Papers* apparently were published as required by the Code, as an online publication with printed copies in at least 5 publicly accessible libraries. As publication date of issues 136-142 should be considered September 2008. Since the various little articles with those substitute names are also covered by Zoological Record, I reluctantly entered

them into OSF. Meanwhile the CESA website no longer mentions any such institutions. WorldCat finds only the Universitätsbibliothek Senckenberg in Frankfurt/M, but the Zeitschriftendatenbank lists additionally the Zoological Museum of Hamburg University for the year 2010, and the Museum Marktleuthen keeps receiving copies as well. So there are at least three locations in Germany alone. *Priamus*, the other CESA journal that contains nomenclatural acts and numerous substitute names, available online through Internet Archive too, is recorded from three German institutions for 2010, and it seems to be deposited in the Zoological Museum Copenhagen and probably a few other museum libraries. So it looks more difficult to eliminate those annoying names than I thought upon starting to write this note.

After all I hope that our colleagues from far eastern Turkey will find at least Carlos Carbonell's comment and will reassess their practice. Detecting homonyms and establishing new names is certainly a meritorious effort, but it should be done in a taxonomically more sophisticated fashion.

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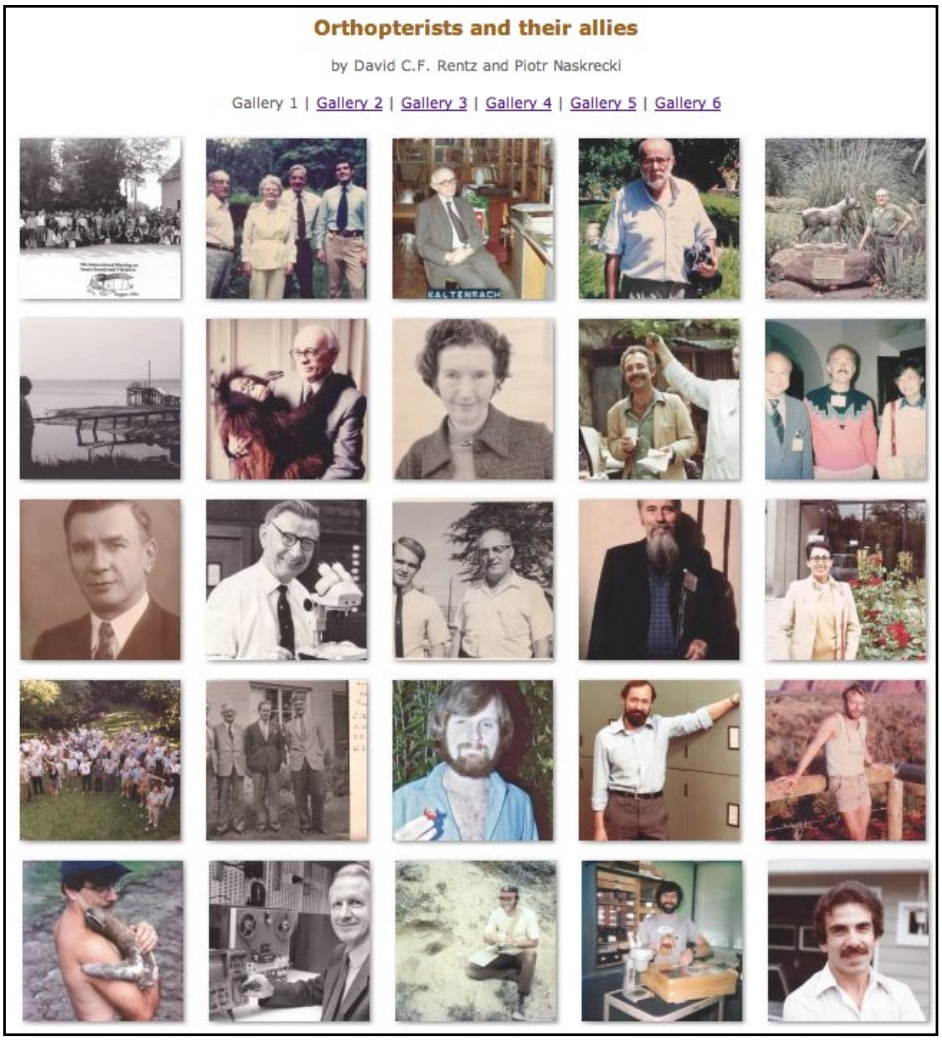
Chamorro-Rengifo, J. & H. Braun. 2010. The Tettigoniidae (Orthoptera) described by Salvador de Toledo Piza Jr. and deposited in the collection of the University of São Paulo, Escola Superior de Agricultura "Luiz de Queiroz", Brazil. Zootaxa. 2635:41–66.
Koçak, A.Ö. & M. Kemal 2008. Replacement names among the genus and family group taxa in Orthoptera. Centre for Entomological Studies, Miscellaneous Papers. 141:1-5.
Koçak, A.Ö. 2008. Nomenclatural notes on the recently proposed replacement names in the order Orthoptera. Centre for Entomological Studies, Miscellaneous Papers. 142:7-8.

Holger Braun
Museo de La Plata
División Entomología

The Orthopterists' Society Photo Gallery

This collection of photos of orthopterists started in the early 60's when I became acquainted with Drs. Ashley Gurney and Harold Grant. They both had small portrait collections of scientists that came to visit their respective institutions. Then whilst at UC Berkeley Dr. S.L. Tuxen spent a year in the Entomology Department. He was a man after my own heart and had many peculiar pastimes. He collected shoes, for example. Shoes from everywhere—all over the world and he had me take a trip to the Piute country outside of Reno, Nevada to find some authentic Piute shoes. He found them all right. He also collected photos of entomologists in "unusual postions". I started doing this too but many are not publishable on this site. And speaking of unusual positions, if you read your "Tinkham" you will discover that he would have been great photographic material! I wish I had more photos of our trips to the desert. Both Ashley and Harold had photo collections. Harold made certain that the Academy



A collection of photos of orthopterists by Rentz and Naskrecki available at http://140.247.119.225/OrthSoc/galleries/Orthopterists/orthopterists_1/orts1.html

photographer took pictures of visiting colleagues.

But back to the collection. When I met Mr. Rehn in 1960, I asked him for a photo and he sent "an unposed photograph". It is the one in Gallery 4 at the bottom of the page. Yes, they really did dress like that in the office in those days. Then when he discovered I had them up on my wall, more treasures were forthcoming. While I was employed at the Academy of Natural Sciences of Philadelphia in the 1970's Sam Roback and others contributed more material. I suspect that much has similar material with the older folks dying and their belongings scattered to the four winds. That's why it's important to preserve this record of "unposed" or other photos of our mentors. I am still looking for a photograph of the cockroach specialist Karl Princis. Even though he visited the U.S., no one seems to have photographed him.

I have more material that will be added in due course. I would encourage members to do the same. We need to connect with our past. Moreover, there are stories behind each photo. Remind me to waffle on about this sometime.

D. Rentz

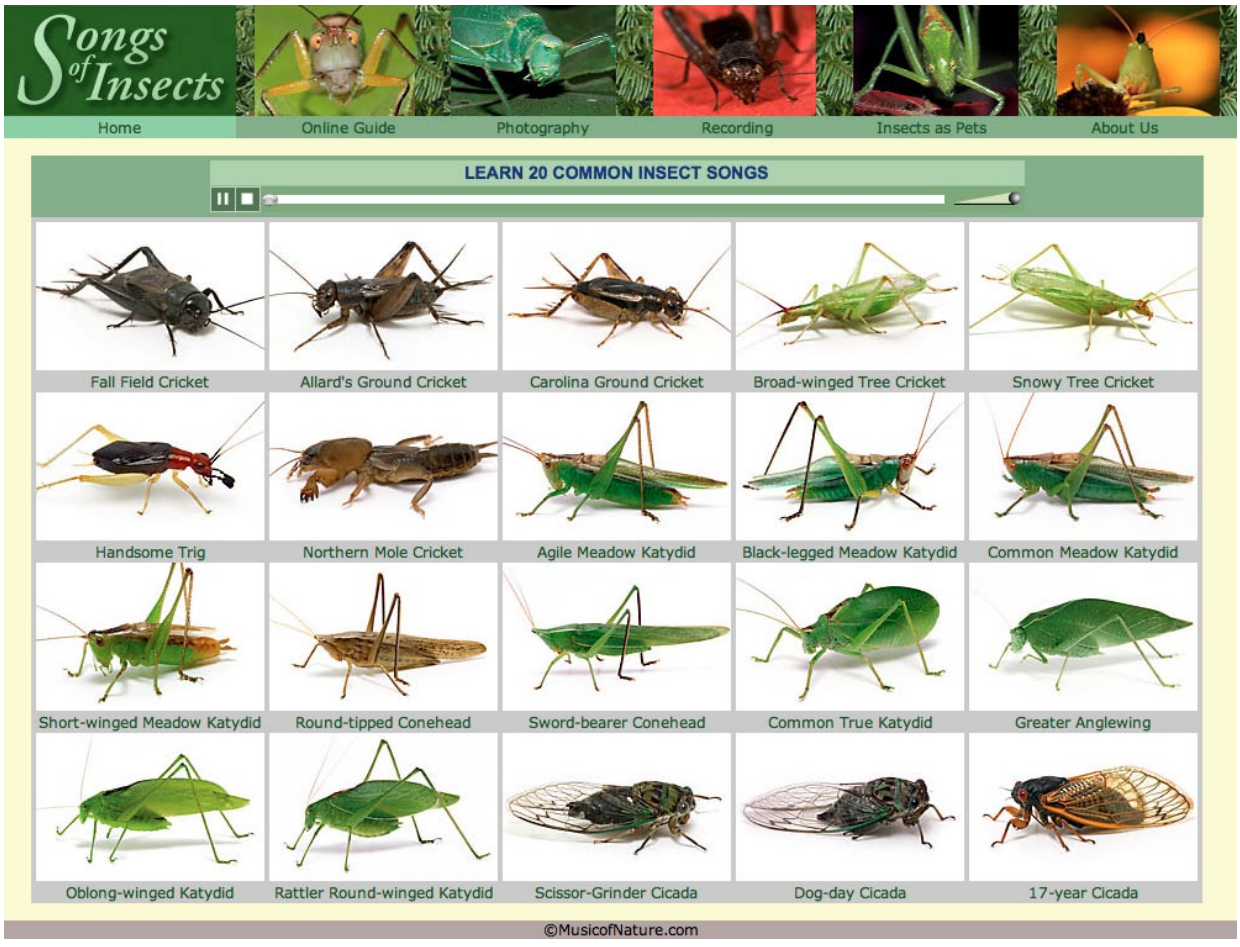
Website Feature:
The Songs of Insects (songsofinsects.com)

The website **songsofinsects.com** is the support website for the book "The Songs of Insects" by Lang Elliott and Will Hershberger. Because most singing insects are orthopterans, the majority of insects featured in this website are crickets and katydids. The website covers 77 singing insects (including cicadas) commonly found in North America. Each species page contains the common name of the insect, an waveform and a sound recording, a short verbal description of the song, an option to hear the song at a lower pitch, and a fantastic habitus photo of the insect.

The makers of this marvelous website (and the book!) are not orthopterists by training, but the painstaking documentation of the songs and the photographs in creating this work is a testament that they must have incredible knowledge of the biology of these creatures.

Be sure to check out songsofinsects.com; It's a great resource for everyone interested in singing insects.

Hojun Song
Editor



At songsofinsects.com, one can listen to songs of common insects in North America

Book review:
A Sound Guide to Korean Tettigoniidae (Orthoptera: Ensifera)

There are about 40 katydid species known from the Korean Peninsula, of which 34 species occur in South Korea. A new guidebook by the Korean orthopterist Taewoo Kim and published by the Korean National Institute of Biological Resources, covers the biology, ecology, taxonomy and songs of all South Korean katydid species. This little gem written in Korean carefully documents geographical distribution, habitat preference, phenology, mor-

phology of both nymphal and adult stages, and song descriptions of each species accompanied by oscillograms, SEM images of stridulatory files and crisp habitus photos taken in the field. The book also comes with a CD containing the sound files of all 34 katydid species. This book is an important contribution to our understanding of the biology and ecology of katydids in East Asia. If only it were published in English so that it can become more readily accessible to everyone!

Hojun Song
Editor

Orthoptera Photograph of This Issue

These beautiful insects are ***Eumorsea balli*** (male on left and female on right) from Sawmill Canyon, Fort Huachuca, Cochise County, Arizona. Commonly found in the tropics, the monkey grasshopper family Eumastacidae is characterized by very short antennae, distinct male genitalia, as well as its unique posture. *Eumorsea* is a small genus restricted to the southwestern U.S. These photographs were taken and generously provided by Robert A. Behrstock.

If you have a photograph of your favorite Orthoptera, please consider submitting to *Metaleptea*!

"Journées acridiennes" - Séminaire International sur la Protection des Végétaux: Abstracts

The importance of bird predation of acridids after treatments of Green Muscle® *Metarhizium acridum* for locust and grasshopper control

Wim C. Mullié
Fondation Agir pour l'Education et la Santé, Route du Front de Terre, BP 6792, Dakar, Sénégal
e-mail : wim.mullie@fondationaes.com

Before synthetic insecticides had been developed, birds were considered as important acridid predators. With the massive use of insecticides since World War II, this knowledge almost became extinct and birds became rather victims instead of allies of locust control. The 1986-1988 Desert Locust invasions eventually opened the eyes of donors for the side effects of chemical locust control and two projects were born. The first "Locustox" (1989-2004) to study the impact of chemical locust control on man and environment and the second "Lubilosa" (1989-2002) to develop a biological alternative for the use of chemical pesticides. In this presentation the impact on birds of Green Muscle® (GM), the result of the efforts of the Lubilosa project, will be compared with that of organophosphate insecticides mainly used for locust control. GM is a biopesticide containing the entomopathogenous fungus *Metarhizium acridum*. The results of field studies carried out between 1989 and 2010, especially in Senegal and Niger, will be analyzed. They show that organophosphorous insecticides used against grasshoppers in a controlled field experiment reduced bird densities with a factor two until at least 35 days post-treatments. After treatments with GM in another controlled field experiment which lasted three rainy seasons over a two-year period, no impact on bird numbers and densities occurred (Repeated Measures ANOVA ($F(2,321)=0.816$, $p=0.443$)) and grasshopper consumption, calculated from transect counts of and from energetic data, increased significantly ($p<0.001$) up to six times as compared to controls. The impact of predation on the grasshopper community was calculated to be 1-3 %/day. Grasshopper densities decreased with 67.5 % between December and May during two successive years, corresponding to a predation of 0.75 – 1 %/day, slightly lower than that estimated on the basis of the energetic needs. Bird exclosures, permeable to the grasshoppers and made of fish netting, were placed on both treated and control plots to quantify predation during the rainy season, the main reproductive period of the grasshoppers studied. Grasshopper densities in the cages were 31±2,4 % (max. 35%) higher than outside cages (repeated measures ANOVA ($F(1,26)=17,81$, $p<0.001$)), irrespective of treatments, confirming the importance of predation. Grasshopper predation by birds in plots treated with GM extends and intensifies its impact. A revaluation of the role of birds in grasshopper and locust control is recommended.

Key words: locust and grasshopper control, Green Muscle®, *Metarhizium acridum*, impact predation, acridivorous birds, exclosures, grasshopper density.

Study of the functioning of biotopes of *Schistocerca gregaria* (Forskal, 1775) (Acrididae, Cyrtacanthardinae) in Sahara of Algeria between 2006 and 2009

H. BENSAAD[1] et B. DOUMANDJI-MITICHE[2]
[1]Département de lutte antiacridienne, Institut National de la Protection des Végétaux.
[2]Ecole Nationale Supérieure Agronomique, El Harrach, Alger, Algérie.

Locust in Africa is an extremely serious threat to agriculture. Its invasion area covered Africa, north of the Equator, the Middle East, the Arabian Peninsula and Indo-Pakistani and sometimes Mediterranean Europe. This represents a total of 57 countries and over 20% of the land. Beyond periods of invasion, locusts fold into remission in the driest areas of their dispersal territory where they often go unnoticed. Preventive control is recognized by the international community as the only sustainable strategy to control invasions of locusts. It is to continuously to monitor the outbreak surface and to destroy by rapid response on limited areas; bands of larvae and first groups of locusts which have begun the process of gregarization. Advanced research undertaken by FAO experts, led to the introduction of some practical modern tools of information transmission and computer applications for early warning and decision support such as GPS (Global Positioning System) The geographic information system (RAMSES), satellite device of locust information transmission (eLocust 2) Application of locust data transfer via satellite (eLocust Mapper 1.12). These last have gradually led to a better understanding of locusts' ecology and implement control methods and prevention strategies based on the location and mapping of potential locust habitats. The result of the mapping, made by prospectors in the INPV of 12,205 recorded all over South regions namely Tamanrasset, Adrar, Bechar, Tindouf and Illizi, confirmed the existence of two breeding seasons, Spring breeding in Central Sahara, under the influence of depression in the Mediterranean diet, ranging from late February to early July and a smaller fall breeding occurring in the southern Sahara, under the influence of monsoon rains, ranging from October to December. The result of the distribution of larvae and adults in breeding has highlighted eight breeding at Tamanrasset, Adrar, Bechar and Illizi.

Key words: Locust, mapping, distribution, reproduction.

Phase characteristics of the desert locust during the last five locust seasons with focus on the subsequent outbreaks in Mauritania

SIDI OULD ELY, Sid'ahmed Ould Mohamed, Mohamed Elhacen Ould JAEVAR, Ahmed Salem Ould Benahi, et Mohamed Abdallahi Ould Babah

Centre National de Lutte Antiacridienne, B.P. 665, Nouakchott, Mauritanie

Desert locust *Schistocerca gregaria* population dynamics were monitored by ratio morphometric measures in western and western-central region in Mauritania over five consecutive locust seasons (2006-2011) during which two subsequent outbreaks took place. Collected locusts revealed a significant dominance of solitarious forms among three locust seasons (2007-2010), despite high population densities encountered during the 2008-2010 locust seasons. The results showed that the F/C ratio (F, hind femur length; C, maximum head width) is significantly correlated to percentage of individuals with 7-stripped eyes, suggesting that gregarization may have occurred at low population densities unlike the 2006-2007 locust season in which major morphometric traits are typical to transiens forms. Meanwhile, locust populations of the ongoing outbreak (2010-2011 breading season) are likely to shifting toward typical transiens forms. It is also suggested that the origin of the latest outbreaks are likely to havestarted in west-central Mauritania and progressed through western Mauritania where sustainable ecological conditions prevail. These results are discussed in relation to the desert locust population dynamics.

Key words: desert locust, morphometrics, population dynamics, locust season, Schistocerca gregaria, solitarious, transiens, outbreaks.

Alternative method against locusts

B. DOUMANDJI-MITICHE[1]*, F. OUTTAR[1], F. MOUHOUCHE[1] et S. DOUMANDJI[1]

[1]Ecole Nationale Supérieure Agronomique, El Harrach, Alger, Algérie.

*doumandjimitiche@yahoo.fr

Within the framework of a biological control against locusts, we tested some biological agents on the locust pilgrim *Schistocerca gregaria* (Forskal, 1775), the migrating locust *Locusta migratoria cinerascens* Linné, 1758 and the Moroccan locust *Dociostaurus maroccanus* Thunberg, 1815. *Bacillus subtilis* gives 100 % of mortality on the larval stages at the end of 8 days. *Azadirachta indica* the neem and *Lawsonia inermis* the henna gave good control. Tèflubenzuron and Triflumuron have an important bioinsecticide action and prevent the moult in the insects leading to their death. *Metarhizium anisopliae var. acridum* or "Green muscle" causes a strong mortality in the insects treated with at the larval and adult stage. The rates of hatching for eggs treated by pulverization strongly decrease.

Key words: *Bacillus subtilis, Azadirachta indica*, Téflubenzuron, *Metarhizium anisopliae var. acridum*, migrating locusts.

Study of the biological impact of fluorescent Pseudomonas spp in two physiological and biochemical parameters of L5 larvae of *Locusta migratoria* (Linnaeus, 1758)

Hakima OULEBSIR-MOHAND KACI[1*] et Bahia DOUMANDJI-MITICHE[2]

[1]Département de Biologie, Faculté des Sciences, Université de M'hamed Bougarra. BP35000 Boumerdès, Algérie.

[2]Dép. Zool. Agri. Forest., Ecole Nationale Supérieure Agronomique, 16200 Alger, Algérie.

*mkbio2005@yahoo.fr

Our study allows us to test the effect of entomopathogenic bacteria *Pseudomonas fluorescens* bv III and *Pseudomonas fluorescens* bv V on the haemolymph of *Locusta migratoria* metabolites, namely proteins and carbohydrates as well as on the histology of the digestive system of larvae fifth stage of migratory locust *Locusta migratoria*. It is seen from the results obtained, signifying a decrease of haemolymph protein concentration compared with controls with an increase in carbohydrate. After completion of histological sections, examination of different parts of the digestive tract showed some histological changes in treated individuals.

Key words: *Locusta migratoria*, hemolymph, *Pseudomonas fluorescens*, histology.

Insecticidal activity of two plant extracts on larvae of fifth instar of *Schistocerca gregaria* (Forskal, 1775) (Cyrtacanthacridinae, Acrididae)

Aatika BOUHAS-BOUBEKKA[1]* et Fazia. MOUHOUCHE[1]

[1]Ecole Nationale Supérieure Agronomique, El Harrach (Alger, Algérie).

*aboubekka @hotmail.fr

Africa, especially West, the Sahel and the Maghreb Deep South, are simultaneously undergoing the horrors of two evils. On the one hand, the locust invasion and its immediate damage, but massive passenger and secondly the large-scale spraying of insecticides and chemicals whose effects are pernicious fear of long-term risk both the health of populations that the sustainability of ecosystems through residues and persistence. Research aimed at finding substitutes for these substances are launched with several avenues explored such as vegetable extracts. Larvicidal activity of *Datura innoxia* and *Azadirachta indica* on the 5th stage of *Schistocerca gregaria* is measured by the rate of mortality, length of larval stage and gain weight. The extracts were administered to larvae by ingestion using three doses in geometric progression rate of two (5 % = D1, D2 and D3 = 10 % = 20 %). their effectiveness

at a dose (D3 = 20 %) in terms of percentage of mortality reached Day 5 26.7 % for neem extract and 50 % for that of datura, it has also manifested by an inhibition of development by causing an extension in the duration of the larval stage. On gain weight, they have induced values remarkably small compared to untreated.

Key words: *Schistocerca gregaria* larvae, plant extracts, *Datura innoxia* and *Azadirachta indica*.

Action of *Peganum harmala* L. (Zygophyllaceae) leaf extracts on some biological parameters of *Schistocerca gregaria* (Forskål, 1775) (Orthoptera, Cyrtacanthacridinae)

Abdellah KEMASSI[1,2*], Z OUAL1, A. OULD EL HADJ-KHELIL[1], M. DADI BOUHOUN[1] et Mohamed DIDI OULD EL HADJ[1]

[1]Laboratoire de Protection des Ecosystèmes en Zones Arides et Semi arides, Université Kasdi Merbah- Ouargla.

[2]Institut des Sciences de la Nature et de la Vie, Centre Universitaire Ghardaïa.

*akemassi@yahoo.fr

The study examined the oral toxicity of the crude leaf extract in acetone and by contact of essential oils extracted from *Peganum harmala* leaves on the fifth stage larvae and adults of *Schistocerca gregaria*. It is noted toxicity of essential oils plus that of the acetone crude extract of the plant species harvested at Wadi Sabseb in region of Ghardaia (North East Algerian Sahara). In individuals treated by contact with ugly essential oils of *P. harmala*, a mortality rate of 100% is reached after 8 mn.30 s in L5 larvae and after 30 mn.18 s in adults. As for the individuals fed cabbage leaves sprayed with *P. harmala* leaf extract with acetone, a mortality rate of 16.66% is reached after 15 days and 30 days for L5 larvae and adults of *S. gregaria* respectively. Evaluation of lethal time 50 (LT50) for these plant extracts, leaves out the swift action of essential oils compared to the acetone crude extract of this plant. The lethal time 50 estimated for essential oils being shorter, it is about 6mn 12s for L5 larvae and 19mn 21s for adults, while for the treated byb acetone leaf extract, it is about 24.80 days and 43.95 days for L5 larvae and adults of *S. gregaria* respectively.

Key words: Toxicity, *Schistocerca gregaria, Peganum harmala*, leaf extracts and essential oils.

Comparative study on the effect of two entomopathogenic fungi *Beauveria bassiana* and *Metarhizium anisopliae var acridum* on the feeding behavior of *Schistocerca gregaria*

F.Z. BISSAAD[1], F. BOUNACEUR[2], F. HALOUANE[1] et B. DOUMANDJI-MITICHE[3]

[1]Département de biologie, Faculté des Sciences, Université M'Hamed Bouguera de Boumerdes (Algérie).

[2]Faculté des Sciences de la Nature et de la Vie, Université Ibn Khaldoun. Tiaret, Algérie.

[3]Ecole Nationale Supérieure d'Agronomie, Département de Zoologie Agricole et Forestière. Alger, Algérie.

The Desert Locust is considered a scourge of agriculture and particularly in Africa. Its ravages extend to the most arid and semi-arid west coast of Africa to India. Faced with this locust plague, chemical control by using insecticide is still widely prevalent. The massive use of chemical pesticides has led to negative consequences on the environment, wildlife, humans and animals without affecting the frequency of invasions. The search for ecologically sound alternatives in this fight against locusts has become a necessity. The studies were then directed to the use of mushrooms entomophatogènes. This study shows that the two entomopathogenic fungi have affected the weight change of L5 larvae *S. gregaria*, examination of these results also shows that the average weight gain in control larvae was 0.4230 g. It is 0.159 g for those treated with *B. bassiana*. Cons by the larvae treated with *M.anisopliae* their weight gain is very small, it is 0.011 g. Regarding the initial consumption of L5 *S. gregaria*, it begins with 0.716±0.086 g for controls against 0.05±0.008 g and 0.691±0.083 g respectively in treated *B. bassiana* and *M. anisopliae*. This consumption increases and decreases over time and reaches values either higher or lower than baseline until the final value of 0.168 ± 0.020 g, 0.029 ± 0.005 g and 0.068 ± 0.008 g respectively for the controls treated *B. bassiana* and *M. anisopliae*. Indices of nutritional consumption and use of food showing were also affected by treatment to both fungi.

Key words: *Schistocerca gregaria*, *Beauveria bassiana*, *Metarhizium anisopliae var acridum*, consummation, weight.

Entomopathogen fungi *Metarhizium anisopliae* essay on the cuticle of *Schistocerca gregaria* L5 larvae (Acrididae, Cyrtacanthacridinae)

Mahmoud YOUCEF[1]*, F. HALOUANE[2] et B. DOUMANDJI-MITICHE[1]

[1]Dép. Zool. Agri. Forest., Ecole Nationale Supérieure Agronomique BP16200 Alger, (Algérie).

[2]Université de M'hamed Bougarra Boumerdès (Algérie).

*madoui112@yahoo.fr

In the context of biological control against the desert locust, the beetle the most known worldwide, we studied the effect of an entomopathogenic fungus on Locust. The work done includes the following parameters. Initially we studied its action on the dry weight, the amount and rate of chitin and cuticular proteins abdomen. Finally we completed the work and illustrated by a histological study of the cuticle in control and treated L5. The study of the effect of *Metarhizium anisopliae* on the cuticle showed a significant difference ($p < 0.05$) between-dry weight of the abdominal cuticle of L5 processed compared with controls. Indeed cuticle dry weight at 1 day after molting was 17.4 ± 1.24 mg for control individuals and 16.18 ± 1.10 mg for treaties. Then the dry weight continued to increase to 27.2 ± 3.12 mg in the control on the 6th day after molting, by cons in the treated dry weight was 19.1 ± 1.29 mg in the same day. The effect of Metarhizium on the amount and rate of cuticular chitin is highly significant ($p < 0.000$)

between control and treated. Regarding the quantity of cuticular protein, treatment with the same fungus causes a non-significant difference between treated and control L5 *S. gregaria*. On the other hand a significant difference is obtained for the rate of cuticular proteins. The results concerning the effect of *Metarhizium anisopliae* on the histological structure of the cuticle of L5 *S. gregaria* show that entomopathogenic causes a decrease in the thickness of the cuticle due to the decrease of the thickness of the innermost layer is the endocuticle. For the cons exocuticle is slightly affected and the effect on the epicuticle is not significant.

Key words: *Schistocerca gregaria, Metarhizium anisopliae*, biological control, cuticle.

Test of three biopesticides on L5 larvae of *Locusta migratoria* (Linnaeus, 1758) (Oedipodinae, Acrididae)

F. OUTTAR[1]*, F. MOUHOUCHE[1], F. BISSAD[2], L. MIZAB[2], N. CHAHBAR[2] et B. DOUMANDJI-MITICHE[1]

[1]Ecole Nationale Supérieure Agronomique, El-Harrach; Alger, Algérie.

[2]Faculté des Sciences, Département de Biologie, Université de Boumerdes (Algérie).

*outtar25@yahoo.fr

Our work is based on the use of three biopesticide, *Metarhizium anisopliae var acridum* the Triflumuron (TFM) and henna *Lawsonia inermis* on larval *Locusta migratoria* L5 applied with the two modes of entry, contact and ingestion. For this study, we tested the effect of these three biopesticides on the morphology and the larval haemolymph proteins L5, quantitatively and qualitatively The results show that these three biopesticides applied with the two modes of entry have resulted in morphological deformities in larvae L5. It may be noted also that these three biopesticides applied with the two treatments caused alterations in serum protein of *Locusta migratoria*.

Key words: *Locusta migratoria, Metarhizium anisopliae var acridum* the Triflumuron, *Lawsonia inermis*, morphology, haemolymph proteins.

Effect of leaf extraction of oleander (*Nerium oleander*) on mortality and evolution weight in the migratory locust (*Locusta migratoria*) (Acrididae, Oedipodinae)

Ghania BEZAZE[1] et Fazia MOUHOUCHE[1]

[1]Ecole nationale supérieure agronomique, El Harrach, Alger, Algérie.

Our study was conducted on different instars and imago of migratory *Locusta migratoria*. First, we tried to see the behavioral sequences of *Locusta migratoria* in the presence of fresh leaves of the oleander. Indead, we found the leaves of oleander that have a deterring effect and perhaps even repellent in food intake. Imagos tested on fresh leaves of *Nerium oleander* showed body weights lower than those fed on the witness *Stenotaphrum americanum*. Also, we studied the action of the oleander leaf extract on weight change and mortality in different instars and imago. The results of this study indicate that extracts of *Nerium oleander* tested by contact, at low doses act on the larvae L1, L2, L3 and L4. So the insecticide has good larvicidal efficiency accompanied by a good knockdown. L5 larvae, the higher the dose, the higher mortality is rapid and important. For imagos of *Locusta migratoria* treated by ingestion showed a decrease in weight daily. The potency of the extract caused a progressive weight loss in individuals more apparent in males than females.Indeed, food intake is inhibited by all doses of oleander and the mortality rate varies from one dose to another. The highest dose caused a mortality D1 to 55.55 % after 10 days of treatment. Upon completion of this work, we can conclude that *Locusta migratoria* is more sensitive to the action of treatment with the extract of oleander leaf contact compared to treatment with leaf extract of oleander ingestion. This leads us to say that the plant is considered as a promising source of bioinsecticide and lends itself well to investigations in the field of biological control.

Key words: *Locusta migratoria, Nerium oleander*, leaf extraction, mortality.

Compared graminivory among two locust species: *Dociostaurus maroccanus* Thumb. et *Locusta migratoria cinerascens* L.

L. ALLAL-BENFEKIH[1]*. D. PETIT[2] et B. DOUMANDJI-MITICHE[3]

[1]Université Saad Dahleb, Blida, Algérie.

[2]Faculté des sciences et techniques, université de Limoges, France.

[3]Ecole Nationale Supérieure d'Agronomie, El Harrach, Alger, Algérie.

*acrido@yahoo.fr

We studied the diet of the larvae and the adults of two graminivorous locust species in the field. *Dociostaurus maroccanus* comes from a herbaceous station with close-cropped vegetation in the semi arid

The Moroccan Locust (Courtesy: Michel Lecog, CIRAD, France; Photographer: Antoine Foucart, CIRAD) (http://www.iranica.com/articles/locust)

Algerian stage, at which only the larvae are strictly graminivorous. *Locusta migratoria cinerascens* comes from cereal irrigated perimeters in the Central Sahara. For *D. maroccanus*, the correlation between the plants covering on the ground and their consumption frequency (all confused families) increases from L1 stage until the adult stage. In parallel, one notes a progressive increase in the diversity of the consumed plants. Concerning Poaceae, no correlation between their covering and their consumption frequency is noted: some are consumed by the first larval stage whereas others are not consumed before the adult stage. *L. migratoria cinerascens*, the correlation between the covering of Poaceae on the ground and their frequency of consumption is always significant whatever the stage. In the adults in particular, this correlation is all the stronger as the covering of graminaceous plant species is important. The diet of L4, L5 and the adults do not overlap, translating can be zones of different diet. Calculations of the regression residues make it possible to classify the most appetent species like *Lolium multiflorum* and *Sorghum vulgare* of the less appetent ones like *Triticum durum* and *Phragmites communis*.

Key words: Graminivory, *Dociostaurus maroccanus, Locusta migratoria cinerascens*, Poaceae, diet.

States of phasaires *Dociostaurus maroccanus* Thunb, 1815 (Acrididae, Gomphocerinae) at three regions: Oued Séfioun (W. Sidi Bel Abbes), Youb (W. Saida) and Ain El Hadid (W. Tiaret)

Abderrezak CHAOUCH[1], B. DOUMANDJI-MITICHE[2] et K. MOUMENE[1]

[1]Institut National de la Protection des Végétaux El Harrach, Alger, Algérie.

[2]Ecole Nationale Supérieure Agronomique d'El Harrach, Alger, Algérie.

The study of the state phasaire Moroccan locust populations was undertaken in three regions: Wadi Séfioun (W. Sidi Bel Abbes), Youb (W. Saida) and Ain El Hadid (W. Tiaret). To study the morphometric indices, we made measurements on a sample of 40 adults males and 40 females, caught during the months of June and July 2002. To this end, we made three measurements. These measurements using a caliper the length of the hind femur F, the length of the elytra E and pronotum P. Thus we calculated the average ratio between the length of the hind femur on the length of pronotum (F / P), length of elytra along the length of posterior femur (E / F) and the average ratio between the length of elytra along the length of pronotum (E / P). Each mean is accompanied by the corresponding standard deviation. The study of the state phasaire showed that the population of *Dociostaurus maroccanus* Region Youb (Sidon) and Oued Séfioun (Sidi Bel Abbes), captured during the two periods in June and July 2002, is the gregarious state, while the population of the region of Ain El Hadid (Tiaret) is the transient state degregans.

Key words: *Dociostaurus maroccanus*, state phasaire, morphometric indices.

Grasshoppers and crickets pullulation in Bordj Bou Arreridj area (Algeria)

A. KHOUDOUR[1]*, S. DOUMANDJI[2], D. MOUTASSEM[1] et A. MERIBAI[1]

[1]Centre universitaire de Bordj Bou Arreridj (Algérie).

[2]Ecole Nationale Supérieure Agronomique, El Harrach, Alger, Algérie.

*khoudourabdelmalek@gmail.com.

Orthopterans pullulations takes place nearly each year in Bordj Bou Arreridj region. This work is about three types of homogenous middles, a waste land and shrub. To characterize the grasshoppers and crickets populations the quadrants method of 9 m² is utilized each month with 16 repetitions. Among the six species studied, four are known for the ravages: the maroccan locust *Dociostauus maroccanus*, *Ocneridia volxemi*, *Calliptamus barbarous* and *C. wattenwylianus*. The investigation of monthly results for each station shows that the list of deserted and fallow field and waste land of *D. maroccanus* multiplication. The waste land still appear the plays a role for the most favorable to *C. wattenwylianus* and *Ocneridia volxemi*. The equitability values comparison between the three middles shows that the shrub possesses the Orthptera population the best balanced of. The protection crop service should supervise particularly the fallow fields waste lands as preventive measure.

Keys words: Orthopterans, pullulations, *Dociostaurus maroccanus, Ocneridia volxemi, Calliptamus barbarus*, Bordj Bou Arreridj.

Effects of weak climatic variations on assemblages and life cycles of Orthoptera in North Algeria

A. GUENDOUZ BENRIMA[1]*, B. DOUMANDJI-MITICHE[2] et D. PETIT[3]

[1]Faculté des Sciences Agro–Vétérinaires, Département d'Agronomie, Univ. SAAD DAHLEB de Blida (Algérie).

[2]Dép. Zool. Agri. Forest., Ecole Nationale Supérieure d'Agronomie, El Harrach Alger (Algérie).

[3]UMR 1061, INRA, Univ. Limoges, 123 av. A. Thomas, 87060, Limoges Cedex France (daniel.petit@unilim.fr).

*atiguen@yahoo.fr

A study on orthopterologic diversity was carried out in two stations situated at 25 km (Soumàa) and 4 km (Koléa) from the Mediterranean Sea in the Mitidja plain (North Algeria) between 1991 and 1992. Mean temperatures are higher in Soumàa than in Koléa, the dry period begins earlier, at the end of spring, in Koléa. The two stations show a diversified entomofauna, as 28 species were listed in Koléa and 24 in Soumàa. Three seasonal assemblages were defined; the summereautumn one significantly differs between the two stations, especially for minority species. The life cycle of larvae was investigated for 6 dominant species in both stations. Four species present a precocious hatching in Koléa, but with a longer duration of larval life. The two species that accomplish their larval life earlier in Koléa than in Soumàa show the greatest lag in hatching date, suggesting an adaptation to the early onset of the dry period. The longer larval life of *Ochrilidia harterti* in Koléa is discussed in the light of a possible supernumerary larval stage.

Key words: Climate Cycle, orthopteran, Mitidja, Algeria.

Diversity and distribution of Orthoptera at the Tlemcen area

Amina DAMERDJI*
Université Aboubekr BELKAÏD–Tlemcen (Algérie).
*damerdji_halim@yahoo.fr

The region of Tlemcen was divided into four main areas: The coastline (Ghazaouet), the plain of Maghnia, that of Tlemcen with its mountains and its periphery, and ultimately that of the stepp. The composition on the Orthoptera, was carried out on a north-south transect analysis showed 44 species orthopterological .The species are divided into two sub-order: that of Ensifera and that of Caelifera. The first comprises 14 species distributed among those of 2 families Tettigoniidae and Gryllidae. Each of these two families consists of 7 species. The sub-order Caelifera is the largest, most diversified and includes 3 families of those Pamphagidae, the Pyrgomorphidae and Acrididae. The latter is most important in species richness and abundance. A decrease of species diversity is found the norther most area to the southern zone. A dicrease in species diversity and the equirepartition is observed in the area most northerly to the southern zone. Orthoptera disturbance in the organisation of the seems to be more important in the plain of Maghnia and shorelines. Orthopterological species distribution according to ecological condition allowed us to find four types, namely: species with very wide distribution (6 species), those with wide distribution (9 species), those with limited distribution (18 species) and last with very limited distribution (11 species).

Key words: Diversity, repartition, Orthoptera, area, Tlemcen.

Orthopteran biodiversity (Caelifera) the three stations in the area of El Tarf, El Kala

Zoubeida SOBHI[1]*, Leila ALLAL-BENFEKIH[1]
[1]Faculté des Sciences Agro–Vétérinaires, Département d'Agronomie, Univ. SAAD DAHLEB de Blida (Algérie).
*sozouzou10@yahoo.fr

Study of the abundances, the richness and the seasonal composition of orthopteran communities Caelifera was realized in three naturals' humid sites of east Algeria, in the area of d'El Tarf-El Kala. The 19 populations Caelifera take a census of, is dispatch on 12 species in the Chtaïba site, 11 species in the marsh of Mekhada and 10 species in the station of El-Ghorra. The different species have been regrouping depend their class of frequency, and their succession in the time is tributary of the minimal seasonal temperature for the study sites. Standpoint richness, the communities of the three sites being different, on the other hand its different the point of view abundance of populations effectives. Among the species, we are demonstration that *O. fuscocincta* and *C. vagans* are exclusively altitudinal acridian and whom presence of *O. c. sulfurescens* in the two floor of vegetation that characterized by oak forests, in El-Ghorra and Chaîba it may be attribute or explained by moving the two species due of favoritism of temperature conditions that is favorable for development of this species of higher level the forest of zeen oak (*Quercus faginea*) then at the moderate level with a mixture the zeen oak and the liege oak (*Quercus suber*) up to lowly level of the wooded maquis in dominate the liege oak. The station of humid grassland is characterized by the species of littoral environment like as *A. thalassinus*. Otherwise, the richness of acridian depend the vegetal biodiversities and the diversity of orthopteran communities is associated to graminacea biodiversity.

Key words: orthopteran biodiversity, humid area, succession, east Algerian.

Contribution to the study of wildlife bioecological orthoptérologique Region Larbâa-Nath-Irathen

O. BOUANEME[1] et S. DOUMANDJI[1]
[1]Ecole Nationale Supérieure Agronomique El Harrach, Alger, Algérie.

In 3 stations Larbâa Nath-Irathen grasshoppers are studied. Quadrats and sweep netting are used. So spread between 41 1477 locust species, 14 sub-families and 5 families were captured. In the quadrats, 907 individuals distributed among 33 species, 13 families and 5 sub- families are observed. The quality of sampling is 0.14 to Aboudid and Anessis and 0.19 to Taksabt. The total wealth are 15 species Aboudid, 19 and 23 to Anessis Taksabt. The relative abundances by year are the highest recorded for *Pezotettix giorni* (19 %) in Anessis (59.2 %) and Taksabt (34.7 %). 75 % are scored Aboudid for *Pezotettix giorni* in January 2007, 100 % to Anessis (III 2007) for *Odontura* sp. and (IV) *Odontura algeciras* and 100 % for taksabt *Paratettix meridionalis* (I 2007). The frequency of occurrence is 75% for *Acrotylus insubricus* (very regular class) to Aboudid for *Pezotettix giornae* (class constant) and to Anessis *Acrotylus insubricus* and *Paratettix meridionalis* (very regular class) to Taksabt. The Shannon-Weaver indices are strong between 4 and 4.52 bits Aboudid bit Taksabt. Equitability is from 0.69 to 0.78 at Anessis Aboudid. In AFC stations are scattered in three quadrants. 9 species are ubiquitous. In the sweep net, 570 Orthoptera distributed among 25 species, 10 sub-families and 3 families are trapped. The sampling quality is good (0.03 to Aboudid, 0.19 and 0.11 to Anessis to Taksabt). The total wealth are between 11 and 19 to Aboudid Anessis. The relative abundances highest annual are 22 % for Aboudid *Pezotettix giorni*, 70.8 % for Anessis *Pezotettix giorni* and 28.4% for Taksabt *Acrotylus insubricus*. centesimal frequencies of 100 % are noted for Aboudid *Acrotylus insubricus* (II, III, IV 2007), Anessis for *Acrotylus insubricus* (II, V 2007) for *Pezotettix giornaï* (I, 2007) and *Odontura* sp. 2 (III 2007) and Taksabt for *Paratettix meridionalis* (IV, 2007. The frequency of occurrence is high and Aboudid Anessis (66.7 %) for *Acrotylus insubricus* (very

regular) and for Anessis *Acrotylus insubricus*, *Calliptamus barbarus* and *Pezotettix giornaï* (very regular) and 75 % noted in Taksabt for *Acrotylus insubricus* (very regular). The Shannon-Weaver diversity is between 2.79 at Anessis and 3.31 bits at Taksebt. The fairness is high (0.66 <E <0.83) The AFC indicates that the three stations are dispersed in three quadrants. 9 species are ubiquitous.

Key words: Ecology, Orthoptera, Quadrat, sweep nets, Larbaâ-Nath-Irathen.

Contribution to the inventory of Orthoptera in three stations in the basin of Ouargla

H. BELHADJ[1] et B. DOUMANDJI-MITICHE[1]

[1]Ecole Nationale Supérieure Agronomique El Harrach, Alger, Algérie.

The results of the study of bioecology of Orthoptera in three stations in the basin of Ouargla allowed us to inventory 16 species of Caelifera and 2 species of Ensifera. The suborder of Caelifera presented 3 families Pyrgomorphidae namely, the Acrididae and Acrydiidae. The family Acrididae seems to be the largest with 6 sub-families, while the other two families are represented by only one species each *Pyrgomorpha cognata* and *Paratettix meridionalis* respectively. In the suborder Ensifera, there was only one subfamily, that of Gryllinae which belongs to the family Gryllidae represented by 2 species *Gryllus bimaculatus* and *Gryllulus palmetorum*. The Station of I.N.F.S.A.S. includes 13 species of Caelifèra and 1 species of Ensifera. That of Mekhadma is less rich in species, we identified 7 species of Caelifères and 1of Ensifera. The peuplements of grasshoppers of the station Hassi Ben Abdallah differs somewhat from that of the two palm ,we identified 10 species of Caelifères. 5 species of grasshoppers are common to all three stations, there are *Pyrgomorpha cognata*, *Aiolopus thalassinus*, *Duroniella lucas*, *Acrotylus patruelis* and *Ochrilidia gracilis*.

Key words: Orthoptera, Bioecology, Ouargla.

Inventory of Orthoptera in the steppe region of Sidi el Djilali (Tlemcen) and diet genus *Sphingonotus*

Lotfi MESLI[1]*, M. MESTARI[1], F. HASSANI[1] et A.S. BOUKLI HACEN[1]

[1]Faculté des sciences. Université AbouBekr BELKAÏD Tlemcen, Algérie.

*meslilotfi@yahoo.fr

An inventory of Orthoptera in the steppe region of Tlemcen over a period of two years from September 2007 to September 2009, revealed the presence of 28 grasshopper species, the majority belongs to the family Acrididae. A study of the diet of two species of *Sphingonotus* was made in the region of Sidi el Djilali in Tlemcen. We based on the study of faeces and comparison with a reference épidermothèque and thanks to the method of the window. The results showed a marked polyphagia locust with a trend toward aromatic and medicinal plants. The Locust have made a food choice since the frequency of plant species found in feces and their recovery rate on the ground shows no relationship. Consider the case of Thymus ciliatus with a recovery rate of 5.9 percent and a frequency of 78.9 percent.

Key words: Inventory, Orthoptera, caeliferes, diet, Tlemcen, steppe, *Sphingonotus*.

Place of Orthoptera in the arthropodofaune of the area of Adrar

Ahmed SID AMAR*, B. DOUMANDJI-MITICHE et S. DOUMANDJI

Département de Zoologie Agricole et Forestière, Ecole Nationale Supérieure Agronomique El Harrach Alger (Algérie).

*a.sidamar@gmail.com

The present study is carried out in an irrigated perimeter and an oasis in the area of Adrar (Its latitude is of 27° 49 ' North and its longitude is of 0° 11 ' Is), on bioclimatic floor Saharien, winters moderate. L' inventory arthropodofaunistic is carried out thanks to two techniques d' sampling, that of the pots To bore and the net to fauchoir. In the station of Sbaihi in full field 856 individuals are trapped, distributed between 72 species in the pots and 24 by the net. Under greenhouse 877 individuals are captured, divided between 83 species by pots and 10 species per net. Indeed, 1169 individuals divided between 73 species by pots and 56 species per net on the level of the oasis of Mahdia. The class of Insecta offers the most important richness, (97.6 %) in full field and (99.3 %) under greenhouse. in the station of Sbaihi Cependant under will palmerai of Mahdia it is recorded (97.6 %) abundance of the species of Insecta. In Sbaihi, it is the order of Hymenoptera which dominates with 52.6 % follow-up by Coleoptera (14.0 %) in full field, however Orthoptera occupy 11.5 %. Under greenhouse in the same station also Hymenoptera is most abundant (42.0 %), Homoptera in second rank with 32.7 % and Orthoptera is represented by 5.9 %. Two orders appear dominant on the level of the agroécosystème of Mahdia, Hymenoptera (37.7 %) and Podurata (13.7 %), thus Orthoptera are mentioned by (12.4 %). Species having a greater richness in the perimeter of Sbaihi in full field, it ya *Messor capitatus* (10.3 %), *Messor arenarrius* (9.1 %) and *Nysius* sp. (5.4 %). Within Orthoptera, it is recorded the predominance of *Acrotylus patruelis* with 1.5 %. On the level of the greenhouses, it ya also two species, are: *Messor arenarrius* (24.2 %) and Aphidae sp. (32.2%), but among Orthoptera it is *Locusta migratoria* which dominates with 2.1%. However in Mahdia under the palm trees species of arthropods Entomobryidae sp. (13.7 %), Aphidae sp. (7.96 %) and *Messor* sp. (6.7 %) are most present. Orthoptera represented by *Morphacris sulcata* with 4.6 %.

Key words: Inventory, pitfall, Sbaihi, Mahdia oasis, Adrar (Touat).

Autecology of the desert locust *Schistocerca gregaria* (Forskal, 1775) (Orthoptera, Acrididae) in southern Algeria

Djillali MAHDJOUBI[1]* et A. GUENDOUZ-BENRIMA[1]
[1]Université Saad Dahleb Blida.
*djillalimahdjoubi@Gmail.com

Our present work is the contribution to a study of the locust for a better understanding of this household reproduction and its gregariousness. First, a study of it's status phasaire and diet was carried in two periods (spring and autumn) of 2009 in some biotopes of Algeria. On the observations made in the prospected habitats indicate that the presence and density of *S. gregaria* are primarily related to soil texture (soil, light sandy loam) and their moisture (humidity important) which in turn determine the distribution ground vegetation. Regarding the vegetation habitats, 92 plants species have been recorded spontaneous (tree, shrub and herbaceous) in different habitats explored. The morphometric study shows that this locust populations are in heterogeneous states so there is presence of solitary individuals and transiens with a variable density between autumn and spring. Finally, the diet of the locust shows that it's only operating 25 plant species found in the feces of individual locusts. The food choice of locusts may de different according to sex.

Key words: *Schistocerca gregaria*, morphometry, diet, habitat, phytosociology, southern Algeria.

Bioactivity of *Cymbopogon schoenanthus* L. (Poaceae) essential oils on the larvae and adults of *Schistocerca gregaria* (Forskål, 1775) (Orthoptera-Acrididea)

Abdellah KEMASSI[1,2]*, N. HELLALI[3], M. HADJ MAHAMMED[3], Z. BOUAL[2], A OULD EL HADJ-KHELIL[2] et M. DIDI OULD EL HADJ[2]
[1]Institut des Sciences de la Nature et de la Vie, Centre Universitaire Ghardaïa BP 455 Ghardaïa 47000, Algérie.
[2]Laboratoire de Protection des Ecosystèmes en Zones Arides et Semi arides, Université Kasdi Merbah- Ouargla BP 511 Ouargla 30000 Algérie.
[3]Laboratoire de Biogéochimie des Milieux Désertiques, Université Kasdi Merbah-Ouargla BP 511 Ouargla 30000 Algérie.
*akemassi@yahoo.fr

The study of the contact toxicity of *Cymbopogon schoenanthus* L. (Poaceae) essential oils collected in the region of Illizi (central Sahara of Algeria) in L5 larvae and adult of desert locusts showed that this plant extract is toxic both in L5 larvae and adults of S. gregaria. It looks like a fast action is very marked in larvae compared with adults. L5 larvae die early with a mortality rate of 100% is reached after 35 mn.11', in adults, the mortatalité 100 % is only reached after 63mn19'. Disorders of movement and inability to join tarsique are observed following the spraying essential oils of C. schoenanthus on L5 larvae and adult of this locusts. The LT50 is estimated at around 28mn.36' for L5 larvae and 48mn.54' for adults of *S. gregaria*.

Key words: Bioactivity, essential oil, *Cymbopogon schoenanthus*, *Schistocerca gregaria*, central Algerian Sahara.

Evaluation of the growth regulator effect of Teflubenzuron on the L5 larvae of the pilgrim locust *Schistocerca gregaria*

Fatma ACHEUK[1]* et Bahia DOUMANDJI-MITICHE[2]
[1]Université de Boumerdes, Algérie (*criquet72@yahoo.fr).
[2]Ecole Nationale Supérieure Agronomique.

The migrating locusts, *Schistocerca gregaria* (FORSKAL, 1775) occupies a particular place at the ravageurs, it constitutes a quasi permanent threat for the crop plants and the pasturs of many countries of Atlantic and North Africa at the equator in Asia of south-west while passing by the Close East, because of its great mobility, of its very vast surface of invasion, its great potential reproductive, its capacity to consume each day its own weight, and of its polyphagia which enables him to cause severe damage with a broad range of culture. To fight this damage the chemical control with a wise choice of the products remains the most effective means. In the present study we studied the effect of an amount sub-lethal of Téflubenzuron on the histological structure of the digestif tract and the cuticule of the larvae of the 5th stage of the pilgrim locust. The examination of the various parts of the digestif tract of the larvae highlighted notable differences of structure at the individuals treated compared to the control. Microscopic lesions from histological point of view were noticed following the treatment. Teflubenzuron caused modifications on the level of the former intestine, the average intestine and the posterior intestine. The results relating to the study of the cuticule of the abdomen of the larvae L5 de *S.gregaria* make it possible to deduce that Teflubenzuron significantly assigns its structure to the point to destabilize its architecture. This study opens an important prospect as regards fight implying the growth regulators against the devastating insects which are the object of a continual concern on a worldwide scale.

Key words: growth régulator, Teflubenzuron, larvae L5, *Schistocerca gregaria*.

Effect of lufenuron on the larva of fifth instars of the desert locust *Schistocerca gregaria* (Forskål, 1775): Effectiveness and effect on the cuticle

Nadia TIRCHI[1] et F. MOUHOUCHE[2]
[1]Centre Universitaire de Khemis Miliana.
[2]Dép. Zool. Agri. Forest. Ecole Nationale Supérieure Agronomique El Harrach, Alger, Algérie.

Our study consists to evaluate the effect of lufenuron on the larva of the fifth instars of *Schistocerca gregaria*. For this, the product was administered of larva by ingestion. Four doses were utilized and three parameters were evaluated: morphology and behavior of larva, the mortality rate and the effect on the exerted growth. We have also evaluated the effect of the product on the histological structure of the cuticle of larva. Results obtained show a great sensitivity on the larva against this product. Effectiveness of this product on the mortality rate is important. The effect of lufenuron is manifested by the inhibition of mouthing process. A diminution of exerted growth is unregistered on the larva L5 after ingestion of this product. The effect of this product on the histological structure of the cuticle is the reduction of endocuticle thickness and the appearance of gapes on this layer.
Key words: *Schistocerca gregaria*, larvae, lufenuron, rate mortality, exerted growth, Histological structure, cuticle.

Malatox EC50 effect on activity of acétylcholinestérase cérébrale of *Schistocerca gregaria* (Forskål 1775)

A. HAMID OUDJANA[1]*, L. HAMDI-AISSA[1], A. KEMASSI1, M. D. OULD EL HADJ[2]
[1]Laboratoire de Protection des Ecosystèmes en Zones Arides et Semi arides.
[2]Faculté des Sciences de la Nature et de la Vie et Sciences de la Terre et de l'Univers Université Kasdi Merbah-Ouargla, BP 511 Ouargla 30000 Algérie.
*nadjah.oudjana2007@yahoo.fr

This study examines the effect of a toxic insecticide cholinesterase inhibitor and some physiological parameters among males and females of *Schistocerca gregaria* raised in the laboratory and exposed to one a dose of EC Malatox 50. The shortest time of death is noted in males and females treated at a dose Malatox EC50 8g / l. The inhibition of acetylcholinesterase seems more important to the EC 50 dose Malatox 8g / l, with 6.24 ± 8.00 nanomoles / ml / min for males and 5.56 ± 4.91 nanomoles / ml / min for females. The protein levels fall with increasing dose over time. Individual females and males at a fixed dose of 2g Malatox EC 50 / l and at different temperatures are 18 ° C and 36 ° C show a higher mortality over time in individuals treated with fixed dose of 2g Malatox EC 50 / l at 36 ° C. The inhibition of acetylcholinesterase, is more pronounced at the temperature 18 ° C, 21.69 ± 5.66 nanomoles / min / ml in females and 30.32 ± 3.94 nanomoles / min / ml in males. The protein levels after treatment with EC50 Malatox 2g / l at different temperatures seem less important at 18 ° C.
Key words: Malatox EC50, acétylcholinestérase cérébrale, *Schistocerca gregaria*.

Dynamics of population and study of some parameters of reproduction of *Dociostaurus maroccanus* (Thunberg, 1815) in the area of Ain El Hadid (Tiaret)

K. BENAYADA[1]*, B. DOUMANDJI–MITICHE[2], Y. GHALI[1], H. BAHIA[1]
[1]Université de Tiaret, Algérie.
[2]Ecole Nationale Supérieure 'Agronomique EL Harrach, Alger, Algérie.
*kbenayada@.yahoo.fr

The study of the dynamics of populations and parameters of the reproduction of *Dociostaurus maroccanus* being accomplished in the area of Ain El Hadid: Ouled Yahia. At, Ouled Yahia, the epigeal form of the Moroccan grasshopper is noticed from the month of april. This grasshopper has developped 5 of Larval stads (L1, L2, L3, L4 and L5), hatchings persisted over period about one month and factor mattering from its regulation seems to be pluviometry. To *Dociostaurus maroccanus*, the functioning of ovarioles is in general synchronous, the medium number of ovarioles by female is between 9.25 ± 6.07 and 15.77 ± 1.86 ovarioles. The lenghth of accessory gland of females measured 8.50 ± 2.34 and 14.11 ± 02,16mm. The females of *Dociostaurus maroccanus* enter in preliminary vitellogenesis in May with a percentage varying between 84.7 % and 20.2 % and 82 % and 15.1 % for ovary 1 and ovary 2. The vitellogenesis is noted at the beginning of June with a 69.9 % and 73.3 % respectively for ovary 1 and ovary 2. At the males, the medium number of Seminiferous tubes wobbles between 48.50 ± 12.48 and 58.11 ± 4.19 tubes and the medium number of the pairs of secondary glands is counted.
Key words: Ain El Hadid, *Dociostaurus maroccanus*, ovarioles, Seminiferous tubes and secondary glands.

Study of diet genus *Euryparyphes* (Pamphaginae) in the region Moudjebara (Djelfa, Algeria)

Saad BENMADANI[1], B. DOUMANJI-MITICHE[2] et S. DOUMANJI[2]
[1]Faculté Science de la Nature et de la Vie, Université Ziane Achour de Djelfa (Algérie).
[2]Lab. Ornith., Dép. Zool. Agri. Forest., Eco. Nati. Sup. Agro., El Harrach, Alger (Algérie).
*Ortoptere@gmail.com

This study of the diet was conducted in the station located Moudjebara Djelfa, distance of 300 km to the south of Algiers. The study of the diet of the species *Euryparyphes quadridentatus* (Pamphaginae) was conducted in the station Moudjebara showed that the

total wealth of plant species consumed is 5 for the males and the females. *Plantago albicans* is the species the more appreciated with a rate of consumption of (43.8 %) for the males and (68.0 %) for the females. the most elevated relative frequencies in the stools of the males are attributed to *Plantago albicans* (Fr = 78.6 %), followed by *Koeleria pubescens* (Fr = 35.7%).
Concerning the male *Koeleria pubescens* an indication of attraction of 187.6 possesses and (R.G. = 0.2 %). on the other hand *Plantago albicans* with rate of recouverement (R.G. = 0.32 %), present a relatively weak attraction indication (I.A. = 136.8).
For the female *Plantago albicans* (R.G. = 0.3 %), possess an indication of attraction of 212.7. on the other hand *Artemisia herba alba* with more elevated rate (R.G. = 10.9 %), only present a weak indication of attraction (I.A. = 0.5).
Key words: Djelfa, Moudjebara, diet, relative frequency, index of attraction, *Plantago albicans, Euryparyphes quadridentatus*.

Contribution to the study stands of Orthoptera (Insecta, Orthoptera) at Boumlih area (Boumerdes)

Kamel HAMADI[1] et B. DOUMANDJI-MITICHE[2]
[1]Inst. Nati. Form. Cad. Jeun., Texraïne, Alger, Algérie.
[2]Dép. Zool. Agri. Forest., Eco. Nati. Sup. Agro., El Harrach, Alger (Algérie).

Orthoptera Region Boumlih (Wilaya of Boumerdes) were surveyed between 2009 and 2010, which revealed the presence of 20 species. The study site is shown by the pilot farm tree located in the Boumlih daïra Bordj Mnaiel. Orthoptera identified are stationed around the plants of different varieties of olive trees and irrigated crops. From the results obtained, the richness of Acrididae seems most important with 11 species. The family Tettigoniidae is present with a wealth of 6 species, only one species has been identified for the family Pamphagidae. The family Acrididae remains the most representative by the number of individuals per species. In the study sites, species orthoptérologiques show a distribution which is organized according to their ecological requirements.
Key words: Orthoptera, Boumlih, Acrididae, environmental requirements.

Place of Orthoptera in the trophic menu of the Common raven *Corvus corax* in the Ain Ouassara area (Djelfa, Algérie)

Ahlem GUERZOU[1]., W. DERDOUKH[1], F. BAZIZ–NEFFAH[1], K. SOUTTOU[1,2], M. SEKOUR[1,3] et S. DOUMANDJI[1]
[1]Dép. Zool. Agri. Forest., Eco. Nati. Sup. Agro., El Harrach, Alger (Algérie).
[2]Faculté Science de la Nature et de la Vie, Université Ziane Achour de Djelfa (Algérie).
[3]Laboratoire Bioressources Sahariennes : Préservation et valorisation, Univ. Ouargla (Algérie).

The study of the diet of the Common raven is carried out in the area of Ain Ouassara in the north of Djelfa. The analysis of 10 pellets of the Common raven shows the predominance of Orthoptères in the trophic menu of Corvus corax (R.A. % = 47.7 %). Within this order Acrididae are represented (R.A. % = 42.1 %). In terms of species *Calliptamus* sp. (R.A. % = 19.3 %) is the species the most introduced by the Common raven. It is followed by *Calliptamus barbarus* (R.A. % = 17.8 %).
Key words: Orthoptera, *Corvus corax*, diet, pellets, Djelfa.

Part of Ortoptéroides in entomofauna of cultivate area at Ghardaïa (Algeria)

N. CHOUIHET[1], B. DOUMANDJI-MITICH[1] et S. DOUMANDJI[1]
[1]Ecole Nationale Supérieure Agronomique (E.N.S.A., El Harrach, Alger).

This study was done at three different stations located in Ghardaia (32 ° 28'N 3 ° 42 'E) on an inventory for the Super-order Ortoptéroides. Sampling carried out by two methods the sweep net and pitfall highlights the presence of *Acrida turrita*, of *Acrotylus patruelis*, of *Aiolopus thalassinus* of *Brachytrypes megacephalus*, *Gryllulus algirius*, *Gryllulus* sp *Gryllumorpha* sp *Ochrilidia gracilis Pyrgomorpha cognata* and *Pyrgomorpha* sp belonging to the order Orthoptera. The order Blattodea is represented by *Blatta orientalis*, *Blattella germanica* and *Lobolampra* sp. The order of the Dermaptera is represented by *Labidura riparia*. Isoptera sp ind. is the only species representing the order of Isoptera. No species of Mantodea, or Phasmodea has been captured.
Key words: Orthopteroids, grown space, Orthoptera.

ORTHOPTERISTE: New software for the identification and characterization of orthopteran insect species

Abdelkader HADJ SEYD[1] et Abdellah KEMACI[2]
[1]Centre Universitaire de Ghardaïa. Route de Ouargla, Ghardaïa.
[2]Laboratoire ECOSYS, Université Kasdi Merbah, Ouargla.

In this work, we propose to develop software to identify some species of grasshoppers insects based on the identification key of L. Chopard. Our software "Orthopteriste" accurately identifies a multitude of these insects (198 species spread over 19 families and 85 genders) belonging to two suborders ENSIFERA (49 %) and CAELIFERA (51 %). With its interactive graphical interface, guiding the user, step-by-step, the software starts by identifying the sub-order then the super-family then the family and gender, finally arriving to identify and precise the studied species. Identification is based on etymological, morphological and physiological differences between the said insects.
Key words: Orthoptera, Acridology, inventory, identification key, software.

Etho-écological study of *Schistocerca gregaria* Forskål, 1775 (Orthoptera, Cyrtacanthacridinae) and *Locusta migratoria cinerascens* (Orthoptera, Oedipodinae) in the area of Adrar (staion Tsabit)

Aldjia OUDJIANE[1]*, Atika GUENDOUZ-BENRIMA[1] et Fariza BOUSSAD[2]
[1]Université Saad Dahleb, Département d'Agronomie Blida.
[2]Doctorant à L'ENSA d'El Harrach, Alger.
*afhz2002@yahoo.fr

The present study is performed in the station of Tsabit, It is in 40 north km of Adrar (28°18 'N 0°12 'W). In this station the working of irrigation makes especially by the system of drop with drop (potato, small pea, onion, tomato, poivron, summer squash, sugar beet, carrot and the fodder cabbage) or by sprinkling (small plots of wheat, barley, oats, thousand and sorghums). There is the single spindle of wheat, the others are left. We have chosen a palm-gove, a natural middle, a full fields and pivots for studied the etho-eclogy of *Schistocerca gregaria* and L*ocusta migratoria* during the autumn- winter season of 2007 and winter-spring of 2008. We have established when we have studied the fluctuation of the two locusts, the presence of Locusta migratoria during the two periods and the presence of *Schistocerca gregaria* just during the winter-spring season in the all prospected middles of each station except for the natural middle and palm-gove. The calculus of density and the analyze of the biometry have showed that the two locusts are in the form transiens trending to the solitary form. The study of the diet of the two species has enabled us to noted that the appreciable vegetable species appertain to the family of Poaceaes with the cultivated species: *Tritucum durum* L. for *S. gregaria* and *Sorgum vulgare* L., *Pennisetum glancum* L. for *L. migratoria*.

Key words: Adrar, Tsabit, *Schistocerca gregaria, Locusta migratoria*, Morphometry, Fluctuation, Density, Diet.

Editorial

It's already May and for those of us who are in the Northern Hemisphere, it is the beginning of the field season. I will certainly be very busy this summer, doing lots of Orthoptera-related research. My newly established lab already has many students interested in Orthoptera. I find that Orthoptera is a wonderful group to attract any aspiring biologists.

As you can see, the content of the *Metaleptea* is becoming richer and richer as new issues are published and it's an excellent venue for publishing various types of work. In this issue, we have many interesting articles and opinions as well as the abstracts from the recent conference on locusts in Algeria. I hope that this trend can continue in the future issues.

As always, I thank all the members who contributed to this issue as well as my associate editor Sam Heads who provides excellent editorial support in a timely manner.

To be published in *Metaleptea*, please send me new collecting techniques, distribution maps, new ideas and controversies, travel logs, personal reflections, stories about famous orthopterists, short stories and poems, photographs or anything related to Orthoptera at song@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 September 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

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