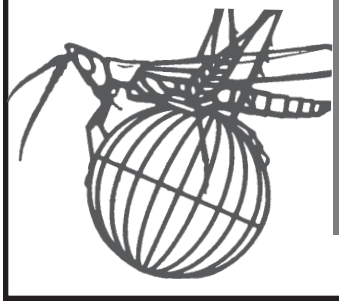
THE NEWSLETTER OF THE *ORTHOPTERISTS' SOCIETY*



# Metaleptea

VOl. 24, NO. 1 February 2004

**INSIDE THIS ISSUE**

## *Society News*

## Come to the Canadian Rockies in 2005

### Ninth International Meeting of the Orthopterists' Society

### Canmore (near Banff), Alberta, 14-19 August 2005

After much searching, Local Committee Chair, Dr. Dan Johnson, has selected Canmore, Alberta as the site of our next international meeting. It is in the heart of the spectacular Canadian Rocky Mountains, just outside the world famous Banff. Within a short distance there is a fascinating high montane orthoptera fauna, as well a very rich prairie fauna, and Dan is developing plans to run field trips to both. He is developing a series of exciting symposia, and there will be plenty of time for submitted papers. The meetings will be held in the Canmore Radisson Hotel known for its culinarily delectable offerings. We are particularly anxious to obtain the participation of students, and to that end he is working very hard to arrange for inexpensive housing in the meeting hotel.

So mark you calendars for these dates for an exciting meeting.

For more information contact Dan Johnson <dan.johnson@uleth.ca>

## *The Passing of the Baton from Jeff Lockwood to Greg Sword*

After10 years of devoted and exemplary service to our Society, Jeffrey Lockwood is leaving the position of Executive Director for a new career at the University of Wyoming at the interface between science and philosophy. Jeff was a worthy successor to our founder, Stan Gangwere, and, building on the firm foundation that Stan established, Jeff moved the Society further professionally and administratively. He established an electronic membership database and several innovative programs. Those who had contact with him experienced his extraordinarily sensitive diplomacy, often accepting blame for things that were the fault of others (including me). While he and I sometimes disagreed, (witness our *Melanoplus spretus* and taxonomic use of genitalia altercation in JOR Nos. 3 and 5 which resulted in lasting friendship!), we always came to an amicable conclusion, and not necessarily a compromise.

I have appointed Gregory Sword to replace Jeff and I thought that members would like to know something about him. He arrived in Arizona at the age of 2, and was a resident until the end of his undergraduate education at the University of Arizona. There he was introduced to grasshoppers as well as "how to do science" by Reg Chapman and Liz Bernays. He then moved to the University of Texas at Austin where he continued to study grasshopper host plant use and received his PhD a few years ago. Following this, he did postdoctoral work in phase change in *Schistocerca* with Steve Simpson at Oxford University that involved field studies in Mauritania. Upon completion of this work he joined a group in the Agricultural Research Service of the US Department of Agriculture that is developing ecologically based-preventative management strategies for grasshoppers, Mormon crickets, and locusts. Despite the enormous economic significance of these groups, surprisingly little is known about their ecology and behavior. Welcome aboard Greg.

***T. J. Cohn***

All pics are modified versions of Dr. Priotr Naskreckt's phoots published on the society's web site. Please view the colored originals which are so much better than my adaptations. My personal apologies for any distortions of the excellent originals in my attempt to make this publication more visually appealing.

## *In Memoriam: R. F. Chapman*

The Orthopterists' Society lost one of its cherished members this summer. Reg Chapman passed away on May 2, 2002, leaving behind a lifetime of dedication to entomological research. Though recently retired from the University of Arizona in 2001 where he held joint appointments in Entomology, Physiological Sciences, and the Division of Neurobiology, he continued to remain active in teaching, writing and research. Reg was a long-term honorary member of the Orthopterists' Society, and consistently supported the Society's efforts with his expertise, enthusiasm and generous contributions. Many Society members are undoubtedly familiar with Reg's scientific works including his seminal entomology text *The Insects: Structure and Function,* as well as *The Biology of Grasshoppers* that he co-edited with Tony Joern. In addition to these landmark books, Reg's unfailing enthusiasm and ambition resulted in a myriad of other high quality books, chapters and journal articles on a wide variety of subjects. An excellent synopsis of Reg's life and accomplishments by Walter Blaney was recently published in *Physiological Entomology* (vol. 28:155-156). Rather than restate his impressive biography, I thought I'd share with Society members some of my personal thoughts and experiences with Reg. My early interactions with him are in many ways responsible for the way my life has since unfolded.

As an undergraduate at the University of Arizona in Tucson, I wandered into the laboratory of Liz Bernays to inquire about a research position in ecology. Liz was already regarded as an outstanding orthopterist whose work was a cornerstone in the field of insect-plant interactions. She was also married to Reg, and together the two shared a wonderfully productive scientific partnership and personal relationship. I managed to get the job, where I was to work primarily as Reg's assistant for what was to be three exciting and formative years. Initially, however, I had no idea how lucky I was. I really didn't know anything about entomology or plant-insect interactions. In fact, it took me a while to fully appreciate how well known and respected Reg and Liz were, not to mention how fortunate I was to be working with them.

Just as Reg and I would often observe grasshoppers, I had the opportunity to observe Reg in action both in and out of the lab. His demeanor was always cheerful and polite. Even if he had the weight of the world on his shoulders, you would never know it. When speaking to Reg, he was invariably attentive and would really focus on what you had to say. His comments were always helpful, and in the event that he didn't agree with you, his criticism was constructive and never negative. Though he was usually calm and quiet, he was also prone to occasional animated outbursts in which he would imitate animals, odd behaviors, or particularly pompous people. These same qualities made Reg an outstanding teacher. Students considered themselves lucky to have been taught by him.

In the laboratory, Reg exhibited remarkable patience and attention to detail. Perhaps the most important thing I learned from him was to stop and take the time to see what insects are doing. We would often sit together in a dark, heated room called the "Hot Box," observing grasshoppers as they fed on different plants. During these times I would think to myself here I am with Reg Chapman, a famous scientist, sitting in the dark while watching grasshoppers eat for hours on end. Surely he has more important things to do, books to write, or people to meet. But to Reg, taking the time to learn more was the most important thing to do. I would also ask him about the role played in the field by some of the behaviors we observed in the lab, to which he would often reply, "We really don't know." This in turn inspired me to work in the field later in my career to try to fill some of the gaps in our knowledge.

Reg continued to be a major source of inspiration and assistance long after I left his lab as an undergraduate. This was not only true for me. Many of the people who had worked with him in the past considered him to be an extremely valuable resource, colleague and friend. The things I learned during those three short years laid the foundation for my future and Reg was there for me the entire way. I visited with Reg and Liz at every opportunity and from those visits I always walked away with an important insight or some good advice.

In some ways, knowing Reg could almost make you lazy. Anytime you had a question about a particular insect or wondered if a certain study had been done, instead of going to the library, you could ask Reg. Not only was he always more than willing to help, but he usually knew the answer! It was hard not to draw on this wonderful source of knowledge.

Upon hearing that Reg passed away, my wife described him as the most perfect gentleman she had ever met. Her words stuck with me. She is not a scientist, and in contrast to me, her interactions with Reg were largely outside the lab. Clearly Reg made a substantial contribution to science as evidenced by his vast scholarly works, but at the same time he maintained himself as very kind and caring person. He will be remembered and missed as a true gentleman and scholar.

***Gregory Sword***

## *Orthopterists' Society 2002 Financial Report (p. 1)*
## *(In US Dollars)*

### Operating Income

(does not include income from restricted OS2 Database Endowment)

| | |
|---|---|
| Membership Dues | 4,657.00 |
| Publications (subscriptions, publications, page charges) | 20,618.20 |
| Non-Designated Contributions | 2,740.00 |
| Sponsored Membership Contributions | 345.00 |
| Research Grant Contributions | 8,015.00 |
| Credit Card Fee | 215.00 |
| Investment Income (including interest on checking acc't.) | 1,208.84 |
| Miscellaneous | 4.50 |
| **Total** | **37,803.54** |

### Expenditures

| | |
|---|---|
| Officer's Remuneration | 7,034.00 |
| Editorial Assistant | 14,375.00 |
| Printing | 14,981.81 |
| Research Grants | 11,595.00 |
| Visa Credit Card Charges | 441.93 |
| American Express Credit Card Charges (cancelled in 2003) | 60.00 |
| OS share of Montpellier Meeting Costs | 4,110.00 |
| Secretarial Services | 413.00 |
| Miscellaneous* | 622.00 |

* Bank wire fees, miscellaneous bank fees, secretarial services, Visa terminal replacement, adjustment for error in foreign exchange rate).

| | |
|---|---|
| **Total** | **53,632.80** |
| **Apparent Deficit** | **15,829.26** |

The apparent deficit was incurred primarily from unusual printing expenses, and the payment of 2001 research grants in 2002.

The deficit was covered by a large checking account carryover (accumulated to pay for 2001 research grants of 4,280), a contribution from the OS2 Database Endowment, the close out of the Strong Money Market Fund in the Operating Fund, and the transfer of moneys from other Money Market Funds (on which the interest rate was almost as low as that on our Interest Checking Account) in the Operating Fund. No withdrawls were made from our Index Fund, Bonds or Preferred Stock.

## *Orthopterists' Society 2002 Financial Report (p. 2)*

**Fund and Checking Account Balances**

| | 31 Dec. 2001 | 31 Dec. 2002 |
|---|---|---|
| OPERATING FUND | | |
| Strong Blue Chip Fund (restricted to Research Grants Program) | 13,582.91 | 9,472.87 |
| Strong Growth & Income Fund | 28,137.36 | 21,994.70 |
| Strong Investor's Money Market Fund | 976.00 | -0- |
| Morgan Stanley Dean Witter (Preferred Stock, Money Market Fund) | 5,135.16 | 10,276.68 |
| Interest Checking Account | 7,828.00 | 3,253.90 |
| **Total Operating Fund** | **55,659.43** | **44,998.15** |
| ENDOWMENT ACCOUNT | | |
| Morgan Stanley Dean Witter. (Preferred Stock, Index Fund, MM Fund) | **16,344.37** | **15,911.42** |
| OS 2 DATABASE ACCOUNT (Restricted) | | |
| Morgan Stanley Dean Witter Money Market Accpount (transferred to Vanguard) | 183,400.00 | -0- |
| Vanguard Total Stock Market Index Fund | 45,276.51 | 185,773.52 |
| Vanguard Prime Money Market Account (* after payment of page charges for JOR paper on Database Program) | 5,662.38 | 7,526.62* |
| **Total Database Account** | **234,338.89** | **193,300.14** |
| **TOTAL NET WORTH OF SOCIETY** | **306,342.69** | **254,209.72** |

Most of the decline in Fund values for 2002 resulted from a large decline in the US stock market. No stock funds were sold during this period. All capital gains distributions were reinvested (and in the case of Vanguard, all dividends as well). In 2003 the US stock market recovered part of its loss.

## *Katydids and Bushcrickets: Reproductive Behavior and Evolution of the Tettigoniidae*

***By Darryl T. Gwynne***

317pp. Cornell University Press.

Before I begin this review, I should confess that I am biased. Ever since I had my first close encounter with a 3 inch long "Great green" bushcricket while on a seaside holiday in the south of England at the age of eleven, I have been fascinated by the Tettigoniidae. Given this disposition, I couldn't fail to be enthralled by Gwynne's "Katydids and Bushcrickets". This book, which is richly illustrated with color and black and white photographs, together with numerous line drawings, graphs and tables, is not just a book for bushcricket devotees, however. It will appeal to any naturalists who wish to be introduced to this fascinatingly diverse family of insects. The book is about more than katydids and bushcrickets though. It shows how in-depth studies of the natural history of any group of animals can lead to answers to much wider evolutionary questions. As such, the book will also appeal to anyone interested in evolutionary ecology and sexual selection.

One thing I really like about Gwynne's writing is his use of the literature. Early studies are so often overlooked, especially in the field of evolutionary ecology, in which authors often seem interested only in jumping on the bandwagon of the latest trendy topic. Yet the rewards for digging deep into the literature can be great. Gwynne uncovers countless early gems, such as Gabriel Brunellius' detailed and accurate drawings of the anatomy of the Great green bushcricket, dated 1791, and Jean-Henri Fabre's unparalleled observations of the habits of bushcrickets published in 1917.

The focus of this book, as the subtitle suggests, is the evolutionary ecology of bushcricket reproductive behavior. Before this subject is covered in depth, however, we are given the necessary background on the biology of the family. Initial chapters introduce the diversity and phylogenetic position of the Tettigoniidae, their life cycles and feeding habits and their natural enemies and defenses. Each of these topics could form the basis of a book in their own right, but Gwynne succeeds in condensing the information and avoids broad generalizations by using numerous specific examples to illustrate the diversity of tettigoniid behavior.

The sections on reproduction include chapters on song and mate attraction and the hazards associated with mating. The main thrust of the book, however, is related to the unusual nuptial feeding behavior found in most tettigoniids and the effect that this has on sex roles, in terms of which sex is competitive and which is choosy when it comes to mating. During mating, male bushcrickets typically transfer a large gelatinous mass, the spermatophylax, along with the rest of the spermatophore. The spermatophylax, which can represent as much as 40% of male body weight, is then eaten by the female while insemination occurs. A chapter is dedicated to the function and evolution of this fascinating behavior - a subject close to my heart, since it was the topic of my Ph.D.. Gwynne's review of the literature is, as usual, very thorough and encompasses both pioneering studies by early 20th century scientists and more recent empirical tests of their original hypotheses.

In the remaining chapters, Gwynne shows that while in many species of bushcricket males compete for mating opportunities and the females are the choosy sex, in some cases these typical sex roles are reversed. Gwynne explains how this change in sex roles appears to be due to shifts in the operational sex ratio; the ratio of sexually available males to females in the population. Referring to studies of the Mormon cricket and an Australian Pollen katydid, Gwynne shows that the spermatophylax lies behind shifts in the operational sex ratio. This nuptial gift is expensive for the male to produce and delays him from re-mating, while at the same time benefiting the female as a food source. At times of food stress, males able to manufacture a spermatophylax are in short supply, while hungry females increase their mating rate in order to forage for the proteinaceous nuptial gift. This causes the operational sex ratio to become female-biased and inevitably leads to competition between females for the few sexually available males. The males then have the luxury of being able to choose between females, selecting only the largest and most fecund as mates. Gwynne suggests that in some species, selection resulting from sex role reversal may have lead to the evolution of elaborate sexually selected traits in females, such as the enlarged mandibles and complex stridulatory organs that are found in certain neotropical pseudophylline bushcrickets. That nothing is known about how these females use their elaborate traits highlights just how much more there is still to be discovered about the fascinating world of katydids and bushcrickets.

***K. Vahed,***
***University of Derby,***
***U.K.***

## *Phylogeny and the evolution of acoustic communication in extant Ensifera.*

***by L. DeSutter-Grandcolas***

**2003 Zoologica Scripta 32:525-561.**

Abstract. Ensifera present an appropriate and interesting model for the study of acoustic communication, because of their diverse signal and communication modalities, and due to their accessibility for field and laboratory studies. Several hypotheses have been proposed to explain the acoustic evolution of Ensifera, but they were elaborated without any reference to a falsifiable phylogeny, and were consequently highly speculative. Similarly, phylogenetic relationships between ensiferan clades have not hitherto been studied using modern standard methodology, and the sole cladistic analysis by Gwynne in 1995 was methodologically flawed.

No sound hypothesis therefore currently exists for ensiferan phylogeny, which precludes historical analysis of their communication modalities. In the present paper, the phylogeny is established on the basis of morpho-anatomical characters and used to analyse the evolution of acoustic communication in this clade by mapping the characters related to auditory and stridulatory structures onto the resultant trees. Cladistic analyses resulted in two equi-parsimonious cladograms (length 154, C 64, CI 58, RI 61) with the following topologies: (1) [(Grylloidea-Gryllotalpidae) (Rhaphidophoridae (Schizodactylidac (Gryllacrididae ((Stenopelmatidae-Cooloola) (Anostostomatidae (Prophalangopsis (Cyphoderris (Tettigoniidae-Lezina))))))))] (2) [(Grylloidea-Gryllotalpidae)(Rhaphidophoridae (Schizodactylidae (Gryllacrididae-Cooloola-(Stenopelmatidae (Anostostomatidae (Prophalangopsis (Cyphoderris (Tettigoniidae Lezina))))))))].

According to these topologies, Ensifera were ancestrally devoid of acoustic and hearing systems. An acoustic (tegminal or femoro-abdominal) apparatus appeared a number of times independently with convergent strutures. Similarly, tibial tympana developed several times independently. Moreover, four hypotheses (each according to a definite pattern of character transformation) can be proposed to explain the evolution of acoustic communication in the different ensiferan clades and relate it to a definite communicatory context. These hypotheses do not apply equally to ensiferan subclades. Grylloidea and Gryllotalpoidea could have experienced convergently a direct development of an intraspecific acoustic communication. Acoustic communication in Tettigoniidea has evolved more ambiguously, and may either have resulted from a direct evolution analogous to that having occurred in Gryllidea, or have developed in a completely different behavioural context. Future studies of acoustic communication in the different ensiferan clades will have to take into account the fact that the involved structures most often are not homologous and that their evolution may not have taken place in similar conditions. Different hypotheses of acoustic commu nication evolution may apply to different clades, and there may be no single explanation for acoustic communication in Ensifera

**********

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***CANADA***

## *Catching grasshoppers: a technique to avoid*

**Karim Vahed**

"I know the best way to catch grasshoppers", said Grandson Simkoko, clearly unimpressed by the meager harvest that had resulted from half an hour of energetic flailing with my trusty sweep net. "I will show you", he said with a broad smile, producing from his pocket a large matchbox crammed with an astonishing variety of acridoids. "You set fire to as small patch of grass. When they smell the smoke and hear the fire roar, the grasshoppers fly and hop in the opposite direction and you can catch them easily".

It sounded a little drastic, if not rather dangerous, but I knew that as a ranger in Malawi's Nyika National Park, Simkoko had years of experience in burning the dry afromontane grassland that clothed the vast expanse of rolling hills. After all, it was burning that helped to maintain areas of lush green grass favored by the park's Burchell's zebra and numerous antelope.

Simkoko carefully selected a half-acre triangle of grass, bordered on two sides by a band of thick, green vegetation and on the other by recently burned grassland on an almost vertical slope. "The fire will stop when it reaches the green bushes", Simkoko explained confidently as he dropped a lighted match into a tussock of dry grass in the center of the plot. I was impressed by the speed at which the fire grew. Within seconds the flames were two feet high and began to spread in a rapidly expanding ring, crackling and roaring with ever increasing intensity. The hot sun shining through the haze of smoke cast an eerie purple light over the scene. I gazed, almost hypnotized, as I contemplated the wall of fire. Then, at my feet, what had appeared to be a blade of grass transformed into a seven-inch long stick insect that suddenly took flight from the advancing flames. It had been well away from the heat of the fire and I paused to wonder what cue had triggered the escape response and how the stick insect must be a descendent of a long line of ancestors that had succeeded in escaping the regular bushfires long enough to breed. I felt a twang of guilt as the grass around me came alive with a myriad of mantids, stick insects and grasshoppers, all attempting to flee from the impending inferno. Instead of concentrating on collecting the grasshoppers, I began a futile attempt to transfer as many of the diminutive refugees to the safety of the bushes as I could. To make this task easier, I took off my cumbersome kit bag and laid it in the grass well away from the fire.

I had become absorbed once again in catching my quarry when, with no prior warning, the wind changed direction and I became engulfed in thick, acrid smoke. Having decided that it was time to beat a hasty retreat, I realized that my bag wasn't where I thought I had left it. Choosing to bring my khaki kit bag, the exact color of the dry grass, had seemed like a good idea at the time, as had carrying within it not only my book of field data from the past three weeks, but also my passport, camera, credit cards, cash and airline tickets. I began to panic, like the frantic insects around me, running back and forth in the region in which I thought I had deposited my bag, while flailing my arms and sweep net around in an attempt to attract Simkoko's attention. He was standing on the hillside above me, sensibly well away from the smoke and fire. After staring at me quizzically for what seemed like an age, Simkoko realized that my strange behavior wasn't a new grasshopper catching technique and came running to my aid. "My bag!", I exclaimed in a plaintive wail that was barely audible over the hiss and crackle of the rapidly advancing wall of fire. Simkoko leapt around me, dancing in and out of the flames brandishing a small leafy twig in a vain attempt to beat them back. I had just resigned myself to the fact that my kit bag was incinerated and had started to plan a trip to the British Consulate to discuss a replacement passport when I literally tripped over the bag's long shoulder strap. It lay just feet away from the fire and although it was a little singed, the contents were unharmed.

As I informed Simkoko of my discovery, a gust of wind fanned the flames to three times their former size and sent a dense pall of smoke over us. "This way!", Simkoko cried as he realized that the only remaining escape route was through a dense thicket of vegetation that formed an apparently impenetrable wall before us. Sweat poured from Simkoko's face as, hacking at the woody tangle with his traditional Malawian hand-axe, he began to clear a narrow passage through the undergrowth. As we crawled along the passage, the inferno roared behind us with the power of an express train. Branches cracked like gunfire as, rapidly dried by the intense heat, they burst into flame. I could see that the determination on Simkoko's face was beginning to transform into panic. I was surprised to find myself praying hard for salvation, when suddenly the smoke cleared and we emerged into bright sunshine. I felt elated as we sprinted clear of the fire to the previously burned grassland on the steep hillside overlooking the scene of devastation.

As Simkoko and I looked at one another, he began to produce an alarmingly high-pitched wheezing sound that thankfully turned out to be a laugh of relief. "We made it!", I shouted, slapping Simkoko firmly on the back. But his smile of relief had turned to a scowl of

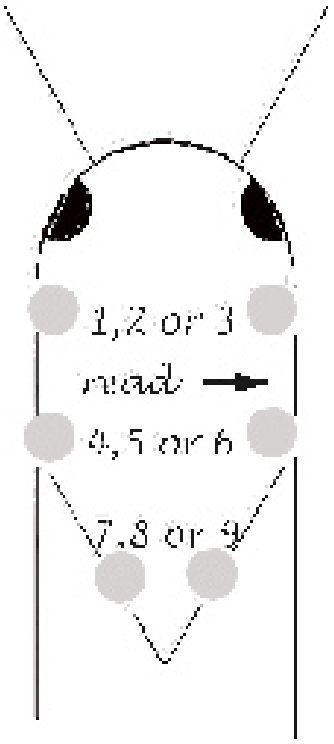
concern. “The fire should stop at those bushes”, he said, without confidence, as the bushes exploded into flames the height of a two-story house. “It is heading towards base camp. I must try to put it out. You wait here!”, exclaimed Simkoko, as he raced heroically back down the hillside towards the fire. I paused momentarily as I wondered whether it would be socially acceptable for me to remain at my safe vantage point while Simkoko risked his life to save the expedition’s base camp. Having reluctantly decided that it wasn’t, I followed Simkoko, cutting a green leafy branch to use as a beater. I could smell the rubber of the soles of my boots burning as I ran over the smoldering grass. By the time I caught up with Simkoko he had already made good headway at the fire’s line, beating it into submission with a large branch that was beginning to look decidedly charred. We worked together, flailing at the hissing fire again and again, leaping away from the intense heat of the flames as they lashed out at us defiantly. When, after an exhausting hour, we eventually had the blaze under control, Simkoko turned to me and said with a frown, “I think that maybe we should not use this method to catch grasshoppers again”.

## *Marking grasshoppers*

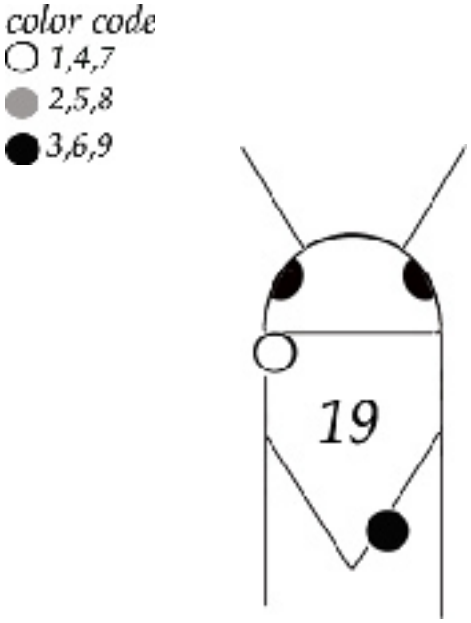
***Marianne Niedzlek-Feaver***

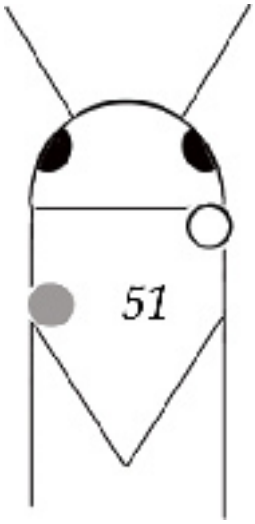
My laboratory examined the effectiveness of a variety of marking techniques. We tried several paints and inks including those available in various ‘magic’ markers. Enamel paints, (we used the brand name, Testor), emerged as the top choice for marking media. They last for months even in the field, and have no noticeable deleterious effects on the animals. Crude marking tools (grass stems and twigs) can be used on animals to make small dots and dashes without applying much force. Species marked using these paints in the field included grasshoppers, Chortophaga *viridifasciata* and *Dichromorpha viridis*, and katydids, *Orchelimum puchellum* and *Orchelimum vulgare*. Grasshoppers, *Schistocerca americana* and *Dissosteira carolina* were also marked using these paints in the laboratory. Testor’s new acrylic modeling paints should not be used. They are extremely toxic, killing newly molted individuals within 24 hours.

The code adopted for adults, developed by Dr. Robert Willey (U. of Illinois, now retired), involves six possible positions on the pronotum for dots. Color and dot position code for numbers. Two dots are painted on each individual’s pronotum with numbers reading left to right with the animal’s head oriented away from the investigator. Dots placed in position one, near the head, depending on color, will equate to numbers 1-3.
Position two, mid-pronotum, if dotted denotes numbers 4-6. Position three, at pronotum’s end and near tegmina, codes for numbers 7-9.




Let us suppose a white dot equates with the numbers one, four and seven. A gray dot can stand for the numbers two, five and eight and a black dot can represent numbers three, six or nine. Given these color examples, a left-white dot in position one, and a right-black dot in position three would equate with the number 19. A left-gray dot in position two and a right-white dot in position one would indicate the number 51. To indicate numbers above 99, different colors are used.




## *A plea to the membership*

Please consider submitting a technique or protocol for dealing with Orthoptera, which proved successful or unsuccessful, for publication in Metaleptea. We would like to collect successful methods as well as tips on protocols to avoid, and compile them into a pamplet that could be distributed at the Canmore meeting. Methodology was the one-topic members wanted to see a regular column devoted to in this newsletter according to the survey conducted at the last meeting. Especially requested by the membership was information on techniques that allowed various species to be located, captured without harm, marked permanently or reared successfully in the laboratory.

A special thank you to Darryl Gwynne and Karim Vahed for submitting reviews of literature on Orthoptera that would be of interest to the membership. This was the second most requested item on the survey of the membership. Please continue to send to the editor of Metaleptea any news on publications that may prove of interest to the membership. You do not need to submit a formal review. The membership benefits simply from being informed of books or other publications that they may want to consult in the near future.

This newsletter costs the society a great deal to produce and mail to all the members. Your continuing support would indicate that you consider this a worthwhile endeavor. So please contribution to future issues.

***M. Niedzlek-Feaver***
***mnfeaver@unity.ncsu.edu***

***We welcome these new members to the society.***

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Mr. Joshua A. Deily
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***Signal evoluation and trait divergence in cone-headed katydids*** *(Tettigonioidea, Copiphorinae, Neoconocephalus)*

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*Red grasshoppper/locust management, application techniques, operations, ecology, insect pathology, chemical and biological control*

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*Bioecology of phytophagous species (natural enemies and life cycles, host plants)*

Dr. James H. Kennedy
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Mr. John E. Lee
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