Editorial

Dear Pyraloidea fans,

Welcome to this 7th edition of our newsletter. The last year has been almost as exciting for me as the preceding. I haven’t yet been in the field, and our planet’s biodiversity continues to diminish and to be poorly managed, but scientifically speaking I have reasons to be happy. Firstly, I was able to secure funding to hire Théo Léger at our Museum for three years to do his Ph.D.; his research will focus on the phylogeny of Crambinae and Scopariinae, with Matthias Nuss as co-supervisor. Théo did his M.Sc. project with me on genus Catharylla, successfully defending last September and he tells us more about his project on page 4. Following the termination of my own Ph.D. on the phylogeny of the Crambinae 21 years ago, I kept thinking about it and that I should take it up again with the new methods made available since, but also that it was too big an undertaking given the limited research time I have. So with Théo on board, I feel that finally some answers to my questions will become available. My second reason to rejoice is the publication of Regier et al. (2012) ‘A molecular phylogeny for the pyraloid moths (Lepidoptera: Pyraloidea) and its implications for higher-level classification’. More on the conclusions of this project is available on page 2.

I thank all of the contributors who sent material for publication and as usual please send me any changes of address for the next issue and don’t be shy if you want to take over for the 2014 issue. Finally, don’t hesitate to disseminate PP widely!

Cheers,

Bernard Landry

Glaucocharis holanthes (Meyrick) from New Zealand. Photo by Birgit Rhode, NZAC, Landcare Research, Auckland.

This issue was made possible with the help of David Agassiz, Jurate & Willy De Prins, Christian Guillermet, Robert Hoare, Théo Léger, Matthias Nuss, Eivind Palm, Colin Plant, Qi Mujie, Birgit Rhode, Alma Solis, Kevin Tuck, and Shen-Horn Yen.

The logo of The Pyraloid Planet was created by Florence Marteau of the Muséum d’histoire naturelle, Geneva, Switzerland, and the layout of this issue was made by Corinne Charvet of the same institution.
A molecular phylogeny for the pyraloid moths

In relation to family-group taxa of Pyraloidea, systematists working with morphological characters have not been able to unravel clear phylogenetic relationships except for the division of Pyraloidea into two subgroups, Pyraliformes (=Pyralidae sensu stricto) and Crambiformes (=Crambidae). Regier et al. (2012) were able to fill this knowledge gap partly. Up to five nuclear genes were sequenced for 42 pyraloid species of 18 of the 22 subfamilies and up to 14 additional genes for 21 of the pyraloid species studied plus all 24 outgroup taxa. Cathariinae, Cybalomiinae, Heliothelinae, and Linostinae were not included in the study. As can be seen in Fig. below, the two major groups of subfamilies are maximally supported and such is also the case for all branches recovered in the Pyraliformes except two obtaining more than 90% support. In Crambiformes, the phylogeny is maximally supported for many branches, such as, for example the Pyraustinae + Spilomelinae clade, with Wurthiinae nested within the latter and hence synonymized. A ‘wet-habitat clade’ made of Acentropininae, Midillinae and Schoenobineinae is also maximally supported as well as a clade made of Crambinae + Acentropininae + Mus Rotulae + Midillinae + Scoparinae + Schoenobineinae and a clade made of Crambinae and Scoparinae. The latter finding provided a strong argument for studying the phylogeny of both subfamilies in conjunction, which is reflected in Théo Léger’s Ph.D. project (see p. 4). Another proposed clade, the ‘Mustard oil clade,’ for which the majority of caterpillars for which the host plant is known feed on Brassicales, is made of Glaphyriinae, including Evergestinae and Noordinae, which are synonymized with Glaphyriinae. Further research should be extended to the four subfamilies not included in this study and to more of the divergent lineages within each of the larger subfamilies, but it provides a framework on which morphological and other characters can be better interpreted to possibly unravel new evidence of relationship at lower taxonomic level. An opportunity to add to this entire dataset may not present itself in the future, but separate analyses of clades recovered in this study is certainly an interesting avenue to pursue.

Bernard Landry

Maximum likelihood estimate of phylogenetic relationships in Pyraloidea obtained from 500 GARLI searches under a GTR + gamma + I model for all nucleotides (unpartitioned). Bootstrap support values (1000 bootstrap replicates) above branches for: nt123 (19 genes), nt123_partitioned (19 genes), nt123_degen-1 (19 genes), nt123_degen (5 genes). Hyphen (-) denotes bootstrap value <50%. Square brackets denote node not present in the best ML tree for that analysis. Node numbers (to the right of node) are used to organize text presentation of phylogeny. Dotted lines and associated bootstrap values show alternative placements for selected taxa. The number of genes sequenced (5 vs. 19) is given after each genus name. From Regier et al., 2012 (see reference in GlobIZ).
GlobIZ News 2013

During the last 12 months, the number of valid species included in the Global Information System on Pyraloidea (GlobIZ) increased by 946 (+190 synonyms) to a total of 14,135 (+5,638 synonyms). Some 2,100 changes were made by six contributors to GlobIZ pages.

With increasing completeness of the dataset, efforts of editing data are more and more shifting to improve the quality of records, e.g., by verifying original references as well as adding the references for generic transfers and status changes of taxa.

Everybody is welcome to verify data using the public domain www.pyraloidea.org and report missing data or mistakes to Bernard Landry or Matthias Nuss. Moreover, I would be more than happy to provide anybody interested in editing data the right to enter the database for that purpose.

Matthias Nuss

Progress in recording the Pyraloidea of Bulgaria: some preliminary data

There is no complete list of Pyraloidea (Crambidae & Pyralidae) of Bulgaria. The European checklist by Karsholt & Razowski (1996) is very incomplete, contains a few errors and, of course, lacks supporting data. However, the Balkans provide one route by which many species may colonise Europe as a consequence of climate change, so it is important to know the nature of the existing fauna in this area.

The earliest existing data is from Johann and Ludmilla Haberhauer, who collected in the areas around Varna and Sliven in 1861 & 1862 (Lederer, 1863). That list was drawn upon heavily by Rebel (1903) who summarised Bulgarian information to date (though there is much confusion as a consequence of changes to national boundaries). Figure 1 shows the number of species listed for Bulgaria against year; the data from Rebel (1903) are clear; it is interesting that after 1903 there has been a steady rise in the number of recorded species with the trend line describing a slope of more or less 45 degrees.

Of course, not all species are recorded in all years – a closer look at the number of species recorded in each year is interesting (Fig. 2). The peak during the 1930s is largely due to the independent activities of Popescu-Gorj (Black Sea coast) and Tuleshkov (mostly in the south-west). In the 1980s, short review papers covering various small groups were published by Julius Ganev; unfortunately, many of these records lacked supporting data so that the year of the report is not clear. It is likely that Ganev repeated many data from earlier publications so that the trend of the graph in Figure 2 is also perhaps closer to 45 degrees? It is not possible to know.

Data accumulated in the last 20 years has come from personal collecting trips and the efforts of Dr Stoyan Beshkov and Dr Boyan Zlatkov who have retained all of the unwanted material from their many light-trapping sessions and mailed this to me for identification in England (Photograph 1). Of course, most pyralids within these samples are damaged; identification has been based on genitalia dissection even for very common species!

The geographical coverage of the country is acceptable and is shown in Figure 3. At the start of 2013, I have data for 380 taxa; this represents 377 full species and 3 endemic subspecies. Of these, 238 (62% of taxa) are reported in years 2000 – 2012. A further 46 were last recorded between 1980 and 1999 and are likely to be still present; if so, that would raise the total of the “current” fauna to 284 species (=75 % of listed taxa).

Using the EstimateS freeware, “Accumulation Curves” have been generated (Figure 3).
The results are different for each index: between 25 and 94 additional taxa are predicted. A further 94 pyrales is highly improbable; the addition of a further 25 is very possible. Some additional data may facilitate the non-scientific predictions:

- 42 species were certainly first recorded before 1900.
- 136 species (36%) were probably first recorded prior to 1900.
- 93 species were first recorded between 1900 and 1950.

Thus, 60% of the overall fauna was recorded by 1950.

Not all published data state the year of the record, but an additional 56 species were probably recorded before 1950. If this is true, then 75% of the fauna was recorded by year 1950.

Therefore, 25% of species were not recorded until after 1950.

21 species were first recorded during the 1980s.
18 species were first recorded in the years 2000 to 2012.

Most species recorded since 1950 were probably overlooked. However, it is possible that some are genuinely new and this may reflect a change in the pyraloid fauna of the country – perhaps as a consequence of climate change.

For interest, Figure 5 shows the most frequently encountered species, as measured by the number of individual examples captured.

Many data on Bulgarian Pyraloidea hide in private collections or museums. As a self-funding entomologist I am not able to visit every museum in Europe just to look, so it will be very much appreciated if colleagues could look and tell me the information from labels on specimens. This is the final year of survey and is coincident with the 2013 "European Congress of Lepidopterology" which will be held in south-west Bulgaria. It is very much hoped that the many entomologists who are attending this Congress will send me their own collecting data for inclusion.

References


Acknowledgements

The accumulation curve was produced by Dr. Elena Tasheva, an ecologist at the Sofia University “St. Kliment Ohridski”, Faculty of Biology. I have very much enjoyed the company, on collecting trips, of my good friends Dr. Stoyan Bestkov and Dr. Boyan Zlatkov, who have also sent me the material from their lamps at the times of year when I was in England.

Colin Plant

Budding pyraloid specialists

Unravelling the phylogenetic relationships of the Crambinae and Scopariinae

My name is Théo Léger and I just started my Ph.D. under the supervision of Bernard Landry and Matthias Nuss. My main goal is to investigate the phylogenetic relationships within and around the Crambinae and Scopariinae based on morphology and molecular data. I wish to test the monophyly of both subfamilies and their previously categorized lineages (tribes), and to infer the biogeography of the groups recovered and the evolution of their feeding habits. I am also going to develop an interactive key to the genera of Crambinae and Scopariinae of Europe.
Greetings from South Korea

My name is Mujie Qi, a Chinese student. I am 30 years old. Now I am studying for my doctoral degree at the University of Incheon, South Korea, with Prof. Yang-Seop Bae, who works on Microlepidoptera, especially Tortricidae and Pyraloidea.

Before the start of my Ph.D., I obtained my Bachelor’s and Master’s degrees at Northeast Forestry University, Harbin, China. The topic of my Master’s thesis was a systematic study of the Cassidinae (Coleoptera: Hispidae) from Northeast China, which gave me some basic knowledge on taxonomy. I have to admit that taxonomy never failed to fascinate me, so I decided to study in this field more deeply and now my Ph.D. dissertation’s topic is a systematic study of the Phycitinae from NE China. As you may know, the moths of this group do not show high variation in wing colour and pattern, but they are serious pests of many trees. As an important forestry region, NE China has little information on its Phycitinae fauna, so it is time to study this group more deeply in this region. As our laboratory includes collections from Southeast Asia, I hope to look at some more groups of Pyraloidea, such as the Pyraustinae or Acentropinae, in the future.

This year I am trying to graduate and I hope to get a job related to insect taxonomy. Although China is a vast country with abundant natural resources, there are a few experts focusing on taxonomy, so we still have a long way to go, and probably I will need help from the experts of Pyraloidea. I hope to dedicate myself to the taxonomy of Chinese Pyraloidea for all my life and to work along with researchers and students of Pyraloidea from all over the world in the near future.

Finally, I would like to thank Dr. Matthias Nuss and Dr. Bernard Landry for inviting me to introduce myself here. I really appreciate this great opportunity to meet all those who work on Pyraloidea. I wish you all a happy and healthy year and that your work is going well.

Mujie Qi

Phylogenetic studies in Acentropinae

Miss Ling-Ying Tsai, a master’s student with Dr. Shen-Horn Yen, National Sun Yat-Sen University, Kaohsiung, Taiwan, has just completed her thesis entitled “Phylogeny of the genus Parapoynx (Lepidoptera: Crambidae: Acentropinae) with special reference to the evolution of host utilization”. In the earlier phase of this study, Ling-Ying spent about one year to rear caterpillars of various Parapoynx collected from Asia, Australia, Europe and America in order to evaluate the host plant specificity and the behaviors of shelter building. She found that the host plant specificity of Parapoynx is not relevant with plant systematics, but the growing forms of aquatic plants. In order to understand the correlations between the moth phylogeny, plant growing form, habitat and shelter style, Ying-Ling first reconstructed a phylogeny based on two molecular markers from nearly 80 species representing many lineages of the subfamily and a schoenobiine species as the outgroup. The phylogenetic pattern shows that Parapoynx represents a relatively basal group of Acentropinae, and this finding contradicts the earlier hypotheses that Acentropinae “gradually evolved larval tracheal gills” from the lineages without tracheal gills. Meanwhile, “terrestrial immature stages” have evolved independently from aquatic forms several times. The most important finding is that the enigmatic genus Acentria is a derived group within Acentropinae rather than the basal lineage. Regarding the evolution of Parapoynx, none of the species from the same continent, sharing similar wing pattern, living in the same habitat type, and constructing the same shelter style form a monophyletic group. This result suggests that the diversification of aquatic Lepidoptera is much more complex than those of aquatic Coleoptera and Odonata. Ying-Ling wishes to thank Alma Solis, Richard Brown, David Agassiz and Matthias Nuss for providing material from North America, Africa and Europe.

Shen-Horn Yen
**News from...**

**Alma Solis**

The really big accomplishment in pyraloids was the molecular phylogeny of the Pyraloidea (Regier et al., 2013) written with many pyraloid workers. I presented these results at the Lepidopterists’ Society in Colorado, the Entomological Society of American meeting in Knoxville, and the International Congress of Entomology in Daegu, South Korea. I was involved in the *Anania coronata* paper by Yang (et al.) that used morphology and DNA barcoding to show the presence of cryptic species. Bo Sullivan and I described a new species of *Palpita* from North Carolina. Paul Goldstein, who has very kindly stepped in to help me get some of my pyraloid papers out, finished the *Schacontia* paper. This paper began its evolution long ago with Gene Munroe who brought the genus to my attention when we were working on the Neotropical checklist, and that I subsequently transferred to the Glaphyriinae from the Cybalomiinae. Paul Goldstein has started working on Costa Rican *Desmia* that I have been working off and on for decades with Dan Janzen and Winnie Hallwachs. In press is a book on Potential Invasive Insects with a chapter in collaboration with my Colombian student, Ana Diaz, on *Neoleucinodes elegantalis*, the tomato fruit borer. Finally Mark Metz and I have been working on a morphological review of *Diatraea* for a long time that shall be completed soon. We have discovered a new species from the Midwestern U.S. feeding on eastern gamagrass. In press is a short note on the discovery of *Diatraea tabernella* in the Cauca Valley of Colombia. Last fall Brian Scholtens and I got together for two very long days at the USNM in Washington, DC to work on an update of the Nearctic pyraloid checklist. We decided that the issues surrounding the dissertation on North American Chrysidaeinae by E.D. Cashatt (known as Tim) required resolution; we are currently working on a manuscript to validate the taxa described whose names have been floating around in the literature. Last summer I was able to do some fieldwork after the Lepidopterists’ Society in southwestern Colorado, including the Comancha National Grassland (wow! What a place! and mostly phycitines). Then I went to Valles Caldera National Preserve (VCNP) in northwestern New Mexico; in Colorado I discovered many new pyraloid extensions and records from VCNP species. On a final note, I certified to scuba dive in February; my long-term goal with this is to find/see/photo graph aquatic pyraloids. I have either many short manuscripts or one large one on North American acentropines that I need to finish. I presented on my many findings about acentropines at the Lepidopterists’ Society meeting in Colorado, including a movie of the immatures of *P. avernalis* and the use of DNA barcoding to tie them to adults.

P.S. I finally had an opportunity to go back to the Canadian National Collection in Ottawa in March. I was invited by the Canadian Dept. of Agriculture to review a genomics project and so I stayed a few days to work on the Epipaschiinae (yes, I am still working on the MONA fascicle for this group). Lo and behold! The species were already sorted and identified by none other than ME!! I had completely forgotten that I had done this as a student in the 80’s. What a nice surprise!

**David Agassiz**

The staff of the Hope Entomological Collections, Oxford University Museum of Natural History has just completed imaging all their Lepidoptera types and hope to have them on line by the end of the year. These include a lot of Walker types and there are certainly pyrales among them. If you are interested in any specific species you can contact James Hogan (james.hogan@oum.ox.ac.uk).

**Eivind Palm**

I have produced a long article on rare and rarely pictured phycitines of Europe in our Danish journal “Lepidoptera”. The first part was printed in May and the 2nd part will appear in October-November. More than 100 color pictures of mainly south European phycitines and a little about the biology of each species are presented. The text is in Danish, but at the end there is a small English summary. Anyone interested can get a PDF copy by requesting me at Epalm32@gmail.com.

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Pupa of new species of *Diatraea* at the base of eastern gamagrass.

*Psorosa dahliella* Barberino
Kevin Tuck

Xi Cui Du (Southwest University, Chongqing, P.R. China) is studying Pyraloidea at the BMNH from March 2013 to February 2014. During her visit she is also starting to curate the Spilomelinae, disentangling them from the Pyraustinae s.l. and placing them in a new, separate, layout.

On the web

Afromoths

The website www.afromoths.net currently contains 35,450 species-group names. The ultimate aim is to present information on ALL Afrotropical moth species. There are currently 1913 species-group names in the Pyralidae and 2402 species-group names in the Crambidae, of which resp. 1400 and 1631 have species status; other names in this category are either synonyms or unavailable names. The number of referenced species-group names of which the original description has been checked from the primary source is shown in the table:

<table>
<thead>
<tr>
<th></th>
<th>Species-group names</th>
<th>Species status</th>
<th>Names with reference to the original description</th>
<th>Original description checked</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pyralidae</td>
<td>1913</td>
<td>1400 (73%)</td>
<td>1864 (97%)</td>
<td>1154 (60%)</td>
</tr>
<tr>
<td>Crambidae</td>
<td>2402</td>
<td>1631 (68%)</td>
<td>2361 (98%)</td>
<td>1399 (58%)</td>
</tr>
</tbody>
</table>

The main enhancement of the website is the possibility to include images of specimens, not just automatically generated maps as in the former release. Since this is a very recent feature, there are not many pictures yet, just four in the Crambidae (Bocchoris inspersalis, Cadarena pudoraria, Filodes costivitralis and Maruca vitrata) and only 1 in the Pyralidae (Mittonia hampsoni). We would therefore like to advertise a request for pictures of Afrotropical moths, which we may include on the website, stating your name and the faunistic data, as shown under the accompanying figures. This information can best be stored in the file name, e.g. Cadarena_pudoraria_DRC_Katanga_FrontierMine_nearSakaria_17JAN2013_Nvoaden.jpg. We would like to thank you very much in advance for your cooperation.

Jurate and Willy De Prins


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Glaucocaris metallifera (Butler) from New Zealand. Photo by Birgit Rhode, NZAC, Landcare Research, Auckland.