

THE PYRALOID PLANET

Volume 7 – 10 July 2013
A newsletter for the Pyraloidea fans

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.*



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

(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

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, Heliiothelinae, and Linostinae were not included in the study. As can be seen in Fig. below, the two

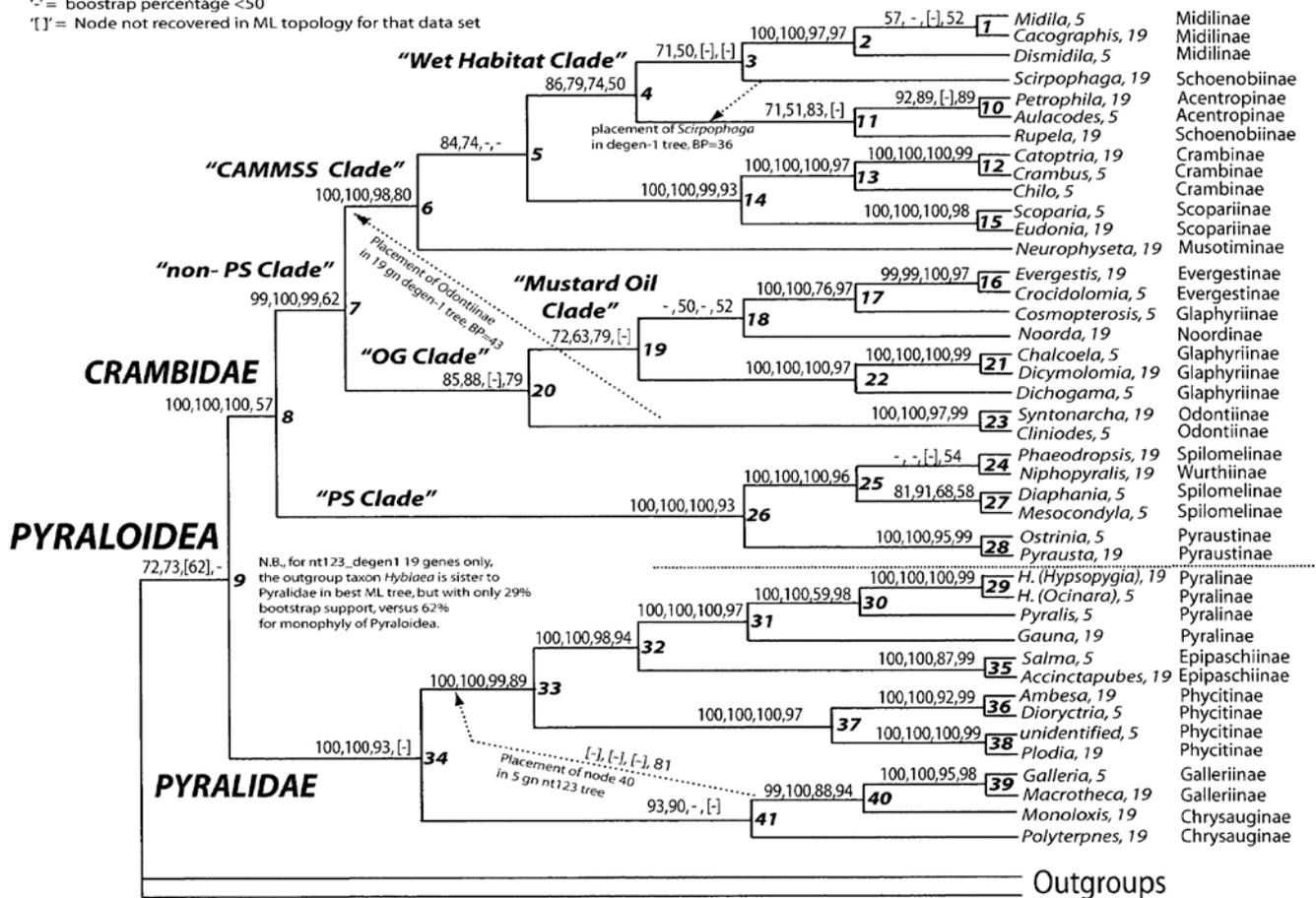
major groups of subfamilies are maximally supported and such is also the case for all branches recovered in the Pyraliformes except two obtaining more than 90% support. In Crambiformes, the phylogeny is maximally supported for many branches, such as, for example the Pyraustinae + Spilomelinae clade, with Wurthiinae nested within the latter and hence synonymized. A 'wet-habitat clade' made of Acentropinae, Midilinae and Schoenobiinae is also maximally supported as well as a clade made of Crambinae + Acentropinae + Musotiminae + Midilinae + Scopariinae + Schoenobiinae and a clade made of Crambinae and Scopariinae. 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

ML topology for nt123(19gn) is displayed.

Bootstrap percentages: nt123(19gn), nt123_partition(19gn), nt123_degen1(19gn), nt123(5gn)
 '-=' bootstrap percentage <50
 '['] = Node not recovered in ML topology for that data set



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), degen-1 (19 genes), and nt123 (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



Holotype male (a) and allotype female (b) of *Diplopseustoides mineti* C. Guillermet, 2013 described as a new genus and species in the Spilomelinae from Réunion. Reference available in GlobIZ.

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 Siiven 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 Tuleskov (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!

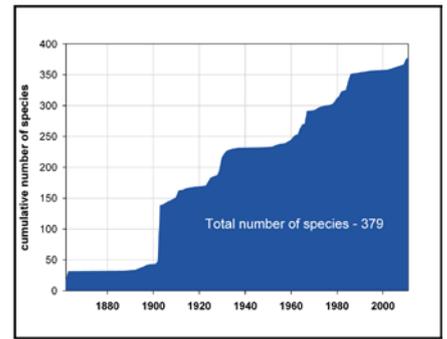


Fig. 1. Number of species of Pyraloidea known from Bulgaria versus year.

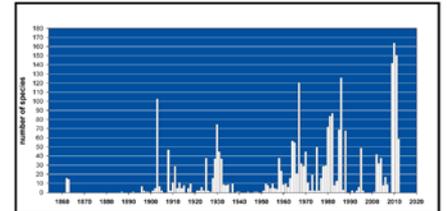


Fig. 2. Actual number of taxa (Pyraloidea) recorded in Bulgaria for the year shown. There are data for 98 of the years from 1862 to 2012 (= 98 of 151 years = 65%).



Photo 1. Sample from a single night of light trapping by S. Beshkov & B. Zlatkov. The Pyraloidea are to be found inside this pile and named by dissection.

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).

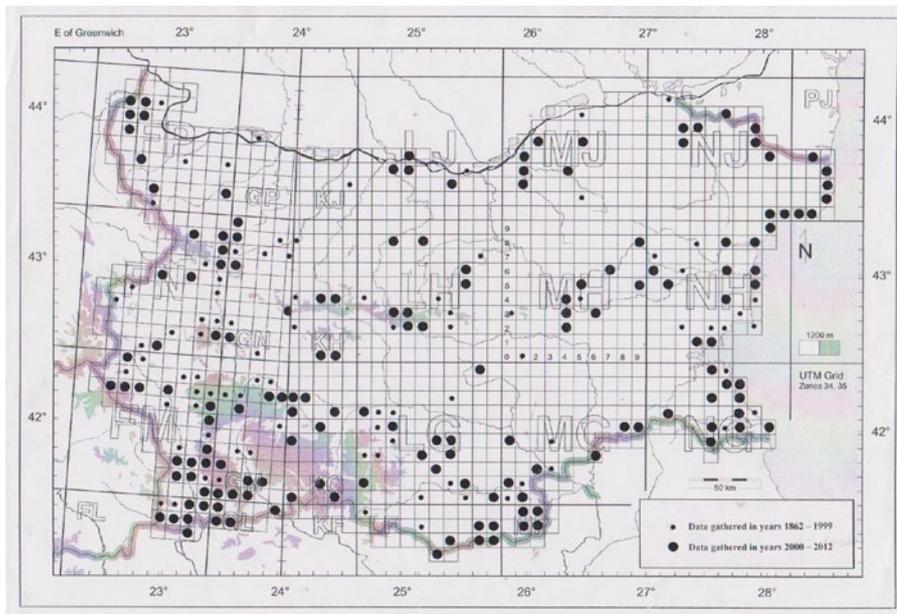


Fig. 3. Distribution of UTM grid squares for which data on Pyraloidea are available

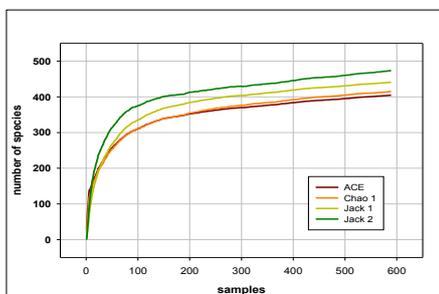


Fig. 4. Species accumulation curves for the diversity indices: Abundance-based Coverage Estimator (ACE), Estimator by Chao (Chao 1), Jackknife Estimators (Jack 1 and Jack 2). The number of randomizations is 100.

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

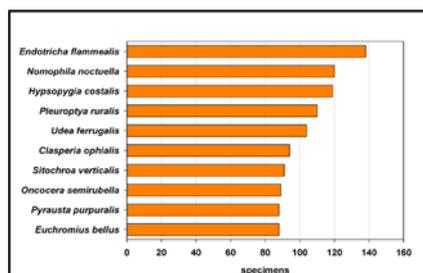


Fig. 5. Most numerically common species (numbers collected)

who are attending this Congress will send me their own collecting data for inclusion.

References

- Karsholt, O. & Razowski, J. 1996. The Lepidoptera of Europe: a distributional checklist. Apollo Books.
- Lederer, J. 1863. Verzeichnis der von Herrn Johann und Frau Ludmilla Haberhauer 1861 und 1862 bei Varna in Bulgarien und Sliven in Rumelien gesammelten Lepidopteren. *Wiener Entomologische Monatschrift* 7: 17-27; 40-47, t. 1; Figs 1-13. [= Directory of the Lepidoptera collected by Mr Johann and his wife Ludmilla Haberhauer in 1861 and in 1862 near Varna in Bulgaria and SLIVEN in Rumelia].
- Rebel, H. 1903. Studien über die Lepidopterenfauna der Balkanländer. I. Bulgarien und Ostrumelien. *Annalen des Naturhistorischen Museums in Wien* 18: 123-347.

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 Beshkov 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.

I previously worked on a revision of the Neotropical Crambinae genus *Catharylla* for my M.Sc. I described six new species and drew a morphological and molecular phylogeny of the group and related Crambinae species. The manuscript is in the process of being submitted.

Facing a lack of freshly collected material pertaining to my current project, I would be grateful to anyone who could supply alcohol-preserved material or dried material collected less than three years ago from any Crambinae or Scopariinae, especially material from the Nearctic, Palearctic, Oriental and Australasian regions. I'm especially looking for fresh material of the following genera: Crambinae: *Ancylolomia*, *Charltona*, *Corynophora*, *Eoreuma*, *Eschata*, *Eufernaldia*, *Gargela*, *Hednota*, *Hemiplatytes*, *Mestolobes*, *Mesolia*, *Metaeuchromius*, *Neargyria*, *Occidentalia*, *Orthomecyna*, *Protyparcha*, *Roxita*, *Surattha*, *Tawhitia*, *Thopeutis*, *Urola*, *Vaxi*, *Xubida*; Scopariinae: *Afrarpia*, *Afroscoptaria*, *Antiscopa*, *Davana*, *Eclipsiodes*, *Elusia*, *Eudipleurina*, *Exsilirarcha*, *Gibeauxia*, *Notocrambus*, *Pagmanella*, and *Toulgoetodes*. I thank you in advance for your help.

Théo Léger



Théo Léger at Serra Bonita Reserve, Bahía, Brazil. Photo by B. Landry, 2011.

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: Hispididae) 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 most 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



Larva of *Parapoynx crisonalis* (photo by: Chia-Hsuan Wei)

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 Chrysauginae 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 Comanche 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/photograph aquatic pyraloids. I have either many short manuscripts or one large one on North American acenotropines that I need to finish. I presented on my many findings about acenotropines 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!

Alma Solis

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).

David Agassiz

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.

Eivind Palm



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



Psorosa dahliaella 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.

Kevin Tuck



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

	Species-group names	Species status	Names with reference to the original description	Original description checked
Pyralidae	1913	1400 (73%)	1864 (97%)	1154 (60%)
Crambidae	2402	1631 (68%)	2361 (98%)	1399 (58%)



Cadarena pudoraria (Hübner, 1825), Democratic Republic of Congo, Katanga, Frontier Mine, near Sakania, 17.i.2013. ©Nigel Voaden.

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:

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 impersalis*, *Cadarena pudoraria*, *Filodes costivitalis* 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



Mittonia hampsoni (Distant, 1897), Democratic Republic of Congo, Katanga, Frontier Mine, near Sakania, 22.xii.2012. ©Nigel Voaden.

"Membership" list

David Agassiz
The Garden House, Stafford Place
Weston-super-Mare BS23 2QZ
UNITED KINGDOM
e-mail: agassiz@btinternet.com;
D.Agassiz@nhm.ac.uk

Stacey Anderson
Entomology Technician
NAQS - AQIS Darwin
PO Box 37846, Winnellie, NT 0821
AUSTRALIA
e-mail: Stacey.Anderson@aqis.gov.au

J. E. F. Asselbergs
Neerland 20 NL-4614
GD Bergen-op-Zoom
NETHERLANDS
e-mail: JEF.Asselbergs@hetnet.nl

Dino Aulakh
177 Charan Bagh
Patiala, Punjab
147001
INDIA
e-mail: dinotude.sym@gmail.com

Yang Seup Bae
Incheon University
Incheon, KOREA
e-mail: baeys@incheon.ac.kr

George J. Balogh
6275 Liteolier Street
Portage, Michigan 49024-2394
U.S.A.
e-mail: bugdr@att.net

Hans Bänziger
Department of Entomology
Faculty of Agriculture
Chiang Mai University
Chiang Mai 50200
THAILAND
e-mail: sangdao.banziger@cmu.ac.th

Alejandro Barro
Dpto Biología Animal y Humana
Facultad de Biología
Universidad de La Habana
Calle 25 # 455 entre J e I
Vedado CP 10400
La Habana, CUBA
e-mail: abarro@fbio.uh.cu

Graziano Bassi
Via San Martino 25
I-10051 Avigliana (TO)
ITALY
e-mail: graziano.bassi@alice.it

Franziska Bauer
Sektion Lepidoptera
Museum für Tierkunde
Senckenberg Naturhistorische Sammlungen
Dresden
Königsbrücker Landstraße 159
D-01109 Dresden
GERMANY
e-mail: franziska.bauer@senckenberg.de

Vitor O. Becker
Reserva Serra Bonita
P.O. Box 001
45880-970 Camacan
BRAZIL
e-mail: vitor.o.becker@gmail.com

Rebecca Bennik
New Zealand Arthropod Collection (NZAC)
Landcare Research
Private Bag 92170
Auckland 1142
NEW ZEALAND
e-mail: rmbennik@hotmail.com

Richard L. Brown
Mississippi Entomological Museum
Mississippi State, MS 39762
U.S.A.
Email: moth@ra.msstate.edu

Fuqiang Chen
Institute of Zoology
Chinese Academy of Sciences
1, Beichen West Road, Chaoyang District
Beijing 100101, P. R. CHINA
e-mail: chenfq@ioz.ac.cn

José Clavijo
Museo del Instituto de Zoología Agrícola
Facultad de Agronomía
Universidad Central de Venezuela
Apartado 4579, C.P. 2101-A
Maracay (Aragua)
VENEZUELA
e-mail: clamiche@telcel.net.ve

Alexandre-Pierre Cotty
Sion
SWITZERLAND
e-mail: alexandre.cotty@gmail.com

Willy De Prins
Dorpstraat 401B
B-3061 Leefdaal
BELGIUM
e-mail: Willy.deprins@gmail.com

Julian P. Donahue
Natural History Museum of
Los Angeles County
900 Exposition Boulevard
Los Angeles CA 90007-4057
U.S.A.
e-mail: julian.donahue@gmail.com

Xicui Du
College of Plant Protection
Southwest University
Beibei District, Chongqing 400716
CHINA
e-mail: lucy2073@sina.com

Marc Epstein
Senior Insect Biosystematist, Lepidoptera
Plant Pest Diagnostic Branch
California Dept. of Food & Agriculture
3294 Meadowview Rd
Sacramento, CA 95832-1448
U.S.A.
e-mail: mepstein@cdfa.ca.gov

Guillermo Fernandez
Institut Cavanilles de Biodiversitat i
Biologia Evolutiva
C/ Catedrático José Beltrán nº2
E-46980 Paterna
SPAIN
e-mail: guillermo.fernandez@uv.es

Clifford D. Ferris
5405 Bill Nye Avenue, R.R. #3
Laramie, WY 82070
U.S.A.
e-mail: cdferris@uwyo.edu

Reinhard Gaedike
Florusstraße 5
D-53225 Bonn
GERMANY
e-mail: tinagma@msn.com

Barry Goater
27 Hiltingbury Road "The Ridge"
GB-SO53 5SR Chandlers Ford (Hampshire)
UNITED KINGDOM
e-mail: barrygoater@tiscali.co.uk

Kurt Grimm
Fruthwilerstrasse 65d
CH-8272 Ermatingen
SWITZERLAND
e-mail: kurtgrimm@bluewin.ch

Chris Grinter
Denver Museum of Nature & Science
2001 Colorado Blvd.
Denver, Colorado 80205
U.S.A.
e-mail: Christopher.Grinter@dmns.org

Christian Guillermet
11 Ruelle des Amandiers
Garbejaire 108
F-06560 Valbonne Sophia Antipolis
FRANCE
e-mail: chring@club-internet.fr

John Hawking
Murray Darling Freshwater Research Centre
La Trobe University
University Drive
PO Box 991
Wodonga, Vic 3690
AUSTRALIA
e-mail: J.Hawking@latrobe.edu.au

James E. Hayden
Curator of Lepidoptera
Florida State Collection of Arthropods
FDACS, Division of Plant Industry
P.O. Box 147100
Gainesville, FL 32614-7100
U.S.A.
e-mail: jehayden63@gmail.com

Bob Heckford
67 Newnham Road
GB-PL7 4AW Plympton (Plymouth), S. Devon
UNITED KINGDOM
e-mail: bob.heckford@btinternet.com

John B. Heppner
Florida State Collection of Arthropods
Division of Plant Industry
Florida Department of Agriculture
P.O. Box 147100
Gainesville, Florida 32614-7100
U.S.A.
e-mail: jheppner@flmnh.ufl.edu

Alvaro Herrera Villalobos
Enlace con Investigadores
UEA de Vertebrados, INBio
Apdo Postal 22-3100
Santo Domingo, Heredia
COSTA RICA
e-mail: alherrer@inbio.ac.cr

Robert J. B. Hoare
New Zealand Arthropod Collection (NZAC)
Landcare Research
Private Bag 92170
Auckland 1142
NEW ZEALAND
e-mail: HoareR@landcareresearch.co.nz

Ronald W. Hodges
85253 Ridgetop Drive
Eugene, Oregon 97405-9535
U.S.A.
e-mail: rwhodges@rhodges.net

Terence Hollingworth
6, impasse Chopin
F-31700 Blagnac
FRANCE
e-mail: Terence.Hollingworth@airbus.com

Martin Honey
Department of Entomology
Natural History Museum
Cromwell Road
London SW7 5BD
UNITED KINGDOM
e-mail: m.honey@nhm.ac.uk

Marianne Horak
Australian National Insect Collection
GPO Box 1700, Canberra, ACT, 2601
AUSTRALIA
e-mail: marianne.horak@csiro.au

Robin Howard
Las Descargues
F-46210 Gorses
FRANCE
email: robin.lasdescargues@gmail.com

Peter Huemer
Tiroler Landesmuseum Naturwissenschaften
Feldstrasse 11a
A-6020 Innsbruck
AUSTRIA
e-mail: p.huemer@tiroler-landesmuseen.at

Utsugi Jinbo
Department of Zoology
National Museum of Nature and Science
Amakubo 4-1-1 Tsukuba-shi
Ibaraki, 305-0005
JAPAN
e-mail: ujinbo@kahaku.go.jp

Ole Karsholt
Zoologisk Museum
Universitetsparken 15
DK-2100 København Ø
DENMARK
e-mail: okarsholt@snm.ku.dk

Gareth Edward King
Departamento de Biología (Zoología)
Universidad Autónoma de Madrid
C/. Darwin, 2
28049 Cantoblanco (Madrid)
SPAIN
e-mail: sterrhinae@gmail.com

Valentina Kirpichnikova
Mountain-Taiga Station
Far Eastern Branch of Russian Academy of
Sciences
RU-692533 Gornotajozhnoe,
Ussuri region
RUSSIA
e-mail: omelko@ott.ru

Rajesh Kumar
Central Muga Eri Research & Training Institute
Central Silk Board
Ministry of Textiles, Govt. of India
P.O. Ladoigarh
Pin Code 785 700
Jorhat, Assam
INDIA
e-mail: rajesh.ento@gmail.com,
rajeshentocmerti@csb.gov.in

Gregor Kunert
Kunert Business Software
Deutscher Platz 5c,
D-04103 Leipzig
GERMANY
e-mail: Gregor.Kunert@kbs-leipzig.de

Hiroshi Kuroko
JAPAN
e-mail: vhiroshi@i-next.ne.jp

Bernard Landry
Muséum d'histoire naturelle
Route de Malagnou 1,
CH-1208 Genève
SWITZERLAND
e-mail: bernard.landry@ville-ge.ch

Jean-François Landry
Agriculture and Agri-Food Canada
Central Experimental Farm, Neatby Bldg.
960 Carling Avenue
Ottawa (Ontario)
K1A 0C6, CANADA
e-mail: landryjf@agr.gc.ca

Théo Léger
Muséum d'histoire naturelle
Route de Malagnou 1,
CH-1208 Genève
SWITZERLAND
e-mail: legerth0@etu.unige.ch

Patrice Leraut
Muséum national d'histoire naturelle
45, rue de Buffon
F-75005 Paris
FRANCE
e-mail: pleraut@mnhn.fr

Houhun Li
College of Life Sciences, Nankai University
Tianjin 300071
CHINA
e-mail: lihuhun@nankai.edu.cn

Weichun Li
Department of Plant Protection
College of Agronomy
Jiangxi Agricultural University
Nanchang Economic & Technological
Development Area
Nanchang, Jiangxi Province 330045
CHINA
e-mail: weichunlee@126.com

Jiayu Liu
College of Life Sciences, Nankai University
Tianjin 300071
CHINA
e-mail: fsluijiayu@163.com

Jean-Michel Maes
Museo Entomologica
AP 527, Leon
NICARAGUA
e-mail : jmmaes@ibw.com.ni,
jmmaes@yahoo.com

Koen Maes
AgroBioSys Intl.
Kleine Smetledestraat 192
B-9230 Wetteren
BELGIUM
e-mail: kvmaes@belgacom.net,
kvmaes@telenet.be

Richard Mally
Sektion Lepidoptera
Museum für Tierkunde
Senckenberg Naturhistorische Sammlungen
Dresden
Königsbrücker Landstraße 159
D-01109 Dresden
GERMANY
e-mail: richard.mally@senckenberg.de

Edda Martinez
Mississippi Entomological Museum
Box 9775
Mississippi State, MS 39762
U.S.A.
e-mail: eddalis_97@yahoo.com

Eric Metzler
P.O. Box 45
Alamogordo, New Mexico 88311-0045
U.S.A.
e-mail: spruance@beyondbb.com

Wolfram Mey
Museum für Naturkunde
Humboldt-Universität
Invalidenstr. 43
D-10115 Berlin
GERMANY
e-mail: wolfram.mey@mfn-berlin.de

Joël Minet
Muséum national d'histoire naturelle
45, rue de Buffon
F-75005 Paris
FRANCE
e-mail: minet@mnhn.fr

Andrew Mitchell
Agricultural Scientific Collections Unit, OAI
NSW Department of Primary Industries
Forest Rd
Orange NSW 2800
AUSTRALIA
e-mail: Andrew.Mitchell@austmus.gov.au

Charlie Mitter
Department of Entomology
4112 Plant Sciences Building
University of Maryland
College Park, Maryland 20742
U.S.A.
e-mail: cmitter@umd.edu

Shankara Murthy
Department of Agricultural Entomology
UAS, Raichur
College of Agriculture
Bheemarayanagudi - 585 287
INDIA
e-mail: smurthyent@gmail.com

Herb H. Neunzig
Department of Entomology
North Carolina State University
Raleigh, North Carolina, 27695-7613
U.S.A.
e-mail: h.neunzig@gte.net

Matthias Nuss
Staatliche Naturhistorische Sammlungen
Museum für Tierkunde
Königsbrücker Landstr. 159
D-01109 Dresden
GERMANY
e-mail: matthias.nuss@senckenberg.de

Eivind Palm
Sejerslevvej 14
Sdr. Sejerselv
DK-6280 Højer
DENMARK
e-mail: Epalm32@gmail.com

Eugenie Phillips
COSTA RICA
e-mail: eugeniephillips@hotmail.com

Colin W. Plant
14 West Road,
Bishops Stortford
Hertfordshire
CM23 3QP
UNITED KINGDOM
e-mail: cpauk1@ntlworld.com

Jerry A. Powell
Essig Museum of Entomology
201 Wellman Hall
University of California
Berkeley, CA 94720
U.S.A.
e-mail: powellj@nature.berkeley.edu

Mu-jie Qi
Department of Life Sciences
Animal Diversity Laboratory
University of Incheon
Incheon, 406-772
KOREA
e-mail: qimujie@163.com

Yingdang Ren
Institute of Plant Protection
Henan Academy of Agricultural Science
Zhengzhou 450002
CHINA
e-mail: renyd@126.com

Amanda Roe
Systematics and Evolution
CW315 Biological Sciences Bldg
University of Alberta
Edmonton, Alberta T6G 2E9
CANADA
e-mail: amandaro5@gmail.com

Daniel Rubinoff
310 Gilmore Hall
Dept. of Entomology
University of Hawaii
3050 Maile Way, Honolulu
Hawaii 96822-2231
U.S.A.
e-mail: rubinoff@hawaii.edu

Michael Sabourin
630 Beaver Meadow Rd.
Marshfield, VT 05658
USA
e-mail: mothvet@yahoo.com

Akio Sasaki
11-5, Onoba 5
Akita City
Akita Pref., 010-1424
JAPAN
e-mail: scopar089@ybb.ne.jp

Brian Scholtens
Biology Department
College of Charleston
66 College Street
Charleston, South Carolina 29424-0011
U.S.A.
e-mail: scholtensb@cofc.edu

Rob Schouten
Museum, Dept. of Natural History
Stadhouderslaan 41
NL-2517 HV Den Haag
NETHERLANDS
e-mail: rschouten@museon.nl

Christian H. Schulze
Department für Populationsökologie, IECB /
Universität Wien
Althanstr. 14,
A-1090 Wien
AUSTRIA
e-mail: christian.schulze@univie.ac.at

Andreas Seegerer
Zoologische Staatssammlung München
Münchhausenstr. 21
D-81247 München
GERMANY
e-mail: Andreas.Seegerer@zsm.mwn.de

Jay Shaffer
Department of Biology-3E1
George Mason University
4400 University Drive
Fairfax, Virginia 22030-4444
U.S.A.
e-mail: jshaffe1@gmu.edu

Ayuna A. Shodotova
Institute of General and Experimental Biology
Siberian Branch of the Russian Academy of
Sciences
Sakhyanovoi Street 6, Ulan-Ude, 670047
RUSSIA
e-mail: shodotova@mail.ru

Thomas J. Simonsen
Department of Entomology
The Natural History Museum
Cromwell Road, London SW7 5BD
United Kingdom
e-mail: t.simonsen@nhm.ac.uk

Frantisek Slamka
Racianska 61
SK-83102 Bratislava
SLOVAKIA
e-mail: f.slamka@nextra.sk

M. Alma Solis
SEL, USDA, Smithsonian Institution
P.O. Box 37012
National Museum Natural History
E-517, MRC 168,
Washington DC 20013-7012
U.S.A.
e-mail: alma.solis@ars.usda.gov



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

Wolfgang Speidel
Museum Witt
Tengstr. 33
D-80796 München
GERMANY
e-mail: speidel-wolfgang@web.de

Felix Sperling
Department of Biological Sciences
University of Alberta
Edmonton, Alberta T6G 2E9
CANADA
e-mail: Felix.Sperling@ualberta.ca

Hari Sutrisno
LIPI - The Indonesian Institute of Sciences
Zoological Division
Research Center for Biology
PO Box 25, Cibinong 16911, Bogor
INDONESIA
e-mail: sutrisnohari@yahoo.com

Stephen Sutton
Borneo Books
PO Box 13908
88845 Kota Kinabalu, Sabah
MALAYSIA
e-mail: stephensutton7@gmail.com

Kevin Tuck
Department of Entomology
Natural History Museum
Cromwell Road
London SW7 5BD
UNITED KINGDOM
e-mail: K.Tuck@nhm.ac.uk

Peter Ustjuzhanin
Engelsa Str., 23, app. 106,
Novosibirsk 63005
RUSSIA
e-mail: petrust@mail.ru

Héctor Vargas
Facultad de Agronomía
Universidad de Tarapacá
CASILLA 6D
Arica, CHILE
e-mail: havargas@uta.cl

Francesca Vegliante
Staatliche Naturhistorische Sammlungen,
Museum für Tierkunde
Königsbrücker Landstr. 159, D-01109 Dresden
GERMANY
e-mail: francesca.vegliante@senckenberg.de

David L. Wagner
Department of Ecology and Evolutionary Biology
University of Connecticut
Storrs, CT 06269
U.S.A.
e-mail: david.wagner@uconn.edu

Terry Whitaker
4 Crowtrees, Low Bentham
Lancaster LA2 7EE
UNITED KINGDOM
e-mail: t.whitaker1@btinternet.com

Chunsheng Wu
Institute of Zoology
Chinese Academy of Sciences
Beichen West Road, Chaoyang District
Beijing 100101
P. R. CHINA
e-mail: wucs@ioz.ac.cn

Hiroshi Yamanaka
4-18, Eiraku-cho
Toyama City
Toyama Pref. 930-0853
JAPAN
e-mail: hycopm@po1.ctt.ne.jp

Zhaofu Yang
Canadian Centre for DNA Barcoding
Biodiversity Institute of Ontario
University of Guelph
Guelph, ON, N1G 2W1
CANADA
e-mail: yangzhaofu@nwsuaf.edu.cn

Shen-Horn Yen
Department of Biological Sciences
National Sun Yat-Sen University
Kaohsiung 804
TAIWAN
e-mail: shenhornyen@gmail.com

Ping You
Institute of Zoology, Shaanxi Normal University
Xi'an 710062
CHINA
e-mail: youping@snnu.edu.cn

Dandan Zhang
Institute of Entomology, Sun Yat-sen University
Guangzhou, Guangdong 510275
CHINA
e-mail: zhdd61@163.com