The Pollinator Information Network Newsletter

Editorial

January 15, 2018. Vol. 2, Issue 1

Welcome to the first issue of volume 2 of the Pollinator Information Network Newsletter!

The *Pollinator Information Network Newsletter* is one of the projected outputs of an ongoing project of the JRS Biodiversity Foundation, *i.e.* "The Pollinator Information Network for Two-Winged Insects" or simply PINDIP. The PINDIP project has its own website: https://www.pindip.org/. Note that the JRS Biodiversity Foundation has launched a new call for proposals. Find out more on page 2.

In this issue, we will be looking ahead to the 9th International Congress of Dipterology (pages 3-4), which will take place in Namibia in 2018. Registration for the congress is now open! There will be two symposia which relate directly to pollinating Diptera. One of these is the symposium "The importance of Diptera in plant-pollinator networks" and we are happy to announce Dr. Bruce Anderson (Stellenbosch University) as keynote speaker for the symposium. Read Bruce's biosketch on page 5.

We will look back at a training course in general dipterology (pages 6-8) that we organized at the National Museums of Kenya and the International Centre of Insect Physiology and Ecology, in Nairobi (Kenya) from 20 November – 1 December 2017.

We also highlight the projects of two Cameroonian colleagues, *viz.* Sidonie Fameni Topé (pages 9-10) and Michelson Azo'o Ela (pages 11-12).

Hot off the press: the first two volumes of the *Manual of Afrotropical Diptera* have been published and can now be ordered. Find out on pages 13-14 how to order the volumes!

As usual, the issue ends with a list of new, although incomplete, published research related to pollination biology in its broadest sense. We invite everyone concerned to submit relevant information for the *Newsletter*, including summaries of their own research and projects on pollination biology – or publications that they want to see highlighted, relevant literature, upcoming conferences and symposia, possibilities for cooperation and grant applications related to plant-pollinator networks, *etc.*, before the 15th of March.

We wish all of you a happy and prosperous New Year!
Enjoy reading!

Kurt Jordaens on behalf of the PINDIP team

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Call for proposals

JRS Biodiversity Foundation 2018 Request for proposals

The **JRS Biodiversity Foundation** seeks projects that increase the access to and use of biodiversity information relating to pollinator biodiversity assessment and the conservation of pollinator services in sub-Saharan Africa. Pollination is one of the most important ecosystem services supporting human life and livelihoods as well as natural biodiversity and primary productivity. Challenges facing pollinator conservation in Africa are many and include inadequate expertise, insufficient data on pollinator status and on pollinator-plant interactions, few risk mitigation options, lack of standard field methods and data standards, and lack of economic evaluations of pollinator services.

JRS is seeking projects related to these **three areas of conservation and development policy and practice** for which pollinator information may be highly relevant:

1) Data sets for monitoring landscape level climate change impacts;
2) Biodiversity assessments and monitoring in agricultural landscapes; and
3) Monitoring the impacts of land use management and agricultural productivity strategies.

Technical Scope: JRS welcomes proposals that focus on any significant pollinator group, yet have an interest in building our grant portfolio related to Hymenoptera (bees & wasps) or Lepidoptera (butterflies).

JRS' **technical priorities** (see their Pollinators Program website) are:

Methods: (1) Approaches for large scale/low cost pollinator data collection; (2) Methods for pollinator identification; and (3) Methodology, standards, and database design for plant-pollinator data.

Platforms: (1) Develop transferrable database and website models; (2) Develop pollinator knowledge platforms; and (3) Online access to field guides and checklists.

Capacity Development: (1) Baseline datasets; (2) High quality pollinator biodiversity data components of agricultural studies; and (3) Network formation and capacity building.

Out of Scope: Out of the scope of this call are projects that seek to develop new agricultural practices, livelihood and community development projects for beekeeping and honey production, projects that are aimed at taxonomic revision and determination, and mass digitization of museum collections.

Find information on this call can be found on the website of the JRS Biodiversity Foundation:

http://jrsbiodiversity.org/how-to-apply/current-opportunities/2018rfp/

JRS Biodiversity Foundation

Registration is now open: http://icd9.co.za/registration/

Early registration before 28 February 2018
Registration / Abstract submission deadline: 1 September 2018

Registration and submission of abstract are electronic and all payments for registration fees must be made at the time of registration.



Scientific programme:

The overall theme of the Congress will be "Afrotropical Dipterology" and specific symposia are planned that have special relevance to African delegates, but the scientific programme will include other general thematic and taxon-based symposia and poster sessions, and all major aspects of dipterology, including systematics, morphology, physiology, evolution, biodiversity and conservation, ecology, agriculture and forensics will be covered.

Plenary speakers:

The five plenary speakers have now been finalized (see below) and the names, biographies and plenary titles of speakers are available on the official website http://icd9.co.za/plenaries/

Michelle Trautwein - Plenary title: Resolving the Fly Tree of Life.
Brian V. Brown - Plenary title: Phorid fly diversity – frontiers in species richness, structure and behavior.
Netta Dorchin - Plenary title: Unmitigated gallers – specialisation leads to diversification in the Cecidomyiidae.
Rudolf Meiswinkel - Plenary title: Culicoides as vectors for viruses causing disease in livestock.
Martin Hall - Plenary title: The research-casework continuum in forensic dipterology.

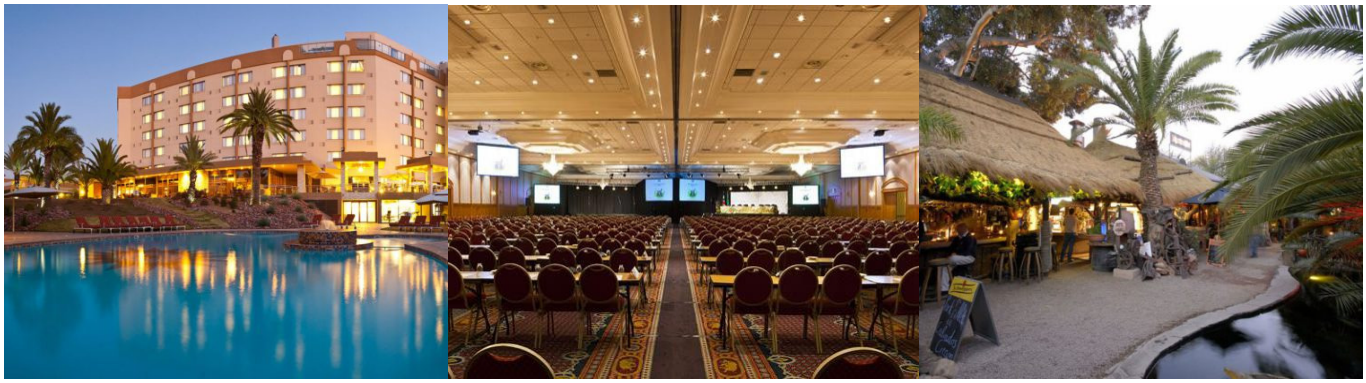
Symposia sessions:

Twenty-five symposia titles have been posted on the official website http://icd9.co.za/symposia-titles/. Note that two symposia relate specifically to Diptera pollinators! More specifically, there is the "Importance of Diptera in Plant-Pollinator Networks" symposium organized by Kurt Jordaens (kurt.jordaens[at]africamuseum.be) (see

next page) and the “Systematics and taxonomy of lower Cyclorrhapha” symposium organized by Andrew D. Young (adyoung[at]gmail.com).

The venue:

The Congress venue will be the Safari Hotels and Conference Centre in central Windhoek. The Hotels offers modern, world class conference facilities, including a large reception area, suitable for functions, space for the erection of poster boards and three adjoining Congress rooms, the largest of which seats over 400 delegates and is suitable for plenary sessions. The Conference Centre has two restaurants, a bar and several smaller sites for beverages. Top-range accommodation and low-end affordable accommodation for students is available at a short distance from the Congress venue.



Contact:

All general e-mail enquiries should be directed to: icd9[at]nasmus.co.za.

Registration:

Registration is now open and must be done using the online registration system, which is available at: http://icd9.co.za/registration/. You will be given two options on the registration landing page: paying via credit card, or submitting a registration form and paying via EFT. Payment must be made at the time of Registration.

Abstract submission:

Only delegates who have registered and paid in advance are allowed to submit abstracts. Any submitted abstracts by unregistered delegates will be deleted from the system without prior notice. Important: Please refer to the formatting guidelines for abstracts at the congress website and ensure your abstract is properly formatted before submission. Abstract submissions must be done using the online registration system, which is available at: http://icd9.co.za/abstractsubmissions/.

Symposium

The importance of Diptera in plant-pollinator networks

Symposium at the 9th International Congress of Dipterology 2018

At ICD9 (see pages 3-4 of this *Newsletter*) Kurt Jordaens (Royal Museum for Central Africa) will organize a symposium on the importance of Diptera in plant-pollinator networks. I'm pleased to announce Prof. Dr. Bruce Anderson (Stellenbosch University) as invited speaker for the symposium! You can read Bruce's biosketch below.

Invited speaker: Prof. Dr. Bruce Anderson

"Nectar foraging flies as agents of plant speciation"

Bruce's broad career path was settled when he was just a toddler… While other children played cops and robbers, he upended rocks, adamant that he would become an entomologist and not a policeman. But his world was upended in his second year at the University of Cape Town when his love affair with flowers began. Marrying his passions for insects and plants, he became drawn to pollination biology and since 2006 he has held a position at Stellenbosch University (South Africa) where his research focus has been on the evolution of plant-animal interactions. His research is driven by the desire to understand why organisms look the way they do, and how they are adapted to their biotic and abiotic environments. He has a special interest in pollinators like moths and long proboscid flies which have provided a wonderful platform to study the (co)evolution of flowers with long tubes. For him, science has been a source of mental and physical adventure enabling him to get into the field, observe organisms in their natural environments and experimentally test interesting hypotheses.

Contact:

Prof. Dr. Bruce Anderson – Stellenbosch University, South Africa – Department of Botany and Zoology – Biological Interactions – banderso.bruce[at]gmail.com.

http://www.biointeractionslab.com/prof.-bruce-anderson.html

If you also wish to contribute to the symposium (poster and/or talk) feel free to contact me at kurt.jordaens[at]africamuseum.be.

Hope to see you at the symposium!
Kurt Jordaens – Royal Museum for Central Africa

Report

Training course in taxonomy and systematics of African pollinating flies

Organized at the National Museums of Kenya and the International Centre of Insect Physiology and Ecology, Kenya
Session 2017

Organisation:

The training (November 20 – December 1) was organized by three institutions: the Entomology Section of the Royal Museum for Central Africa (RMCA, Tervuren) in Belgium, and the National Museums of Kenya (NMK, Nairobi) and the International Centre of Insect Physiology and Ecology (ICIPE, Nairobi) in Kenya.

The objective of this group training was to ensure, for the sake of the African scientists or the persons confronted with the problem, a basic training on the identification and ecology of African Diptera that have a significant role in plant-pollinator networks. The target families are Bombyliidae, Calliphoridae, Mythicomyiidae, Nemestrinidae, Rhiniidae, Syrphidae, and pangonine Tabanidae.

The training consisted of ex-cathedra courses on biogeography, morphology, identification (methods), collection methods, and conservation methods of Diptera. Practical exercises were used to identify Diptera and to improve collection management skills.

The following 14 persons participated in the training:

Hermann Toni (Benin): Hermann is a research assistant at the National University of Agriculture and he currently studies pollination of cowpea, okra, watermelon and tomato in Southern Benin.

Ndayikeza Longin (Burundi): Ndayikeza is a researcher at the Burundi Environment Protection Authority (OBPE) who studies crop pollinators and their conservation.

Eugène Sinzinkayo (Burundi): Eugène is a Researcher at the Burundi Environment Protection Authority (OBPE) and his main interest are pollinating Diptera.

Nadia Toukem (Cameroon): Nadia is a PhD student at the University of Yaoundé, Cameroon. Her study focusses on the pollinator community of cocoa in Cameroon.

Sidonie Fameni Topé (Cameroon): Sidonie is a lecturer and researcher at the University of Maroua, Cameroon. Her main field of interest are pollinating Hymenoptera. More on her research interests can be found on pages 9-10 in this issue of the *Newsletter*.

Michelson Azo'o Ela (Cameroon) : Michelson is a lecturer and researcher at the University of Maroua, Cameroon. He is the head of the Entomology lab at the University of Maroua and his main field of research is plant-pollinator networks. More information on his research interests can be found on pages 11-12 in this issue of the *Newsletter*.

Josiah Collins Achieng (Kenya): Josiah is a Kenyan data entry clerk at the National Museums of Kenya – partner in the PINDIP project – and is especially involved in the curation and digitization of Diptera.

Joseph Mulwa (Kenya): Joseph is a researcher at the Kenya Agricultural and Livestock Research Organization (KALRO) and he is involved in collection management, data collection, entry, and analysis. He is a MSc student with an MSc project on the pollination syndrome of avocado in Kenya.

Kudzai Mafuwe (Mozambique): Kudzai is a researcher, curator and Head of Section at the Natural History Museum of Maputo, Mozambique. The collection at the Natural History Museum is a significant but underappreciated collection in Eastern Africa that holds a large collection of unidentified Syrphidae.

Kisimenda Muambalo (Mozambique): Kisimenda works at the Natural History Museum in Maputo, Mozambique as a Diptera curator involved in the management, digitization and reassessment of the Diptera collection at the Museum.

James Peter Egonyu (Uganda): James is a researcher and lecturer in entomology at Makarere University, Uganda. His research field of interest is in agricultural entomology, more specifically in relation to pollinators, edible insects and pest species.

Genevieve Lee Theron (South Africa). Genevieve recently started a PhD at the University of Stellenbosch on pollination networks in the Karoo in South Africa; more on her project can be found in Volume 1, Issue 2 of the PINDIP *Newsletter*.

Tricia Moodley (South Africa): Tricia is a research technician, involved in the digitization of Diptera, more specifically that of pollinating Diptera, at the KwaZulu-Natal Museum of South Africa which is a partner in the PINDIP project.

Emanuel Martin (Tanzania): Emanuel is a lecturer in wildlife ecology at the College of African Wildlife Management. He is working on the effect of habitat disturbance on the diversity and relative abundance of a variety of animal taxa. They have recently received financial support

from the JRS Biodiversity Foundation to monitor pollinators in the Arusha National Park and other localities in Tanzania.

Trainers were: Ashley H. Kirk-Spriggs (National Museum Bloemfontein, South Africa), Arianna Thomas (University of Alicante, Spain), Robert Copeland (International Centre of Insect Physiology and Ecology, Kenya), Laban Njoroge (National Museums of Kenya, Kenya), John Midgley (KwaZulu-Natal Museum, South Africa), Georg Goergen (International Institute of Tropical Agriculture, Benin) and Kurt Jordaens (Royal Museum for Central Africa, Belgium).

The research activities of two of the participants, Sidonie Fameni Topé and Michelson Azo'o Ela can be found further in this issue. A full program and more pictures of the training can be found on the PINDIP-website: https://www.pindip.org/. In 2019 we will organize a second training course (more information will be available from the PINDIP website and in the forthcoming issues of the PINDIP *Newsletter*)!

SPOTLIGHT

project: **Diversity of flowering insect fauna on *Sesamum indicum* (L.) 1753 (Pedaliaceae) and its impact on fruit and seed yields in Guiring (Far North Region, Cameroon)**

Sidonie Fameni Topé obtained her Ph.D. in Biology of Animal Organisms, option Entomology in 2014 at the University of Ngaoundéré, Cameroon. She is now a Senior Lecturer at the Faculty of Sciences, Department of Biological Sciences at the University of Maroua. Her current research focusses on the crop species *Sesamum indicum*.

In Cameroon, agricultural productivity remains low despite the use of chemical fertilizers, pesticides and crop rotation. This is unfortunate because there is an increased demand for food and income security, which is highly dependent on small scale agriculture. Sesame (*Sesamum indicum*; Pedaliaceae) is considered as a food crop rather than oilseed crop because most of its seeds are consumed directly. Therefore, it can be used to replace, or supply, protein deficiency in malnourished children in the Far North Region which is an agro-ecological zone for the cultivation of this crop. However, the production of sesame is very low (43,033 tons in 2009 and 43,963 tons in 2010 for an area of 29,805 hectares and 30,836 hectares, respectively (AGRI-STAT, 2012)), amongst others, due to a lack of knowledge on its pollination ecology. Understanding the co-evolution of flowering plants and their pollinators is of high importance since insufficient number of suitable pollinators causes a strong decline in fruit and seed production. Interestingly, Sesame's flower structure facilitates cross-pollination, even though the crop is usually considered as self-pollinating.

Key objective:

The aim of this project is to contribute to our understanding in the relationship between *Sesamum indicum* and its insect pollinators to improve crop management in Cameroon.

More specifically, Sidonie will:

1) collect, and identify, the pollinator diversity of Sesame;
2) study the population dynamics and relative abundance of insect pollinators through the growing seasons of Sesame;
3) study the activity of potential pollinators on *S. indicum* flowers and evaluate the impact of insects on pollination and fruit and seed yields;
4) assess the pollinating efficiency of the major pollinators of Sesame.

Planned outputs/outcomes:
The project will contribute to highlight potential negative consequences of any pollinator decline, provoking risks to agriculture and compromising crop yields in sub-Saharan Region in general, and particularly in Cameroon.

Contact:

- Dr. Sidonie Fameni Topé, sidofameni@gmail.com
(University of Maroua, Cameroon)

Supervisor:

- Prof. Fernand-Nestor Tchuenguem Fohouo (University of Ngaoundéré, Cameroon)

Collaborator:

- Dr. Laurentine Soufo (University of Maroua, Cameroon)

SPOTLIGHT

Project: **The study of plant-pollinator networks in Cameroon**

It's generally well-known that entomophilous pollination is a central service in all ecosystem functions and agriculture. Insect pollinators are essential for the survival of several plant species. Their need to provide pollination services is growing with the intensification of agriculture. The conservation of pollinating insects in an ecosystem means the preservation of finely adjusted links between plant and animal species, allowing plants to reproduce successfully.

Michelson Azo'o Ela holds of a Ph.D. in Applied Zoology and specialized in Agricultural Entomology. He defended his Ph.D. at the University of Yaounde I (Cameroon) in 2014 entitled: «Biological diversity of anthophilous insects and impact of their activity on yields of *Cucumeropsis mannii* Naud., *Citrullus lanatus* (Thunb.) Mansf. (Cucurbitaceae) and *Abelmoschus esculentus* (L.) Moench. (Malvaceae) in Cameroon». The results from his study clearly showed that yield of each of the above-mentioned crops increased in the presence of pollinating insects. Hymenoptera was the predominant insect order among the pollinators, both in abundance and richness. Yet, his study also highlighted the importance of several dipteran families in the ecology of the crops. These Diptera included fruit flies responsible for fruit decaying, and Calliphoridae, Sarcophagidae, Muscidae, Drosophilidae, Syrphidae, and Bombyliidae involved in myophily.

Currently, Michelson is a lecturer and senior researcher in the Department of Biological Sciences of the Faculty of Science at the University of Maroua in Cameroon. The different research areas developed within the team comprise: pollination ecology, pollination efficiency in relation to the abundance and diversity of pollinators, beekeeping, biodiversity of flower-visiting insects and their foraging parameters, and assessment of insect pollination impact on crop yield in agronomic and economic terms.

Michelson participated in the training course on the taxonomy and systematics of pollinating flies in Nairobi from November 20 to December 01, 2017 (see pages 6-8 of this issue), and the knowledge gained will improve the entomological and taxonomical skills of the research team and that hopefully will allow them to explore new research areas related to pollination biology.

Key objectives:

Short-term projects include:

1) the introduction in practical work programs of new techniques for data collection, preservation of specimens and identification of insects, mainly adults of Diptera,
2) continuous supervision of students enrolled in the research cycle in agricultural entomology (Master and Ph.D.),
3) the search for grants as a support for research activities.

In the long term, they aim to:

4) set up a reference entomological collection within the department of Biological Sciences of the University of Maroua, and
5) contribute to the realization of the entomological map of Cameroon.

Planned outputs/outcomes:

Results of the various field investigations will be published in peer-reviewed journals and an important entomological database set up at the University of Maroua. This database will make it possible to assess the biodiversity of Cameroonian insect fauna and to better know the pollinating entomofauna associated with crops in a context of integrated and sustainable agriculture.

Contact:

Michelson Azo'o Ela, azooela@yahoo.fr (Department of Biological Sciences, Faculty of Sciences, University of Maroua, P.O. BOX 814 Maroua, Republic of Cameroon)

Supervisor:

-Prof. Messi Jean (University of Yaoundé I, Cameroon)

Collaborators:

-Prof. Tchuenguem Fohouo Fernand-Nestor (University of Ngaoundere, Cameroon)
-Prof. Tamesse Joseph Lebel (University of Yaounde I, Cameroon)
-Prof. Keukenou Sévilor (University of Yaounde I, Cameroon)

OUT NOW !

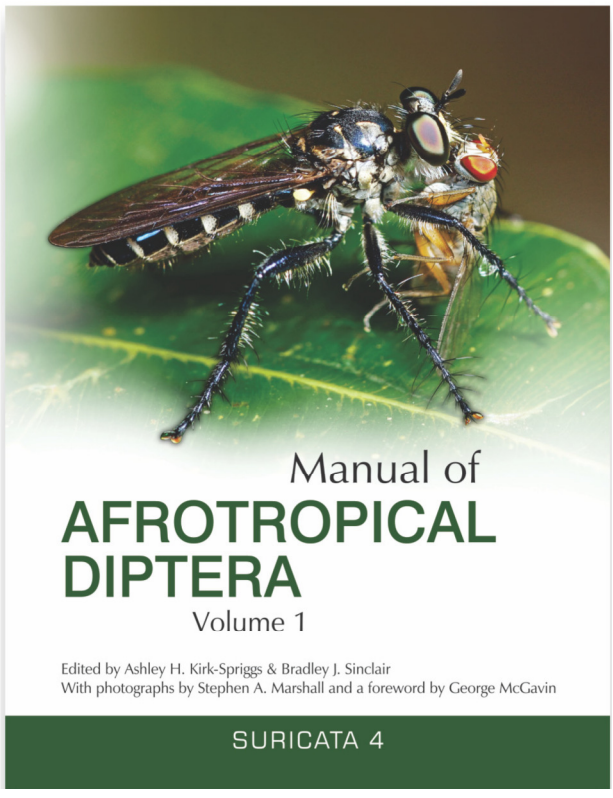
Books:
The *Manual of Afrotropical Diptera:* Volumes 1 and 2

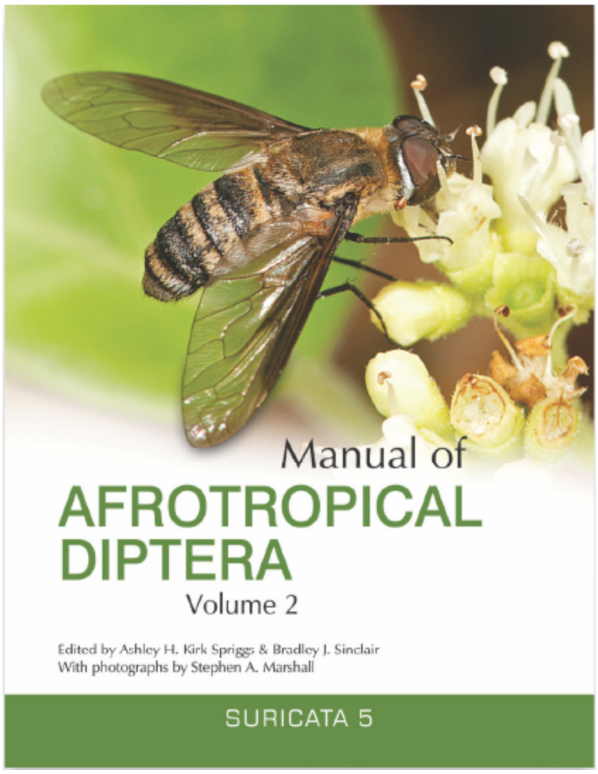
Copies of the books are available for purchase from the SANBI Bookshop
bookshop@sanbi.org.za

True flies, or Diptera, constitute one of the largest orders of insects in the biosphere, with over 160,000 described species worldwide, more than 20,000 of which occur in the Afrotropical Region. They are as diverse morphologically and biologically as they are numerous and many groups have evolved spectacular structural adaptations that are commensurate with their environment and biology. During their long evolutionary history, virtually every terrestrial niche has been occupied by the Diptera, making them one of the most successful groups of organisms on Earth. Many have co-evolved in association with other organisms and become highly specialised parasites or parasitoids of a range of disparate groups of plants and animals. Whether focusing on their systematics, biology, biogeography, conservation, or the more applied aspects, the Diptera remain a fascinating and intriguing group. This four volume book, a collaboration of over 90 international experts on Diptera, is the first-ever synopsis of the 108 families of flies known from the Afrotropical Region and includes discussions on biology and immature stages, economic importance, classification, identification to the genus level, as well as a synopsis of each genus. This work provides the basics for understanding the diversity of a major order of insects in a large tropical and sub-tropical region and is the first such synopsis of its kind for any major insect order occurring in the Afrotropics.

VOLUME1

Volume 1 is published in full colour and comprises ±420 printed pages. The volume includes 11 general introductory chapters dealing with the history of Afrotropical dipterology, collection and preservation, morphology and terminology, natural history, agricultural and veterinary, medical, forensic and phytosanitary significance, biogeography, conservation and the phylogeny of flies. The volume also includes identification keys to all Afrotropical fly families for both adult and larval stages. The text is richly illustrated with over 1,600 illustrations, including 40 colour maps, 800 colour and 60 black and white images and 690 line drawings of flies.





VOLUME 2

Volume 2 is published in full colour and comprises ±920 printed pages. The volume includes family chapters dealing with 43 of the 108 families of flies that occur in the region and covers the nematocerous Diptera and lower Brachycera (sometimes termed the lower Diptera). Each chapter includes a diagnosis of the family, sections dealing with biology and immature stages, classification and identification, an identification key to genera (if more than one) and a synopsis of the fauna section, arranged genus by genus alphabetically. The text is richly illustrated with over 2,900 illustrations, including 1,360 colour and 130 black and white images and 1,430 line drawings of flies.

Due partly to the sponsorship secured, the editors have been able to keep the retail prices of the books very low, to make these affordable for everyone, especially for dipterists and students from developing African countries (which was the original aim). The retail prices are: Volume 1 ZAR350 (= ± USD27); Volume 2 ZAR520 (= ± USD40) (plus the cost of postage and packing, as determined by the SANBI Bookshop).

Copies of the books are available for purchase from the **SANBI Bookshop** bookshop[at]sanbi.org.za. Bookshop staff with provide details of how payments should be made.

SANBI bookshop:
Private Bag X101, Pretoria, 0001 South Africa
Tel. no.: +27 12 843 5000
E-mail: bookshop[at]sanbi.org.za
Website: www.sanbi.org

The books will be officially launched at a special event during ICD9 in Windhoek, Namibia in November 2018 (see pages 3-4 of this *Newsletter*).

Newest literature: In this section, we will list some, but not all, of the newest publications on pollination, mainly, but not exclusively, related to Diptera. If you want to receive a pdf of any of these papers, send an email to kurt.jordaens[at]africamuseum.be.

DECEMBER

Bing, J.; Kessler, D. (2017). Pollination solar flower power. ELIFE, 6: e33591.

Harrap, M.J.M.; Rands, Sean A.; de Ibarra, N.H.; et al. (2017). The diversity of floral temperature patterns, and their use by pollinators. ELIFE, 6: e31262

Stein, K.; Coulibaly, D.; Stenchly, K.; et al. (2017). Bee pollination increases yield quantity and quality of cash crops in Burkina Faso, West Africa. Scientific Reports, 7: 17691.

Nordstrom, K.; Dahlbom, J.; Pragadheesh, V.S.; et al. (2017). In situ modeling of multimodal floral cues attracting wild pollinators across environments. Proceedings of the National Academy of Sciences of the USA, 114: 13218-13223.

Levin, S.; Galbraith, D.; Sela, N.; et al. (2017). Presence of *Apis* rhabdovirus-1 in populations of pollinators and their parasites from two continents. Frontiers in Microbiology, 8: 2482.

Glaum, P.; Kessler, A. (2017). Functional reduction in pollination through herbivore-induced pollinator limitation and its potential in mutualist communities. Nature Communications, 8: 2031.

Chauta, A.; Whitehead, S.; Amaya-Marquez, M.; et al. (2017). Leaf herbivory imposes fitness costs mediated by hummingbird and insect pollinators. PLOS ONE, 12: e0188408.

Pan, C.-C.; Qu, H.; Feng, Q.; et al. (2017). Increased pollinator service and reduced pollen limitation in the fixed dune populations of a desert shrub. Scientific Reports, 7: 16903.

Pornon, A.; Andalo, C.; Burrus, M.; et al. (2017). DNA metabarcoding data unveils invisible pollination networks. Scientific Reports, 7: 16828.

Campbell, B.; Khachatryan, H.; Rihn, A. (2017). Pollinator-friendly plants: Reasons for and barriers to purchase. Hortitechnology, 27: 831-839.

Pritchard, D.J.; Ramos, M.C.T.; Muth, F.; et al. (2017). Treating hummingbirds as feathered bees: a case of ethological cross-pollination. Biology Letters, 13: 20170610.

Spigler, R.B.; Kalisz, S. (2017). Persistent pollinators and the evolution of complete selfing. American Journal of Botany, 104: 1783-1786.

Sapir, Y.; Ghara, M. (2017). The (relative) importance of pollinator-mediated selection for evolution of flowers. American Journal of Botany, 104: 1787-1789.

Prasifka, J.R.; Mallinger, R.E.; Hulke, B.S.; et al. (2017). Plant-herbivore and plant-pollinator interactions of the developing perennial oilseed crop, *Silphium integrifolium*. Environmental Entomology, 46: 1339-1345.

Gemeda, T.K.; Shao, Y.; Wu, W.; et al. (2017). Native honey bees outperform adventive honey bees in increasing *Pyrus bretschneideri* (Rosales: Rosaceae) pollination. Journal of Economic Entomology, 110: 2290-2294.

Martins, K.T.; Gonzalez, A.; Lechowicz, M.J. (2017). Patterns of pollinator turnover and increasing diversity associated with urban habitats. Urban Ecosystems, 20: 1359-1371.

Qu, H.; Seifan, T.; Seifan, M. (2017). Effects of plant and pollinator traits on the maintenance of a food deceptive species within a plant community. Oikos, 126: 1815-1826.

Borghi, M.; Fernie, A.R. (2017). Floral metabolism of sugars and amino acids: Implications for pollinators' preferences and seed and fruit set. Plant Physiology, 175: 1510-1524.

Giannini, T.C.; Maia-Silva, C.; Acosta, A.L.; et al. (2017). Protecting a managed bee pollinator against climate change: strategies for an area with extreme climatic conditions and socioeconomic vulnerability. Apidologie, 48: 784-794.

Marim Toledo, J.A.; Junqueira, C.N.; Augusto, S.C.; et al. (2017). Accessing the genetic content of *Xylocopa frontalis* bees (Apidae, Xylocopini) for sustainable management in pollination services of passion fruit. Apidologie, 48: 795-805.

Desaegher, J.; Nadot, S.; Dajoz, I.; et al. (2017). Buzz in Paris: flower production and plant-pollinator interactions in plants from contrasted urban and rural origins. Genetica, 145: 513-523.

Cardoso-Gustavson, P.; de Souza, S.R.; de Barros, F. (2017). Floral volatile profile in Pleurothallidinae, an orchid subtribe pollinated by flies: ecological and phylogenetic considerations. Phytochemistry Letters, 22: 49-55.

Landaverde-Gonzalez, P.; Quezada-Euan, J.J.G.; Theodorou, P.; et al. (2017). Sweat bees on hot chillies: provision of pollination services by native bees in traditional slash-and-burn agriculture in the Yucatan Peninsula of tropical Mexico. Journal of Applied Ecology, 54: 1814-1824.

Sutter, L. ; Jeanneret, P.; Bartual, A.M.; et al. (2017). Enhancing plant diversity in agricultural landscapes promotes both rare bees and dominant crop-pollinating bees through complementary increase in key floral resources. Journal of Applied Ecology, 54: 1856-1864.

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