The Pollinator Information Network Newsletter

Editorial

October 11. Vol. 1, Issue 2

Welcome to the second issue 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 now has its own website; read more on this on page 2 of this issue, or go directly to https://www.pindip.org/ !

In this issue we will be looking back to the 9th International Symposium of Syrphidae, which was hosted by Brazil this year, and we will be looking ahead to the 9th International Congress of Dipterology, which will take place in Namibia in 2018. Registration will soon be opened.

Further in this issue you can read more on a training course in general dipterology at the National Museums of Kenya and the International Centre of Insect Physiology and Ecology, in Nairobi (Kenya) from 20 November – 1 December 2017. Find out more on the training course on page 6!

We also highlight the PhD projects of Arianna Thomas of the University of Alicante (Spain) who will study the taxonomy of two genera of Rhiniidae, and Genevieve Theron of Stellenbosch University (South Africa) who will study ecological interactions between Nemestrinidae and flowering plants in the Karoo. This second 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 high-lighted, relevant literature, upcoming conferences and symposia, possibilities for cooperation and grant applications related to plant-pollinator networks, *etc*., before the 15th of December.

Enjoy reading!

Kurt Jordaens on behalf of the PINDIP team

Table of Content:

Website

The Pollinator Information Network website

https://www.pindip.org/

One of the planned outcomes of the JRS Biodiversity Foundation project "The Pollinator Information Network for Two-Winged Insects" or simply PINDIP is to develop a website on African dipteran pollinators. This will create a perfect environment to present the project, to share data, and to create a research network. Key features of the website will include: a contacts database for collection managers, taxonomists, and plant-pollinator ecologists, taxon pages (with structured descriptions, specimen records, images, distribution data, and with links to the various museum/institutional collections), and a bibliography. It will further be used to support various ways of communicating with site members and visitors such as forums, newsletters (three per year), and a commenting system.

We hope that the website will be sustainable in the long term, be managed in, and by, African institutes as well, and that we can invite other researchers, and/or research groups during the project, to take part in the development of the project website. The members of the PINDIP project will actively assist in bridging the gap between ecologists that need taxonomic expertise, and the specialized taxonomist. We will also pro-actively bring ecologists and taxonomists in contact which share the same needs (e.g. all those interested in coffee production). Moreover, we intend a user-centered web-design and the website will get iterations of user input and revision during the project.

The website has just been launched and will be updated and improved in the upcoming two months. Nevertheless, you can already access the website through the following link:

https://www.pindip.org/

Please feel free to send any comment to Kurt Jordaens [kurt.jordaens(at)africamuseum.be].

Congress

This year, the 9th International Symposium on Syrphidae (ISS) was organized for the first time in the Americas and the Neotropical Region. The congress took place from 28 August to 1 September 2017 in Curitiba, Brazil. The congress stimulated and established new worldwide research networks, and participants discussed the most recent insights and advances in the area and, above all, encouraged collaboration among scientists from different fields of research in this group of flies. The congress welcomed 41 participants from 11 countries (Argentina, Belgium, Brazil, Canada, Colombia, Czech Republic, Finland, Germany, Netherlands, Serbia, Spain), which presented high quality scientific works, including 34 oral presentations and 29 posters. The next ISS will be organized by the University of Novi Sad (Serbia) and will take place in Greece on the island of Lesbos. See you there!

Mírian N. Morales & Luciane Marinoni (Organizing Committee ISS9)

The abstract volume of the conference can be downloaded from the conference website:

http://syrphidaesymposium.wixsite.com/iss9-curitibabrazil

Important dates

Early registration: November 2017–1st of June 2018
Regular registration: until 1st of November 2018
Abstract submission deadline: 1st of September 2018

Registration and submission of abstract will be 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 behaviour
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:

Twelve symposia titles have been submitted to date and posted on the official website http://icd9.co.za/symposia-titles/ and instructions for other on-line title submissions and an online submission form are available online. Note that two symposia titles submitted thus far related specifically to Diptera pollinators!

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

Training

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
! CALL CLOSED !

The training (November 20 – December 1) is 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 is 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 consists of ex-cathedra courses on morphology, classification, identification, identification methods, collection methods, and conservation methods of Diptera, with a special focus on the target families listed above. Practical exercises will be used to comment on and test the topics presented in the courses. Participants have been asked to bring material they collected so it can be identified during practical work sessions.

This year, the following 14 persons will participate in the training: Josia Collins Achieng (National Museums of Kenya, Kenya), Joseph Mutunga Mulwa (Kenya Agricultural and Livestock Research Organisation, Kenya), Genevieve Theron (University of Stellenbosch, South Africa), Tricia Moodley (KwaZulu-Natal Museum, South Africa), Ndayikeza Longin (Burundian Office for the Protection of the Environment, Burundi), Eugene Sinzinkayo (Burundi Environment Protection Authority, Burundi), Hermann Toni (National University of Agriculture, Benin), Emanuel Martin (College of African Wildlife Management, Tanzania), Kisimenda Muambalo (Natural History Museum of Eduardo Mondlane University, Mozambique), Michelson Azo'ela (University of Maroua, Cameroon), Sidonie Fameni (University of Maroua, Cameroon), Nadia Toukem (International Institute of Tropical Agriculture, Cameroon), James Egonyu (University of Makarere, Uganda), Kudzai Mafuwe (Natural History Museum of Zimbabwe, Zimbabwe).

Trainers are: 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) and Kurt Jordaens (Royal Museum for Central Africa, Belgium).

SPOTLIGHT

PhD project: Biodiversity of Rhiniidae (Diptera) in the Afrotropical region with emphasis on the genera *Cosmina* Robineau-Desvoidy and *Rhyncomya* Robineau-Desvoidy in South Africa.

Arianna Thomas-Cabianca recently started a PhD at the University of Alicante entitled “Biodiversity of Rhiniidae (Diptera) in the Afrotropical region, with emphasis on the genera *Cosmina* Robineau-Desvoidy and *Rhyncomya* Robineau-Desvoidy in South Africa”. Rhiniids are flies known to have strong ecological associations with wild and rural environments, and are believed to be important pollinators, but very little is known about their ecology and life-cycles. Early studies were focused on taxonomy, with most important contributions occurring between the 1930s and 1980s, most prolifically from Fritz Zumpt. After a drastic decline in the taxonomic study of the group, recent studies have reported new species and synonyms; however, no formal revisions of all synonyms have been conducted, and recently-described species have not been incorporated into identification keys. The close morphological relationship within the family, in particular within the genera of Cosmininae, makes such review and update of particular importance.

Until recently, rhiniids were considered a subfamily (Rhiniinae) within Calliphoridae (blowflies). However, recent phylogenetic studies based on morphological and molecular analyses have shown that they are a monophyletic and independent group. This generated several systematic rearrangements that resulted in the rhiniids being considered an independent family (Rhiniidae), with 376 species recognized within 30 genera. The family is mainly distributed in wild and rural areas of the Afrotropical region, extending into the Mediterranean basin, and the Oriental and Australian bioregions. The Afrotropics probably contains the largest diversity of Rhiniidae, with around 150 described species; Cosmininae is the most diverse subfamily with around 130 species.

Key Objectives:

The main goal of my PhD project is to review the taxonomical status of the Afrotropical Rhiniidae with emphasis on the genera *Cosmina* and *Rhyncomya*, and to generate an updated checklist and identification key for South African Rhiniidae. The research is being conducted through an exhaustive revision of Rhiniidae specimens deposited in entomological collections in South Africa and Europe.

Planned outputs/outcomes:

This project will contribute to the knowledge of the taxonomy, biodiversity, and distribution of the Rhiniidae in the Afrotropical region through: an updated database of Rhiniidae material contained in South African and European entomological collections; high-definition stacked photographs of adults specimens and genital structures for all reviewed species, with special emphasis on holotypes; illustrated identification keys for Afrotropical genera and species; distribution/occurrence maps of Afrotropical Rhiniidae; and compilation of biological and ecology information.

Contact and PhD student:

Arianna Thomas-Cabianca, athomasbio@gmail.com (Department of Environmental Sciences & Natural Resources, University of Alicante, Spain)

Supervisors:

-Ana Isabel Martínez-Sánchez (University of Alicante, Spain)
-Santos Rojo (University of Alicante, Spain)

Collaborators:

-Martin Villet (Rhodes University, South Africa)
-National Museum, Bloemfontein, South Africa
-KwaZulu-Natal Museum, Pietermaritzburg, South Africa

This PhD project is partially financed by:

UE-Horizon 2020, Marie Skłodowska-Curie action, Research and Innovation Staff Exchange (RISE) Programme: FlyHigh: Insect-plant relationships: insights into biodiversity and new applications, and the University of Alicante, Spain.

PhD project: Systematics and evolution of keystone pollinators in South Africa’s biodiversity hotspots (University of KwaZulu-Natal)

Genevieve Theron recently started her PhD research at the University of KwaZulu-Natal on the systematics and evolution of keystone pollinators in South Africa’s biodiversity hotspots. Southern Africa is renowned for its tremendous plant diversity contained in three biodiversity hotspots of global significance. It is now well-established that interactions with pollinators have played a pivotal role in the evolution of both functional plant diversity and species richness in these hotspots. This paradigm rests on the viewing of pollinators as niches to which plants can adapt. These niches comprise few, highly diverse and unique pollination guilds such as long tongued flies. Unlike abiotic niches, pollinators represent dynamic niches because they also evolve and adapt. Pollinator evolution may have important implications for plant evolution. However, virtually nothing is known about the evolution of the major pollinator groups of Southern Africa. Our current understanding suggests that local specialized plant-pollinator interactions are represented by a highly asymmetrical network, in which multiple plant species rely on a single pollinator species for reproduction and that local coevolution may explain trait matching between plants and pollinator species. In contrast, evidence from macroevolutionary studies suggests that plant species adapt to pre-existing pollinator traits.

During my PhD project, I will focus on the evolution of long-tongued flies, a group of charismatic and keystone dipteran pollinators in the Southern African flora. Long tongues have evolved in several fly families in southern Africa and fly species are responsible for pollination of more than 100 plant species.

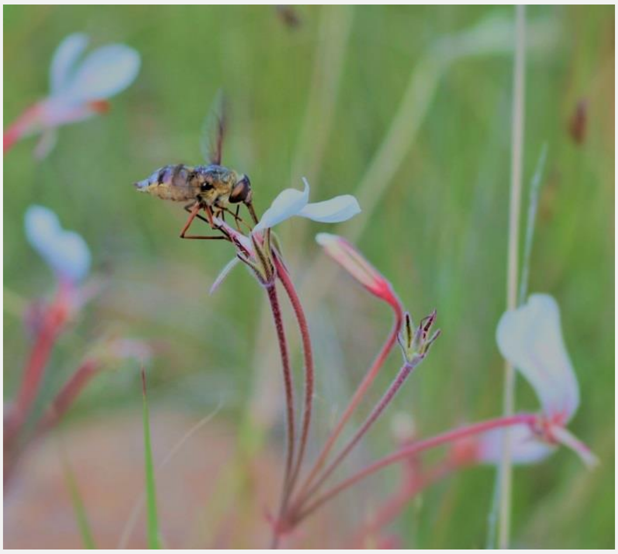
Key objectives:

The aim of the project is to increase understanding of systematics and evolution in the Southern African endemic genus *Prosoeca* (Nemestrinidae), as a means to gain insight into the processes that may drive codiversification and coevolution between plants and pollinators, ultimately giving rise to the tremendous biodiversity of the region. The scope of the project includes diversity at two geographical and taxonomic scales: diversity within *Prosoeca peringueyi* in the Succulent Karoo biodiversity hotspot, and the genus *Prosoeca* across southern Africa. More specifically, I will

1) assess whether the extensive morphological diversity of *Prosoeca peringueyi* within sites across the Succulent Karoo represents different evolutionary fly lineages or intra-population variation (e.g. gender polymorphism, age-related polymorphism). This will be evaluated using DNA barcoding techniques.

2) distinguish between alternative explanations for extant patterns of diversity, particularly whether sympatric divergence or allopatric divergence followed by ecological sorting underlie co-evolutionary mosaics, molecular and morphometric tools will be used to identify and investigate evolutionary and geographical lineages within *Prosoeca peringueyi.*

3) scale up the results of 1) and 2) to southern Africa, to understand whether local pollination guilds evolved independently, or are the result of migrations of preadapted lineages.



Planned outputs/outcomes:

This project will contribute to the taxonomy and phylogeny of the genus *Prosoeca.* With this phylogeny, the *Prosoeca* radiation will be dated and combined with ancestral character state reconstruction (in particular of tongue length) and biogeographical analyses to assess whether the evolution of long tongues predates the evolution of plants that rely on them, and to assess whether long tongues evolved multiple times in situ, or only few times, followed by migration to different biomes in their current ranges.

Contact and PhD student:

Genevieve Theron, genevieveltheron@gmail.com (School of Life Sciences, University of KwaZulu-Natal, South Africa)

Supervisors:
-Dr. Timo van der Niet (University of KwaZulu-Natal, Pietermaritzburg, South Africa)
-Prof. Dr. Steve Johnson (University of KwaZulu-Natal, Pietermaritzburg, South Africa)

Collaborators:
-Prof Bruce Anderson (Stellenbosch University, South Africa)
-Prof Allan Ellis (Stellenbosch University, South Africa)

This PhD project is financed by:

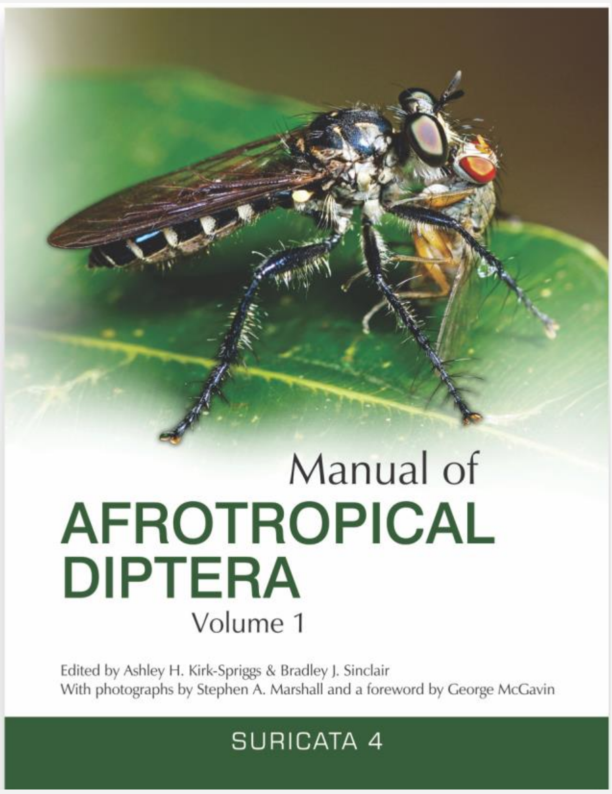
National Research Foundation of South Africa

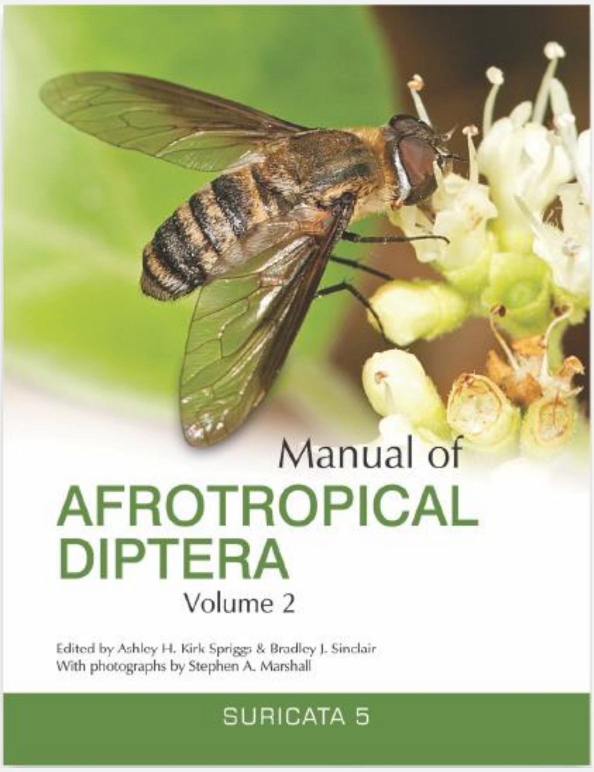
Books:
The *Manual of Afrotropical Diptera*: Volumes 1 and 2

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.

Both volumes will be available in November 2017 (cover prices to be determined) from the SANBI Bookshop: Private Bag X101, Pretoria, 0001 South Africa.

Tel. no.: +27 12 843 5000

E-mail: bookshop@sanbi.org.za

Website: www.sanbi.org

Literature

Newest literature: In this section, we will list some, but not all, of the newest publications on pollinators. If you want to receive a pdf of any of these papers, send an email to kurt.jordaens(at)africamuseum.be.

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Domic, A.I.; Bernhard, P.; Edens-Meier, R.; Camilo, G.R.; Capriles, J.M. (2017). Pollinating ecology of *Polylepis tomentella* (Rosaceae), an Andean anemophilous tree presenting a potential floral fungal infection. International Journal of Plant Science, 178: 512-521. DOI: 10.1086/692504

Flasch, L.; von Elm, N.; Wester, P. (2017). Nectar-drinking *Elephantulus edwardii* as a potential pollinator of *Massonia echinata*, endemic to the Bokkeveld plateau in South Africa. African Journal of Ecology, 55: 376-379. DOI: 10.1111/aje.12352

Funamoto, D.; Ohashi, K. (2017). Hidden floral adaptation to nocturnal moths in an apparently bee-pollinated flower, *Adenophora triphylla* var. *japonica* (Campanulaceae). Plant Biology , 19: 767-774. DOI: 10.1111/plb.12579

Garratt, M.P.D.; Senapathi, D.; Coston, D.J.; Mortimer, S.R.; Potts, S.G. (2017). The benefits of hedgerows for pollinators and natural enemies depends on hedge quality and landscape context. Agriculture, Ecosystems and Environment, 247: 363-370. DOI: 10.1016/j.agee.2017.06.048

Hobbhahn, N.; Steenhuisen, S.-L.; Olsen, T.; Midgley; Johnson, S.D. (2017). Pollination and breeding system of the enigmatic South African parasitic plant *Mystropetalon thomii* (Mystropetalaceae): rodents welcome, but not needed. Plant Biology, 19: 775-786. DOI: 10.1111/plb.12580

Johnson, A.L.; Fetters, A.M.; Ashman, T.L. (2017). Considering the unintentional consequences of pollinator gardens for urban native plants: is the road to extinction paved with good intentions? New Phytologist, 215: 1298-1305. DOI: 10.1111/nph.14656

Lentola, A.; David, A.; Abdul-Sada, A.; Tapparo, A.; Goulson, D.; Hill, E.M. (2017). Ornamental plants on sale to the public are a significant source of pesticide residues with implications for the health of pollinating insects. Environmental Pollution, 228 : 297-304. DOI: 10.1016/j.envpol.2017.03.084

Moron, D.; Skorka, P.; Lenda, M.; Celary, W.; Tryjanowski, P. (2017). Railway lines affect spatial turnover of pollinator communities in an agricultural landscape. Diversity and Distributions, 23: 1090-1097. DOI: 10.1111/ddi.12600

Nottebrock, H.; Schmid, B.; Mayer, K.; Devaux, C.; Esler, K.J.; Bohning-Gaese, K.; Schleuning, M.; Pagel, J.; Schurr, F.M. (2017). Sugar landscapes and pollinator-mediated interactions in plant communities. Ecography, 40: 1129-1138. DOI: 10.1111/ecog.02441

Phillips, R.D.; Brown, G.R.; Dixon, K.W.; Hayes, C.; Linde, C.C.; Peakall, R. (2017). Evolutionary relationships among pollinators and repeated pollinator sharing in sexually deceptive orchids. Journal of Evolutionary Biology, 30: 1674-1691. DOI: 10.1111/jeb.13125

Sawatthum, A.; Jitake, P.; Rangyai, O.; Prangprayong, R.; Pimboon, P.; Suparit, K. (2017). Efficacy of stingless bee *Lepidotrigona terminata* as insect pollinator of F-1 hybrid cucumber. International Journal of Geomate, 13: 98-102. DOI: 10.21660/2017.37.2533

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Ballantyne, G.; Baldock, K.C.R.; Rendell, L.; Willmer, P.G. (2017). Pollinator importance networks illustrate the crucial value of bees in a highly speciose plant community. Scientific Reports, 7: 8389. DOI: 10.1038/s41598-017-08798-x

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Franceschinelli, E.V.; Elias, M.A.S.; Bergamini, L.L.); Silva-Neto, C.M.; Sujii, E.R. (2017). Influence of landscape context on the abundance of native bee pollinators in tomato crops in Central Brazil. Journal of Insect Conservation, 21: 715-726. DOI: 10.1007/s10841-017-0015-y

Giannini, T.C.; Costa, W.F.; Cordeiro, G.D.; Imperatriz-Fonseca, V.L.; Saraiva, A.M.; Biesmeijer, J.; Garibaldi, L.A. (2017). Projected climate change threatens pollinators and crop production in Brazil. PLoS ONE , 12: e0182274. DOI: 10.1371/journal.pone.0182274

Gilpin, A.M.; Denham, A.J.; Ayre, D.J. (2017). The use of digital video recorders in pollination biology. Ecological Entomology , 42: 383-388. DOI: 10.1111/een.12394

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