The pollinator information network newsletter

March 31, 2024. Vol. 7, Issue 2

Welcome to the second issue of volume 7 of the *Pollinator Information Network Newsletter*

The *Pollinator Information Network Newsletter* is one of the projected outputs of the "Diversity of Pollinating Diptera of the Afrotropical Region" project, a project funded by the Belgian Development Cooperation through the framework agreement with the Royal Museum for Central Africa. One of the projected outcomes of the project is the publication of a policy brief on the study of fly biodiversity to protect biodiversity hotspots in the province of KwaZulu-Natal (South Africa), which we present at the end of this issue.

One of the main activities of the project partners and collaborators is to educate school children on flies and their role in pollination. We show some nice pictures of Terence Bellingan of the Albany Museum, Grahamstown and John Midgley of the KwaZulu-Natal Museum interacting with community school children. Amazing to see how enthusiastic the children reacted to the talks! The field season is coming to its end and in this issue you will find a report on our last field trips to the Ndumo Game Reserve in northern KwaZulu-Natal on the border to Mozambique and to Giant's Castle in the Drakensberg Mountains..

We again put a few persons in the spotlight who have participated at our last entomological training course in Tanzania! Melanie de Morney is a member of the Garden Route Scientific Services team at South African National Parks, Tanatswa Gara is a laboratory scientist and deputy insectary manager at Africa University, and Jenipher Tairo is lecturer at the Sokoine University of Agriculture.

We invite everyone interested to submit relevant information for the *Newsletter*, including summaries of your own research and projects on pollination biology – or publications that you want to see highlighted, relevant literature, upcoming conferences and symposia, possibilities for cooperation and grant applications related to plant-pollinator networks, *etc*., before the first of June 2024.

Enjoy reading the second issue of Volume 7 of the *Newsletter*!
the DIPoDIP team

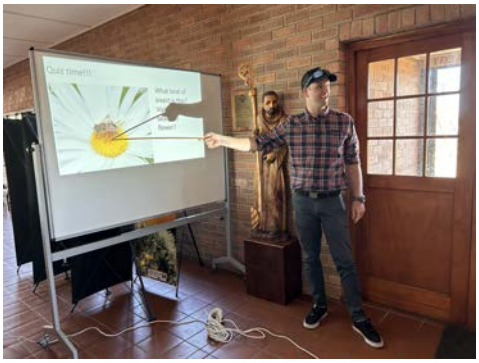
You want more updates on the DIPoDIP project ? follow us on Facebook!

https://www.facebook.com/pollinatingdiptera/

Teaching activities in the DIPoDIP project

DIPoDIP partners and collaborators

One of the main activities of the DIPoDIP project partners is to transfer knowledge on insects, and more specifically on pollinating flies, to school children in South Africa. We do this in two ways. First, as you may see in the three pictures below, the project partners and collaborators visit community schools. They have developed PowerPoint presentations and poster panels with information on flies, flowers, and the role of flies in pollination. These presentations are very interactive and entertaining!


Terence Bellingan of the Albany Museum Makhanda (AMGS) teaching on insects and pollinating flies in the Eastern Cape province of South Africa). Left and middle: at the Holy Cross Junior School. Right: at the Victoria Girls Junior School ©AMGS.

Secondly, the partners invite school children to their museum. Here, the children first follow an interactive and entertaining presentation. Then, they have a short guided tour at the museum with a focus on invertebrates.



John Midgley and Sylvia Ntombela (Assistant Director Education Department) of the KwaZulu-Natal museum organize meeting for school children at the KwaZulu-Natal Museum. First, the school children follow an entertaining and interactive presentation given by John (here to children of Thornhill Christian College) which is followed by a short guided tour in the invertebrates exhibition of the museum ©KZNM.

In the forthcoming years, we will increase our efforts to educate and interact with school children! We are currently developing a booklet with information on flies and flowers, and with a lot of funny and interactive activities for young children. Besides, we will update a set of poster panels that we developed in previous years and that teachers may use to educate their children. On top of this, we are developing a deck of cards on pollinating flies! Together with a general booklet on flies and pollination for the teachers and parents, and a display box with pinned bees, wasps and flies, all these aspects will constitute the DIPoDIP education toolbox! More information will be provided in our upcoming *Newsletters*.

Two Ndumologists take on a giant task

John Midgley & Kurt Jordaens

Late summer in KwaZulu-Natal can be a productive time for fieldwork, and while 2024 did not provide as much material as previous years, there was still some good collecting! Kicking the year off with a trip to Ndumo Game Reserve, we spent six days in January collecting in Northern KwaZulu-Natal, usually a hotspot for tropical species that just make it over the border. And of course, it presents the chance of finding the white whale: *Marleymyia xylocopae*, a bee fly that was described on the basis of two photographs!

The weather was oddly dry, but as expected extremely hot, limiting insect activity to the early morning. Still, some good collecting was had with Malaise traps near the camp and hand collecting at various sites across the reserve. Collecting near the lake shore was a challenge though, with crocodiles watching closely as we set up traps. Ndumo has exceptional calyptrate diversity, and many Miltograminae and Rhiniinae were collected.

Field work at the Ndumo Game Reserve. John Midgley of the KZNM setting up a 6M Malaise trap (lef) and a view on the dry savanah at the reserve. © KMMA.

The real end of summer was spent at Giant's Castle, where El Nino had unfortunately started to bite, leaving few flies in the grasslands. The forests still had some water, and flies were still quite abundant, but it was a far cry from the collecting the previous year. Still, a good trip and valuable specimens were collected for the teaching and insect display boxes that we are going to make as part of the DIPoDIP2 project.

Some of the stunning landscapes at Giant's Castle in the Drakensberg Mountains

Spotlight: Biotechnician Melanie de Morney - South African National Parks, Knysna

A happy Melanie during the 2023 entomological training in Tanzania © KMMA.

Melanie de Morney

IMeet another participant from the 5th training course on the Taxonomy and Systematics of African Pollinating Flies, Melanie de Morney. She forms part of the Garden Route Scientific Services team at South African National Parks. Based in the Garden Route National Park, she works as a biotechnician assisting with terrestrial fauna-related research and monitoring. Her position typically involves data management including collecting, capturing, storing and some analyses of data for scientific research and biodiversity monitoring; providing support, facilitation and coordination to scientists, managers and visiting researchers, as well as participation and providing scientific inputs to awareness and outreach programs.

Never considering a career in entomology, the “bug bit” Melanie during an internship in 2012. Since then, she has slowly but surely expanded her knowledge particularly with sampling, curating, identifying, and preserving insect specimens in a range of different habitats. She is also involved in outreach and education initiatives, sharing her passion for insects and biodiversity.

Melanie during the 2023 entomological training in Tanzania collecting insects with a hand net (left), setting up a Malaise trap with Jarmaine Magoai of the National Museum Bloemfontein (middle), and identifying birds (!) with John Midgley of the KZNM during a walk to Morning Site in the Uluguru Mountains. © KMMA.

Going forward, she would like to expand current education initiatives and monitoring in the Garden Route National Park to include Diptera species, building on existing entomological collections as well as identifying pollinator knowledge gaps and exploring new research areas in the region.

Melanie during the 2023 entomological training in Tanzania collecting insects with a hand net (left), setting up a Malaise trap with Jarmaine Magoai of the National Museum Bloemfontein (middle), and identifying birds (!) with John Midgley of the KZNM during a walk to Morning Site in the Uluguru Mountains. © KMMA.

Spotlight: Laboratory Scientist Tanatswa Gara - Africa University ZENTO, Mutare

Tanatswa Gara

Hello, fellow bush walkers!

Tanatswa Xuxa Gara is the name, a laboratory scientist and deputy Insectary manager at Africa University under a PMI funded Zimbabwe Entomological support programme in malaria (AU/ZENTO). My love for entomology started when I was doing my undergraduate studies in BSc Forensic Science specialising in Biology and Biochemistry.

My current work is majorly on the malaria vector, the Anopheles mosquito. This includes collection of field specimens in malaria endemic areas, morphological identification and then species confirmation using PCR. PCR is also done to check the blood meal source of the mosquitoes, their insecticide resistance status and whether they were carrying the malaria parasite. During the DipoDip training, I gained an important technique of insect pinning and this will allow me to pin some unique specimens we come across to maintain them in good condition for future reference.

Top left: Tanatswa during the 2023 entomological training in Tanzania ©KMMA. Top right: Tanatswa collecting mosquitoes using a hand aspirator/pooter in a hut at a rural homestead ©Tanatswa Gara. Bottom: Tanatswa displaying the museum in the insectary at Africa University (AU) with pinned mosquito specimens. ©AU.

Spotlight: Tutorial assistant Jenipher Tairo - Sokoine University of Agriculture, Tanzania

Jenipher Tairo

Jenipher Tairo identifying insects in the Entomology Laboratory of the Sokoine University of Agriculture (SUA) ©SUA.

Greetings! I'm Jenipher C. Tairo, currently serving as an academician in the Department of Crop Science and Horticulture at Sokoine University of Agriculture (SUA), Morogoro – Tanzania. My passion lies in Agricultural Entomology.

At SUA, I have the privilege of sharing my knowledge and passion with the next generation of entomologists, the undergraduate students. I tutor the students in the field of Entomology providing the necessary knowledge required to tackle the challenges of agriculture. As part of the teachings, I guide students through collecting, sorting, and identification of insects, from their taxonomy and systematics to their significant roles in the ecosystem. I also lead them in understanding environmentally friendly management of destructive insects.

Beyond the classroom, I actively engage in outreach training, explaining the scientific understanding in simple terms for practical application by the farmers. I train farmers, educating them on pest management, pollinator conservation, and Sustainable Agriculture Practices. Recently, together with the AGROVEG project, I took part in training the farmers on fruit flies, and how to control them using agroecological management practices. I also train farmers on the importance of pollinators like bees and flies, highlighting their vital role in agricultural productivity and food security. These trainings enrich farmers with knowledge and strategies to conserve these important insects, promoting sustainable practices and fostering a healthy agricultural ecosystem.

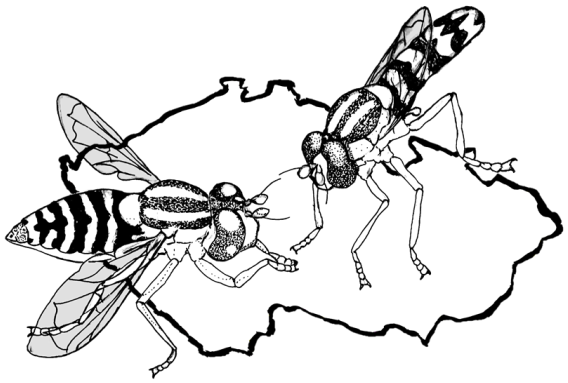
My passion for insect diversity led me to participate in a recent training on the Taxonomy and Systematics of African pollinating flies in 2023. This intensive program allowed me to gain more knowledge on the identification of pollinators such as syrphids, preservation of collected samples of Diptera, and several trapping methods. The training was indeed significant, as it enhanced my ability to educate both students and farmers on these important insects.

Left: Jenipher training local farmers in agroecological farming practices to control pest fruit flies while leaving beneficial organisms unharmed ©SUA. Right: Jenipher identifying insects at the Entomology Laboratory of the Sokoine University of Agriculture (SUA) ©SUA.

I am committed to contributing to the advancement of agriculture by sharing knowledge on conserving beneficial pollinators and using ecologically friendly approaches in managing the destructive ones. I hope to motivate others to appreciate the diverse roles of insects and contribute to a community where agriculture is practiced with minimal negative impacts on the environment.

Left: Jenipher collecting insects on the agricultural plots at the Sokoine University of Agriculture (SUA, Tanzania) ©SUA. Jenipher pinning Diptera during the 2023 entomological training in Tanzania ©Sija A. Kabota.

I am currently pursuing a master's in Crop Science working on fruit flies particularly the melon fly *Zeugodacus cucurbitae* (Diptera: Tephritidae). In the future, I want to continue learning and expanding my knowledge, collaborating, sharing knowledge, and contributing to solutions that will empower farmers and improve agriculture.



12th International Symposium on Syrphidae
Průhonice, Czech Republic
2–7 September 2024

The 12th International Symposium on Syrphidae (ISS12) will take place in Průhonice near Prague (Czech Republic), in Průhonice Castle, with accommodation in Hotel Floret, located in the immediate vicinity of the castle.

The symposium will start on the 2nd of September 2024 (Monday) in the evening and will end on the 7th of September 2024 (Saturday) in the morning. The preliminary schedule is following:

Arrival:	2nd September 2024
Symposium:	3-5 September 2024
Field excursion:	6 September 2024
Departure:	7 September 2024

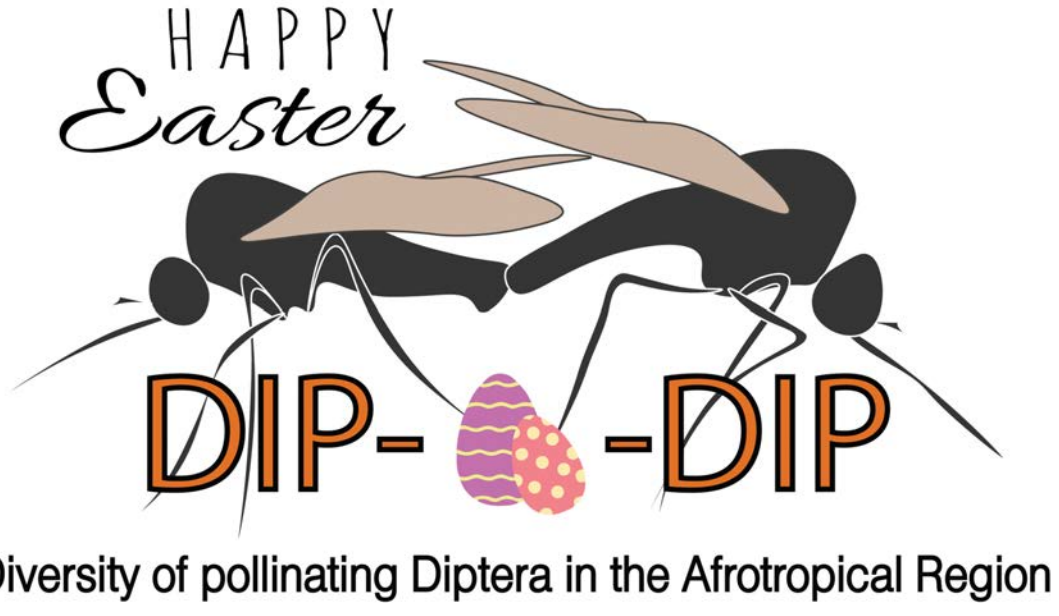
For more information, you can visit the website: https://web.natur.cuni.cz/zoologie/syrphidae/ or send an email to: **Syrphidae12@gmail.com**

Organising Committee,
Jiří Hadrava, Klára Daňková, Antonín Hlaváček, Jakub Štenc, Helena Pijálková, Tadeáš Ryšan, Michael Mikát, Eva Matoušková, Tereza Hadravová

12th Symposium on Syrphidae
Department of Zoology, Faculty of Science, Charles University
Viničná 7, 128 43 Praha 2, Czech Republic
Syrphidae12@gmail.com
https://web.natur.cuni.cz/zoologie/syrphidae/

About the DIPoDIP and DIPoDIP2 projects

The “Diversity of pollinating Diptera in South African biodiversity hotspots” project (DIPoDIP) is a five year project (2019-2023) financed by the Belgian Directorate-general Development Cooperation and Humanitarian Aid through a framework agreement with KMMA. It is a collaboration between the University of KwaZulu-Natal (UKZN), the KwaZulu-Natal Museum (KZNM), Stellenbosch University (SU), the South African National Biodiversity Institute (SANBI), and the Royal Museum for Central Africa (click on the logos for more information). It will be continued as the “Diversity of pollinating Diptera in Afrotropical biodiversity hotspots“ (DIPoDIP2) project in the following five years (2024-2028) and will have additional partners from Burundi and Rwanda. Read more on the project in the forthcoming PINDIP *Newsletters* and on our Facebook page!
https://www.facebook.com/pollinatingdiptera/



©Genevieve Theron

On the following pages you will find our policy brief in English. The policy brief in Zulu (kindly translated by Thembeka Nxele (KZNM) and Afrikaans (kindly translated by Genevieve Theron (ARC) and Burgert Muller (BMSA) are available upon request.

Study pollinator diversity to protect biodiversity hotspots in KwaZulu-Natal

By: John Midgley (KZNM), Timotheüs van der Niet (UKZN), Allan Ellis (SU), Ian Rushworth & Adrian Armstrong (EKZNW), Hendrik Sithole (SANParks), Michelle Hamer (SANBI), Marc De Meyer, Ella Bert, Eva November, Kurt Jordaens (RMCA)

The problem

South Africa is considered the third most biodiverse country in the world and 70% of its invertebrate species are endemic to it. True flies (or Diptera) are a diverse and abundant component of the fauna.

True flies deliver important ecosystem services, such as pollination, pest control, and decomposition, thereby contributing to food security. Loss of true fly biodiversity also negatively affects plant diversity and environmental health.

The province of KwaZulu-Natal contains a significant portion of the Maputaland-Pondoland-Albany (MPA) biodiversity hotspot. The diversity of true flies in these hotspots is, however, poorly known. As a result, the effects of climate and habitat change on this diversity remains unknown, and the use of true fly biodiversity data in conservation management and planning of the MPA hotspot is needed.

©Kurt Jordaens

Bee flies (Bombyliidae) (top), tachinid flies (Tachinidae) (middle) and hover flies (Syrphidae) (bottom) are diverse flies in South Africa (© G. Theron (middle), T. Bellingan (top, bottom))

True fly diversity

True flies constitute a significant part of biodiversity and biomass in ecosystems globally.

Several true fly families, such as bee flies, tachinid flies, and hover flies, are very diverse in KZN and the MPA hotspot.

Many contribute to pollination of plants, including crops, and control of plant herbivores, including pest species. They also serve as food for other organisms such as birds, and are important agents of decomposition in ecosystems.

Natural habitats may act as sources that provide pollination and pest control ecosystem services in adjacent agricultural landscapes (sinks).

True flies are ubiquitous, numerous, easy to observe, and easy to collect. This allows the temporal monitoring of their diversity, abundance, and ecosystem services.

A way forward

Biodiversity data and ecological data of plant-pollinator networks provide relevant information for the improvement of conservation management of natural habitats and biodiversity conservation strategies in KZN.

Active and passive trapping methods allow estimation of the diversity of true flies of specific areas and the temporal changes thereof, while the study of the interactions between true fly species and flowering plants allows description of plant-pollinator networks and elucidation of adaptive mutualisms and evolutionary processes within these networks.

These field data can be supplemented with data from historical entomological collections in South Africa which facilitates assessment of the impact of climate change on true fly diversity and distributions.

Active trapping, such as hand netting, of true flies is one way to study their diversity (© K. Jordaens).

Passive trapping, such as the use of Malaise traps as in the picture above, allows the long-term biomonitoring of true fly diversity (© K. Jordaens).

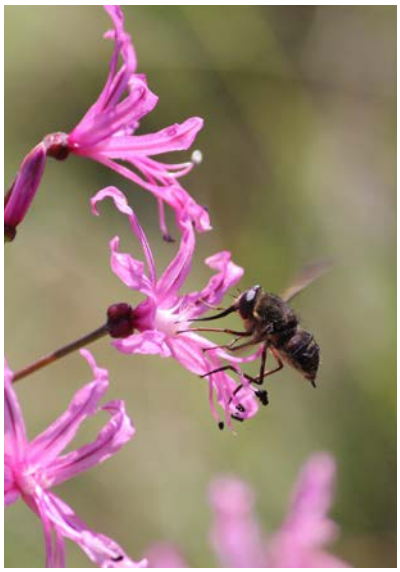
Experimental field work allows description of plant-pollinator interactions in detail (© T. van der Niet).

Key results

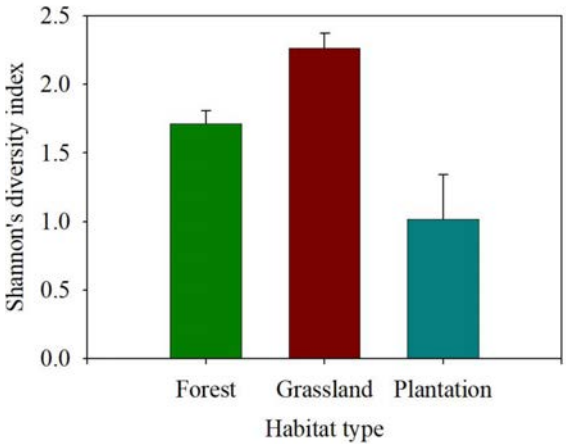
Biodiversity research in the MPA hotspots has indicated high diversity and high degree of local endemism of true flies. Many of these require specific flowering plants or breeding sites such a tree rot-holes and decaying wood.

Natural areas such as forests and grasslands harbour a much higher diversity and abundance of true flies than managed areas such as *Eucalyptus* (gum tree) and *Pinus* (pine tree) plantations. Modified areas lack the ecological requirements to maintain high biodiversity.

A study of the pollinator communities of high elevation plant species of the genus *Crassula* (pygmyweeds) in the Drakensberg mountains revealed that a rich community of true flies are the main pollinators of these and other plant species in alpine communities.



The diversity of tangle-veined flies (Nemestrinidae) in KwaZulu-Natal is high and some are associated with endemic plant species. Shown here is *Prosoeca umbrosa* visiting *Nerine appendiculata* (© G. Theron).



Biodiversity research in the Karkloof region revealed that highly modified and managed areas such as gumtree plantations have a much lower diversity and abundance of hoverflies than indigenous forests and grasslands. This emphasizes the need for better protection of natural areas (© L. Mva).

A flesh fly (Diptera, Sarcophagidae, *Sarcophaga* sp.) visiting a flower of *Crassula peploides* at Witsieshoek in the Drakensberg mountains (© T. van der Niet).

Long-term monitoring of Diptera diversity in the Karkloof Region (© T. van der Niet).

Education of school children on the positive aspects of true flies (© T. Bellingan).

Training of young and emerging South African entomologists (© K. Jordaens).

Further recommendations for true fly research, conservation and monitoring in South Africa

- Establishing long-term monitoring of the diversity of true flies.
- Study plant-pollinator networks in which true flies have an important role.
- Evaluate the threats of true flies and produce Red Data lists for these flies.
- Incorporate true fly biodiversity and ecological data in conservation management and planning in KwaZulu-Natal.
- Train young and emerging fly entomologists to increase institutional capacity.
- Launch education and awareness raising programs to change the mainly negative perceptions of the general public towards true flies.

Contact

Dr John Midgley
Department of Natural Sciences
KwaZulu-Natal Museum
Pietermaritzburg
South Africa
jmidgley@nmsa.org.za
https://www.nmsa.org.za

Link to sources

DIP-DIP
Diversity of pollinating Diptera in the Afrotropical Region

https://www.pindip.org/
https://www.facebook.com/pollinatingdiptera/

Partners and stakeholders

sport, arts & culture
KwaZulu-Natal MUSEUM

SANBI
Biodiversity for Life
South African National Biodiversity Institute

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

South African NATIONAL PARKS

Stellenbosch UNIVERSITY
IYUNIVESITHI
UNIVERSITEIT

AFRICA museum

EZEMVELO KZN WILDLIFE
Conservation, Partnerships & Ecotourism

Belgium
partner in development

About the project

The DIPoDIP project is a collaboration between the KwaZulu-Natal Museum (South Africa), the University of KwaZulu-Natal (South Africa), Stellenbosch University (South Africa) and the Royal Museum for Central Africa (Belgium). South African National Parks (SANParks), the South African National Biodiversity Institute (SANBI) and Ezemvelo KZN Wildlife (EKZNW) are the major stakeholders of the project in the field of conservation. The DIPoDIP project is financed by the Belgian Development Cooperation.