



The conference

Minette Karsten attended the 5th International Symposium of Tephritid workers of Africa, Europe and the Middle East in Belle Mare, Mauritius between 15-18 April 2024. The symposium was held in hybrid format with 125 in-person and a further 20 participants attending online (in total from 30 countries) (Figure 1). Several South African delegates also attended (Figure 2) Prof. Pia Addison (Stellenbosch University), Prof. Aruna Manrakhan (Citrus Research International), Prof. Chris Weldon (University of Pretoria), Rigardt van Rooyen (MSc student, Stellenbosch University), Dillon Wimbush (MSc student, Stellenbosch University), Anderson Lombard (MSc student, Stellenbosch University), Tertia Grové (ARC), Leani Serfontein (Citrus Research International), Julie Mokwele (DALRRD) and Simphiwe Mnguni (DALRRD).



Figure 1 Group photo at 5th International Symposium of Tephritid workers of Africa, Europe and the Middle East.



Figure 2 South African participants at the 5th International Symposium of Tephritid workers of Africa, Europe and the Middle East.

I was involved in three posters that were presented at the Conference related to the DISPEST project and a fourth exploring the use of an alternative marking system for fruit flies.

Landscape Connectivity Of The Fruit Fly Pest, *Ceratitis quilicii (Diptera: Tephritidae) In Southern Africa.** Maxi Snyman, John S. Terblanche, Madeleine Barton, Seth Tsatsu, Aruna Manrakhan, Laura Canhanga, Domingos Cugala, Lore Esselens, Pia Addison, Massimiliano Virgilio, Marc De Meyer, Minette Karsten.

Thermal Fertility Limits Of The Mediterranean Fruit Fly, *Ceratitis capitata (Wiedemann) (Diptera: Tephritidae).** Maxi Snyman, Minette Karsten, Pia Addison, Marc De Meyer, Massimiliano Virgilio, John S. Terblanche.

Unraveling the distribution of *Ceratitis rosa* and *Ceratitis quilicii (Diptera: Tephritidae) in southern Africa.** Seth Tsatsu, Francois Bekker, Maxi Snyman, Laura Canhanga, Tertia Grove, Jullie Mokwele, Jan-Hendrik Venter, Aruna Manrakhan, Minette Karsten, Pia Addison, John S. Terblanche, Marc De Meyer, Massimiliano Virgilio.

Preliminary Analysis Of Quantum Dots As A Marking Technique For *Ceratitis capitata.** Richard Wimbush, Melissa Powell, Sybrand van Dyk, George Marais, Aisha Moerat, Constant Tamboer, Francois Bekker, Minette Karsten, Anandi Bierman, Pia Addison, John S. Terblanche.

[**Ceratitis capitata* - Mediterranean fruit fly; *Ceratitis quilicii* – Cape fruit fly]

The programme

The programme consisted of 10 sessions covering a variety of topics (see below). The detailed Scientific programme and Abstract book is attached to this report as a PDF (TEAM abstract book 15.04.2024.PDF).

14 April	Registration and Welcome
15 April	Session 1: Biology, Behaviour and Physiology
	Session 2: Chemical Ecology
	Session 3: Ecology, hosts, distribution and abundance
16 April	Session 4: Genetics and Taxonomy
	Session 5: Traps and Attractants
	Session 6: Conventional and Biological control
	Session 7: Phytosanitary measures
17 April	Session 8: Management Techniques - SIT
	Session 9: Biotechnology and other control tools
	Session 10: Area-wide/IPM
18 April	Technical tour

Interesting presentations, posters and general comments

Researchers and other stakeholders involved in phytosanitary programmes and/or plant protection agencies were represented at the Symposium and shared knowledge and technologies with regards to the development and improvement of management strategies for different fruit fly pest species. Several talks were of interest and relevant to deciduous fruit growers in South Africa.

Work presented by Weldon et al. explored the response of the medfly, marula fly and oriental fruit fly to protein and showed that medfly has the highest response especially when the bait is placed in the canopy. This work confirms the importance of aerial baiting with a protein bait (and insecticide), especially for medfly and subsequent population suppression.

Challenges with medfly trapping using current attractants were also highlighted at the Symposium presented by Papadopoulos et al. Five traps per km² showed an efficacy of less than 1% recapture (1 fly for every 100). This has implications for detection of low-density populations to trigger management practices in orchards. This also relates to trapping for surveillance of other biosecurity threats and the requirements to detect new incursions early on.

The Symposium had several presentations on the integration of biological control agents for fruit fly control. ICIPE (Kenya) are planning to release *Diachasmimorpha longicaudata* (braconid wasp) in several African countries, primarily for the oriental fruit fly, since it has showed success in North and South America. In addition, the impact of entomopathogenic fungi (EPFs) on spotted-wing drosophila (*Drosophila suzukii*, SWD) behaviour and mortality have been explored at ICIPE. Various entomopathogenic fungi isolates showed high levels of mortality and that a specific isolate (ICIPE78) was also attractive to SWD. This study shows promise for the use of EPF as part of the integrated management of SWD.

Current orchard practices in South Africa are moving towards incorporating mulching, compost or cover crops on the orchard floor. The impact of these on biological control agents, specifically those applied on the orchard floor is not well known. The impact of compost and biochar on Entomopathogenic nematodes (EPNs) were explored in Benin and the results presented at the Symposium. Compost and biochar provided some protection for EPNs tested in the study, but more research is required to confirm this. This avenue of research is also important to explore in South Africa with the increase in biological control agents being applied.

Manrakhan et al. presented trap thresholds for Capilure (4 fruit fly/trap/week) and EGO lure (10 fruit fly/trap/week) specifically for medfly in citrus. EGO lure shows a lot of promise for fruit fly monitoring since the replacement window is 20-25 weeks compared to the 6 weeks for Biolure. Caution should be

taken with applying thresholds in other commodities. Spotted-wing drosophila have also been captured in EGO lure traps in South Africa (for the first time), but the effectiveness compared to SWD lures still need to be explored.

CRI is developing a decision support system (DSS) for medfly in Citrus and was presented by Anderson et al. at the Symposium. The system aims to assist farmers with management decisions including timing of chemical applications. Factors included in the model are number of flies in closest trap to that orchard, information on alternative/adjacent hosts (how close are they and how susceptible are they), the susceptibility of the crop in the orchard, temperature (impacts on fly development), medfly population size based on previous captures (weeks prior) and all captures in traps within a certain radius of the orchard in question. Currently the DSS is being field-tested with several orchards making decisions based on the output from the DSS and comparing this to conventional practices. The performance of the DSS will be determined at the end of the Citrus season for each orchard. The performance/success of the DSS will be followed up on.

A new key for the identification of fruit fly larvae were also presented by Taddei et al. from the European Union Reference Library (EURL) for insects and mites. Current legislation not only requires that exotic flies intercepted must be identified to genus or species level and cannot only be denoted as “non-EU Tephritidae”. A database of which Tephritidae taxa are intercepted in the EU and their origins have been compiled and are now supported by the key.

Julie Mokwele (DALRRD) also presented on the current status of the Oriental fruit fly in South Africa.

The expansion of fruit fly distributions across Europe, could have some implications for market access from South Africa. Data presented at the Symposium by Mouttet et al. (ANSES) from France showed that the oriental fruit fly is now captured consistently every year. In addition, two fruit fly species have invaded France, Peach fruit fly (*Bactrocera zonata*) and Solanum fruit fly (*Bactrocera latifrons*) and in each instance first catches were at their main fruit markets. Both flies are present in Africa, but not yet in South Africa. Peach fruit fly is a risk for Deciduous fruit in South Africa.

Minette Karsten also had a meeting to discuss a new multi-country fruit fly project funded by die DGD (Belgium Development Agency). The 5-year project will be a collaboration between South Africa, Mozambique and Tanzania exploring fruit fly distribution and pest-free areas.



Technical tour

On Thursday, 18 April, Minette Karsten attended the technical tour to the Fruit Fly Mass Rearing Facility, Entomology Division, Agricultural services, Ministry of Agro-Industry and Food Security in Reduit. The facility was opened in 2019 and are focussed on rearing *Bactrocera dorsalis* (Oriental fruit fly), *Bactrocera zonata* (Peach fruit fly) and *Zeugodacus cucurbitae* (Melon fly). Peach fruit fly and Melon fly are not yet present in South Africa and Peach fruit fly (currently in northern Africa; Sudan, Egypt and Libya) poses a serious threat for deciduous fruit (pest of citrus, apple, mango, plum, apricot, peach).

Chemical insecticides, lures and attract and kill products funded by the Ministry are provided to growers at the facility.



Relevance to Industry

- The Symposium provided up to date distribution information on important phytosanitary pests not yet present in South Africa, but present in other African countries. This provides a direct line for any potential future fruit fly invasions.
- The new generation sexing strains research talks I attended could be important for medfly and SWD SIT in the future.
- *Bactrocera zonata* (Peach fruit fly) is a biosecurity concern for the deciduous fruit industry in RSA as hosts include: pome fruit (apple) and several *Prunus* species including apricot, plum and peach. It is listed on CABI as present in Sudan, Egypt and Libya. Methods for monitoring, control and SIT will be important to industry if Peach fruit fly is ever detected in RSA. The contacts and information will be extremely useful in compiling an action plan when needed.
- Many other key contacts have been made (see below) or networks enforce that could provide support for future collaborations.

Key contacts

Raphaëlle Mouttet, ANSES, France. Expertise: Development and validation of identification methods (combining morphological and molecular approaches) for insects of quarantine significance (including fruit flies and beetles). (SWD is present in France)

Dr Preaduth Sookar, Principal Scientific Officer, Entomology Division of the Ministry of Agro Industry and Food Security, Mauritius. Expertise: Plant protection, with a focus on fruit fly management.

Patel Nausheen Azhaar, Senior Scientific Officer, Entomology Division of the Ministry of Agro Industry and Food Security. Expertise: Fruit fly management.

Dr Samira Mohamed, ICIPE, Kenya. Expertise: Integrated pest management with a focus on classical biological control. (ICIPE is working on SWD biocontrol).

Luis Bota, National Fruit Fly Laboratory, Provincial Directorate of Agriculture and Fisheries, Chimoio, Manica Province, Mozambique. Expertise: Integrated pest management of fruit flies.

Prof. Nikos Papadopoulos, Head of Entomology and Agricultural Zoology laboratory, University of Thessaly, Greece. Expertise: Insect Ecology and management of Tephritidae.

Dr Marc de Meyer, Head of Biology Department, Invertebrates, Royal Museum for Africa, Belgium. Expertise: Taxonomy of Diptera (Tephritidae), Phylogeny and insect-plant relationships.

Dr Hélène Delatte, CIRAD, Madagascar. Expertise: Population genetics and biological invasions in island agroecosystems.

Dr Katharina Merkel, Senior Entomologist, Primary Industries and Regions, South Australia. Expertise: Fruit fly behavioural ecology and population ecology.

