FRUITOPIA

NEWSLETTER

ARC-Tropical and Subtropical Crops

Celebrating 95 years of Research Excellence

January - March 2021

ARC-TSC Receives Honorary Visitors

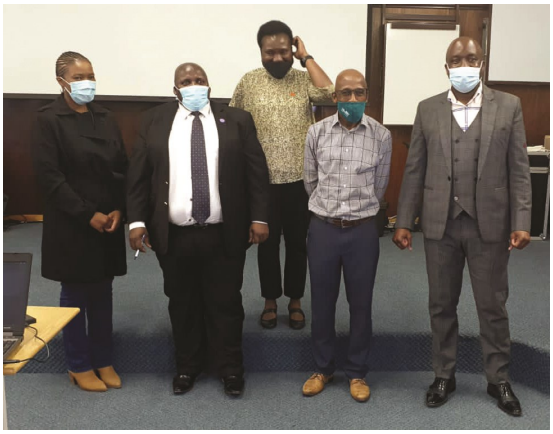

Fig. 1: From left to right: Dr Pakela-Jezile (SMR ARC-TSC), Dr Dagada - Acting Head of Department (DARDLEA), Dr Kgaphola (Chief Director Professional Services - DARDLEA), Dr Moephuli (CEO - ARC) and Mr Msibi (MEC - DARDLEA).

On the 23rd of March 2021, the ARC-TSC had a visit from the CEO and President, Dr Shadrack Moephuli, as well as the Group Executive for Crop Sciences, Dr Nthabiseng Motete. The visit included a short meeting with staff members at the recreational hall, where the CEO commen-ded staff for their work ethic during this difficult time. He also encouraged everyone to work together and continue to stay safe. Engagements were also had with the Mpumalanga MEC for Agriculture, Rural Development, Land and Environmental Affairs (DARDLEA), Mr Mandla Msibi and his team.

This served as an introductory meeting with the intention to engage in future collaboration between the ARC-TSC and DARDLEA. It was highlighted that the ARC has a role to play in helping farmers to maintain pest-free zones and promote animal health.

Fig. 2: MEC Mr Mandla Msibi also had the opportunity to add his signature to our attendance register for VIPs visiting our 95-year-old institution.

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RESEARCH HIGHLIGHTS

Promising new mango selections

Christo Human and Salomie Willemse

After years of mango breeding and evaluation by researchers at the ARC-TSC, and with the input of co-workers in different climatic areas, a new promising mango selection was recently identified for commercialisation. The South African Mango Growers' Association (SAMGA) funds the mango evaluation programme. This is an ongoing project with the aim to breed and evaluate mango cultivars that would enhance the industry's ability to compete on the international market as well as supply new cultivars for the local market.

The new selection identified (CH31-M17&18), was selected at the Cultivar Evaluation day held at Mohlatsi Farm in Hoedspruit, and it will be registered for Plant Breeders' Rights.

Selection CH31-M17&18 is a third generation open pollinated seedling with the cultivar 'Hood' as the original female parent. It is a mid-season selection producing medium size fruit with good fruit shape and a pink blush before it ripens. Once ripe, it has an attractive red external colour, a sweet taste and little fibre.

This is the third selection from the breeding program in two years that has been selected for commercialisation.

Fig. 3: New mango selection CH31-M17&18. External appearance showing attractive fruit colour.

Fig. 4: Internal appearance demonstrating low fibre content.

Ethephon applications affect dormancy and flowering gene expression in litchi

Regina Cronje, Elliosha Hajari and Innocent Ratlapane

Litchi trees only flower successfully when temperatures drop sufficiently during winter and no new leaf flush is present prior to flowering. Removing unwanted leaf flush before flowering by applying the chemical ethephon to the young shoot has been practiced in the industry for years. However, climate change over the past decades has caused later than usual rainfall in autumn and higher winter temperatures both of which contribute to vigorous leaf flush, and thus reduce flowering and yield.

Therefore, it was necessary to optimise the chemical sprays with ethephon to remove frequently re-occurring flush (Fig. 5) by applying ethephon before the new leaf flush occurs.

This forces the trees to stay dormant (Fig. 6) during the warm period in late autumn and winter. By delaying new growth, the chance for successful flowering (Fig. 7) during the colder winter period is considerably increased.

In order to study the mode-of-action of ethephon in buds and leaves and the mechanisms that lead to dormancy and eventually flowering, a gene expression study was initiated in 2018. By monitoring ethylene release, the breakdown product of ethephon and a plant hormone, (Fig. 8) and examining expression of the genes responsible for dormancy and flowering, it was found that ethephon application released ethylene over a period of time in the buds, which is also the reason why trees stayed dormant during the warm period without new leaf flush.

Furthermore, the application caused high gene expression levels of dormancy and flower suppressing genes. However, when temperatures eventually dropped for good flower initiation, flower genes were expressed higher in treated trees than in untreated trees.

This study could therefore prove that by adjusting an existing practice the adverse effects of climate change can be mitigated and that good flowering and yields are still possible for litchi in the warm subtropical regions of South Africa.

Fig. 5: Young leaf flush that inhibits flowering when it occurs in late autumn or early winter.

Fig. 6: Dormant bud after ethephon application.

Fig. 7: Litchi flower and orchard in full boom

Fig. 8: Leaf and bud samples ready for ethylene measurement.

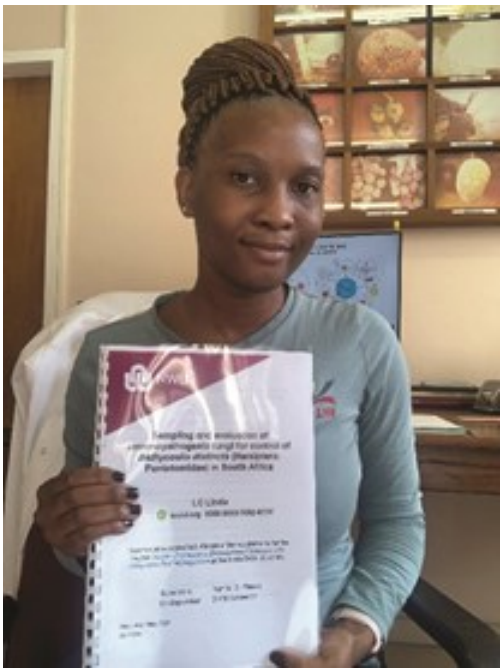
ARCCIT2007 Plant Breeders' Right Granted

The ARC-TSC's citrus mutation breeding project run at the Addo Research Station has the objective to produce improved citrus cultivars. Irradiation methodologies are used to alter one or a few negative characteristics of existing commercial cultivars. Seed content, internal and external pigmentation, fruit shape, ripening time and other characteristics can be changed with irradiation. A Plant Breeders' Right registration was awarded to a 'Cara Cara' mutation that emanated from this programme. The new cultivar, ARCCIT2007 (ZA20217269) shows higher Brix, improved external colour and a high percentage of 75 mm fruit (a size preferred by the EU market) than the original 'Cara Cara'. If marketed commercially, this new cultivar could earn the ARC valuable foreign currency.

Fig. 9: The ARCCIT2007 (on the right) compared with the normal 'Cara Cara' (left)

Staff News

Achievements



Congratulations to

Miss Lungile Linda

She has completed her MSc. in Environmental Sciences (Integrated Pest Management), *cum laude*, through the North-West University.

The title of her thesis is “Sampling and evaluation of entomopathogenic fungi for control of *Bathycoelia distincta* (Hemiptera: Pentatomidae) in South Africa”.

Resignations

Mr N J R Roets

Mr Nicolaas Johannes Rudolph Roets has resigned after 23 years of service.

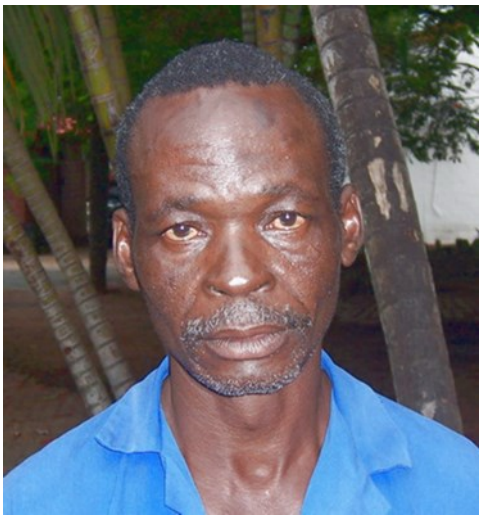
We wish him every success in his new endeavours.

Retirements

Ms A M Zikhali

Ms Annah Monica Zikhale retired after 8 years of service.

We wish Ms Zikhale a wonderful retirement!



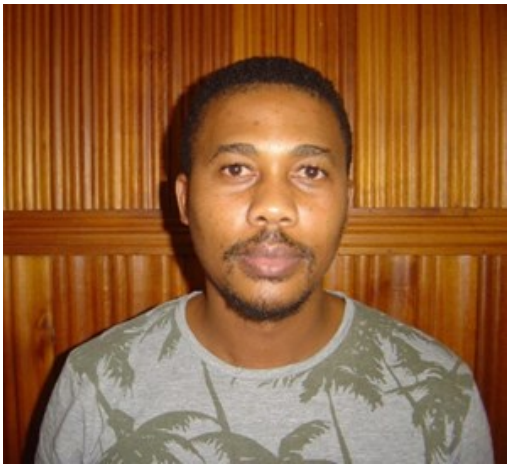
Mr T M Mzimba

Mr Toli Mentick Mzimba retired after 34 years with the ARC-TSC.

We hope that Mr Mzimba will enjoy every minute of his retirement.

Best wishes !

Appointments



Dr Owen Mbatyoti

Researcher in the Crop Protection Division

Dr Mbatyoti holds a PhD in Environmental Sciences from the North-West University, with his thesis on “Soybean host status to *Meloidogyne incognita* and nematode biodiversity in local soybean cropping systems”.

Dr Mbatyoti completed his BSc. Hons and MSc. in Zoology from the University of Fort Hare. He first joined the ARC-TSC as a PhD PDP student in 2015 and later progressed to a post-doctoral fellow in 2018 in the Crop Protection Division.

Dr Ronel Roberts

Senior Researcher in the Crop Protection Division (Plant Pathology Unit)

Dr Roberts holds a PhD in Microbiology from the University of Pretoria, with her thesis on: “Biological and genetic diversity of *Candidatus liberibacters* from South Africa”.

Dr Roberts completed all her tertiary studies (BSc. to PhD in Microbiology) from the University of Pretoria and graduated her MSc. *cum laude*. She was working as a Chief Research Technician at the ARC-PPRI under the Virology Unit since 2012.

Dr Tonna Anyasi

Senior Researcher in the Post-Harvest and
Agro-processing Division
(Food Science Unit)

Dr Anyasi holds a PhD in Agriculture (Food Science and Techno-logy) from the University of Venda, with his thesis on: “Nutritional profiling and effects of processing on unripe banana cultivars in Limpopo province, South Africa”.

Dr Anyasi obtained his MSc. in Food Science and Technology from the University of Ibadan, Nigeria and BSc. Honours in Microbiology from Ambrose Alli University, Ekpoma, Nigeria. He was working as a post-doctoral research fellow at the Cape Peninsula University of Technology prior to joining the ARC-TSC. He has also spent time at the University of Venda as a lecturer, post-doctoral fellow and researcher.