

Annual Review 2024



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General Manager

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ADVISORY COUNCIL

2023/24



Stephen Rabe
Chairman



Grant Smuts
Vice Chairman



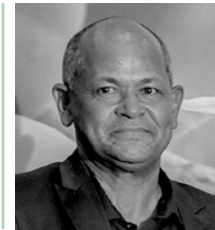
Linde du Toit



**James
Hutton-Squire**



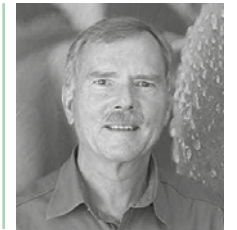
**Frikkie
Jacobs**



**Raymond
Koopstad**



Graeme Krige



Charl Stander



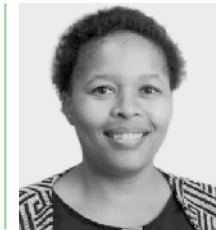
**Prof. Karen
Theron**



**Dr Ilse
Trautmann**



**Gerrit van
der Merwe**



**Cynthia
Mahlathi**
Observer



Anton Rabe
Observer



Stephen Rabe

CHAIRMAN'S REPORT

The success of the first round of the industry leadership programme has highlighted the need to manage the introduction of leadership talent into the various industry structures and not rely on attrition, as in the past, to fill these important roles.

With this in mind Hortgro Science (HGS) has drawn up a terms of reference document that sets terms for council members and the chair. The chair will be elected for a four-year term and can serve a maximum of two terms i.e. eight years.

A newly constituted and expanded HGS Advisory Council (HGS AC) will include younger growers, the Hortgro economic development manager, and technical expertise. The expanded HGS AC will consist of a maximum of 13 members and a minimum of 10 and will include the following:

- Pome Producer Council (PPC) representatives (3)
- Stone Producer Council (SPC) representatives (2)
- Producers that graduated from the Industry Leadership Programme (preferably one each from pome and stone).
- Research/ research management experts (1-2)
- Technical experts (1-2)
- Ad hoc appointment to co-opt a necessary skills base (1)
- Hortgro Executive Director – observer status
- Hortgro Economic Development Manager – observer status

The HGS AC will be appointed by the Hortgro Pome and Hortgro Stone Board in consultation with the HGS GM and the Hortgro Executive Director.

The purpose of the HGS AC is to provide leadership and strategic direction, oversight and support to HGS on behalf of Hortgro Pome and Hortgro Stone.

With this clear mandate in place, it's the responsibility of each council representative to play their role in achieving the purpose of the AC.

I would like to thank all those involved in the research process, special mention to Matthew Addison and Hugh Campbell who both retired in the year under review. There will be opportunities created to celebrate their contributions, and these will be used to thank them in more detail.

A big thank you to Wiehann and his team; the standards they set themselves can only be achieved with passion and commitment, and they have both in abundance.

My indebted thanks to the current AC representatives; it's an absolute privilege to be a part of this experienced collective, that gives so willingly of their time and wisdom.

Until next time, my end is in sight and clarity on the succession process. Thank you.

Wiehann Steyn

GENERAL MANAGER



Governance

Hortgro Science operates under the guidance of the Hortgro Science Advisory Council, which reports to the Hortgro Board and the Pome and Stone Producer Councils. The council consists of Stephen Rabe (Chairman), Grant Smuts (Vice-chair), Linde du Toit, Frikkie Jacobs, Charl Stander, Raymond Koopstad, Prof. Karen Theron, and Dr Ilse Trautmann. In 2024, the council expanded to include two young growers, James Hutton-Squire and Gerrit van der Merwe, as part of succession planning, following their participation in the Hortgro industry leadership programme. Additionally, Graeme Krige joined to represent and acknowledge the involvement of technical advisors in the research process. Anton Rabe (Hortgro Executive Director) and Cynthia Mahlathi (Hortgro Economic Development Manager) serve as non-voting, ex-officio members.

Research and related activities

To boost the competitiveness of South African deciduous fruit farming, our research efforts are focused on enhancing efficiency throughout the value chain, addressing key risks to industry sustainability, and providing critical information for market access and development. Our work is organised into key areas: market access and management of phytosanitary and invasive pests, production efficiency (volume of exportable fruit per unit area), climate change mitigation, water productivity, plant material quality,

postharvest quality, sustainable crop protection, and risk management across the value chain.

In 2024, Hortgro Science reviewed 54 new research proposals addressing questions identified by 13 research workgroups. Following evaluation by five peer workgroups and three technical advisory committees, 27 new projects were approved for the 2024/25 funding cycle. Research funding remains predominantly allocated to projects (72%) and research posts (13%), with a continuing trend toward increased investment in crop protection.

Hortgro Science initiated a low-resolution survey for the spotted-wing drosophila (SWD) in response to the high likelihood of this pest spreading to South Africa. The discovery of a single male fly in November 2023 in the Langkloof prompted comprehensive surveillance, which confirmed the rapid spread of SWD to most major stone fruit production regions.

The crop protection team, notably Matthew Addison, Minette Karsten, and Nanike Esterhuizen, played a pivotal role in monitoring SWD, producing guidelines, coordinating with stakeholders, and launching research projects. Lindi Benic and the market



access team also contributed by assessing market risks and initiating emergency registration of suitable pesticides.

Research and monitoring of the polyphagous shot-hole borer (PSHB) continued. PSHB has spread to Waboomskraal, Paarl, Wolseley, and Grabouw. Meetings were held with growers in these regions to provide guidelines on how to respond.

The past year highlighted the need to expand monitoring capacity for invasive species. With Anton Rabe's leadership, a centre of excellence for monitoring was established at Fruitfly Africa (FFA), where surveillance activities are coordinated with Hortgro, other industries, FFA, and the National Department of Agriculture (NDA).

PHYLA, under Dr Renate Smit, ran five projects during 2023/24 and will launch three additional projects in 2024/25.

Hortgro Science and SAMAC initiated a forum for research managers from perennial tree fruit industry organisations to discuss common challenges and collaborative opportunities.

The first stone fruit concept orchards were established to compare the growth of trees produced through tissue culture with those grown from cuttings or seeds.

Communications

The *Fresh Quarterly*, accessible at www.freshquarterly.co.za, featured diverse topics over the past year, including climate change, irrigation, honeybee pollination, superficial scald, and bruising, alongside presentation summaries from the 2024 Hortgro Technical Symposium. The symposium itself was a major success, with 330 attendees on the strategic day, more than 350 on each of the two technical days, and 285 participants for the pome fruit field day.



The Stone Fruit App continues to grow its dedicated user base and is updated annually. A new Climate Change App has been completed and is undergoing final checks.

The Hortgro Science website serves as a comprehensive resource, explaining the research process, listing various groups and committees, and provides an understanding of the different research programmes and the projects that are part of the programme. The site also features a PSHB subdomain and a new online research library that provides access to abstracts of non-market-sensitive final project reports.

A crop production forum was launched in March 2024 to facilitate discussions on pre-harvest research topics. Additionally, a stone fruit Store-It forum now supports knowledge sharing within the stone fruit postharvest value chain.

Capacity development

Building the next generation of scientists and technical experts remains a priority. In 2023/24, Hortgro Science funded 32 postgraduate students, including 19 MSc, eight PhD, and three postdoctoral candidates. Of these, 56% were female and 25% were black.

Prestige bursary recipient Ms. B. Ngidi graduated in March 2024 and joined the Hortgro Economic

Development Department. A new project has also been initiated to support Ms. P. Solomon's PhD studies.

Support for the Plant Disease Clinic at Stellenbosch University continued with a donation aimed at sustaining this essential service. Hortgro Science also co-funded sabbatical visits by international research leaders, Profs. Lee Kalcsits, Luca Corelli-Grappadelli, and Bart Nicolai, to foster collaboration on ongoing research.

Personnel

Dr Mariana Jooste joined Hortgro as Postharvest Programme Manager (5/8 position) in April. Stellenbosch University buys 3/8 of her time, supporting Dr E. Crouch's research chair in postharvest physiology until January 2026. Dr Minette Karsten was promoted to Crop Protection Programme Manager in October 2024, succeeding Matthew Addison, who will continue with Hortgro on a contract basis. Matthew ably led the programme since 2013 and was instrumental in guiding its focus towards more sustainable crop protection solutions.

As part of the industry leadership development programme, Wiehann Steyn, Marno van der Westhuizen, Minette Karsten, and four growers visited Australia and New Zealand in December 2023, attending the International Symposium on Precision Management of Orchards as part of the visit. Minette also participated in a fruit fly symposium in Mauritius and the International Entomology Symposium in Kyoto.

After a fruitful career, Hugh Campbell, General Manager of Hortgro Technical and formerly Hortgro Science, retired in September. We celebrate him reaching this milestone and acknowledge him for establishing our industry's research footprint, providing strategic leadership, building our capacity and networks, and for nurturing a high-performance culture and fun work environment. He will continue to support Hortgro Science on a part-time basis in 2024/25. Hugh leaves a legacy that he can be truly proud of.



CROP PRODUCTION

Research on dormancy, rootstocks and nursery tree quality, growing season climate, reproductive biology, farming technology and irrigation and nutrition



2024

Crop Production



RESEARCH PROGRAMME

INTRODUCTION

Research within the crop production programme addresses current problems experienced by fruit growers but is also future-directed – research has a long lead time and it is important to start building the capacity and conduct the research for the solutions that will be needed in the future. In this sense, the crop production research strategy is directed and aligned with the requirements and key risks to the orchard of the future. Hence, increasing orchard productivity and efficiency as well as improving fruit quality are the main drivers of the crop production programme while climate change, extreme weather, plant material quality and water availability and quality are key risks that are addressed.

The crop production research programme is structured into six themes, namely dormancy, farming technology, irrigation and nutrition, rootstocks and nursery tree quality, growing season climate, and reproductive biology. The research strategy for each theme is determined by a workgroup (one workgroup per theme) consisting of fruit growers, technical advisors and researchers. When considering research strategy, the workgroups always keep in mind the changes we need to make to our orchards to remain internationally competitive as well as profitable. They also consider the major future risks, as identified within the overarching research strategy, which may jeopardise our profitability.



Dormancy

Research on this theme is aimed at understanding the progression of dormancy under mild winter conditions and the impact of insufficient winter chill on fruit production. We also study dormancy release to potentially identify new, safer rest-breaking chemicals.

Prof. S Midgley completed a project that provided an indication of how climate change during the winter and early spring period might affect pome and stone fruit production in different regions. This information will be incorporated in Hortgro's climate change app.

EXPERTISE

Dormancy workgroup

RESEARCH TEAM

- Prof. Wiehann Steyn – crop production programme leader

Researchers

- Dr Nigel Cook
- Dr Iwan Labuschagne
- Dr Esmé Louw
- Dr Tara Southey
- Prof. Adriaan van Niekerk

Students

- Mr Tristan Dorfling - MSc student
- Ms Cara du Toit – MSc student
- Ms Portia Solomon – MSc student
- Mr Karel Vahrmeijer – MSc student
- Mr Chad van Wyk – MSc student
- Mr Jan Theron - MSc student



NEW PROJECTS:

- Suitability study for the South African deciduous fruit industry focusing on climate adapted plums (pilot study) (T Southey and A van Niekerk) – [see Growing Season Climate](#)

CURRENT PROJECTS:

- Adaptability indexing of pome (apple and pear) and stone fruit (plum) cultivars in diverse South African growing areas (I Labuschagne, E Louw, P Solomon, C du Toit and T Dorfling) – [see Growing Season Climate](#)
- Investigating the significance of temperature on flowering phenology by establishing a South African apple and plum phenophase-temperature database (E Louw and I Labuschagne)
- Growth synchronisation of stone fruit rootstocks and scions with different chilling requirements (C van Wyk) – [see Rootstocks and Nursery Tree Quality](#)
- Rest breaking alternatives to hydrogen cyanamide (C van Wyk, N Cook and J Theron)

COMPLETED PROJECTS:

- Climate profiling and change analysis of the Elgin-Grabouw-Vyeboom-Villiersdorp (EGVV), Koue Bokkeveld (KBV) and Langkloof (LK) production areas specific to Pome fruit (T Southey) – [See Growing Season Climate](#)
- Historic and future modelling and mapping of early season temperature patterns and extremes, and impacts for pome and stone fruit production in South Africa (S Midgley) – [see Growing Season Climate](#)
- Adaptability indexing of cherry cultivars in diverse South African growing areas (I Labuschagne, E Louw, C van Wyk, K Vahrmeijer) – [see Growing Season Climate](#)



Rootstocks and Nursery Tree Quality

Finding more precocious and productive rootstocks adapted to South African conditions is integral to our orchard of the future vision. For this reason, various pome and stone fruit rootstocks are evaluated in an increasing number of industry trials in commercial orchards.

New apple rootstock evaluation sites were planted to dwarfing rootstocks at three locations in the Highveld region where Western Cape results are not applicable due to the milder summer climate, planting under nets and fertile soils.

Other rootstock research is aimed at characterising new rootstocks in terms of adaptation and disease and pest tolerance. Various projects are evaluating the susceptibility of rootstocks to *Phytophthora*, *Rosellinia*, woolly apple aphids, plant parasitic nematodes, crown gall and replant disease. We are also comparing the performance of tissue culture-derived apple and stone fruit trees against those produced from layers or cuttings, respectively. A new project will assess the graft union strength of different apple rootstock and scion combinations.

EXPERTISE

Rootstock and nursery tree quality workgroup
Rootstock evaluation committee

RESEARCH TEAM

- Prof. Wiehann Steyn –
crop production programme leader

Researchers

- Dr Iwan Labuschagne
- Prof. Stephanie Midgley
- Prof. Adele McLeod
- Dr Nigel Cook
- Mr Tristan Dorfling
- Mr Chad van Wyk

Students

- Ms Anika Keuck – MSc student
- Dr Lindani Moyo – Postdoctoral fellow

NEW PROJECTS:

- Quantifying the graft union strength of various apple scion/rootstock combinations (T Dorfling)

CURRENT PROJECTS:

- Evaluation of apple rootstock cultivars for woolly apple aphid resistance (M Addison)
- Evaluation of apple rootstocks against apple replant disease on 'fumigated' and 'non-fumigated' soil (T Dorfling)
- Evaluation of Forelle pears on different rootstocks (T Dorfling)
- Evaluation of new apple rootstocks representing two vigour classes in two growing areas (Molteno, Bokveldskloof & Oewerzicht) (T Dorfling)
- Apple rootstock influence on Granny Smith scion growth, productivity and fruit green colour (T Dorfling)
- Evaluation of new plum rootstocks for South African fruit industry (C van Wyk)
- Evaluation of new peach rootstocks for the South African fruit industry (C van Wyk)
- Growth synchronisation of stone fruit rootstocks and scions with different chilling requirements (C van Wyk) – [see Dormancy](#)
- New apple rootstock plantings in the Highveld region (T Dorfling)
- Evaluation of apple rootstocks tolerance against specific apple replant disease (SARD) (T Dorfling and A McLeod) – [see Pathology](#)

- Tolerance of apple rootstocks against Phytophthora root rot (A McLeod and L Moyo) – [See Pathology](#)
- Evaluation of apple rootstocks representing three vigour classes in three growing areas of South Africa with RDS as scion (T Dorfling)

COMPLETED PROJECTS:

- Optimising true-to-typeness testing in rootstock trials for cost-effective results (T Dorfling)
- Evaluation of pear rootstocks for Packham's Triumph at Jackal River Farm, Vyeboom, for Forelle at La Plaisante, Wolseley, and for Cape Rose at La Plaisante, Wolseley (T Dorfling)
- Evaluation of new apple rootstocks representing three vigour classes (Môrester and Oak Valley) (T Dorfling)
- Effect of mulching, compost and rootstock genotype on white root rot of apple (A McLeod and A Keuck) – [See Pathology](#)

PUBLICATIONS:

- [Fresh Quarterly Sep 2024](#): Mouton, A. Choosing a rootstock.
- [SAFJ Oct/Nov 2023](#): Mouton, A. An introduction to act 36: p. 58.



- [SAFJ Dec/Jan 2024](#): Mouton, A. Many cultivars, limited resources: p. 64.
- [SAFJ Jun/Jul 2024](#): Mouton, A. Rootstocks for stone fruit: p. 58.

EVENTS:

- Langkloof Seminar – 22 November 2023
- Hortgro Technical Symposium – 3 June 2024

**Growing Season Climate**

Of the “serious” pome fruit producers, South Africa, together with Brazil, has the production regions closest to the equator. This means higher summer temperatures and generally, altogether more plant stress and more fruit downgraded for processing compared to our major competitors.

The great inefficiency of caring for fruit that ultimately ends up in a juice bin significantly impacts the profitability of the South African industry, especially under the serious cost squeeze conditions that the industry is experiencing. It should not be surprising that research under this theme is predominantly aimed at decreasing sunburn and internal fruit quality defects brought about by climatic stress.

A new project utilizes the ProHort ecophysiology platform to study the innate ability of different apple genotypes to tolerate high light and heat. Prof. Lee Kalcsits of Washington State University is a collaborator on the project and participated on the project while visiting South Africa on his sabbatical. Dr Tara Southey of TerraClim

launched a pilot project to determine the possibility of developing suitability maps for new plum cultivars.

Jason Ladegourdie's project showed how Packham Triumph growers may benefit from draped nets while Tara Southey generated high resolution topographical and climatic maps for the EGVV, Langkloof and Ceres production regions. These maps can be of great assistance in site selection for new plantings.

EXPERTISE

Growing season climate workgroup

RESEARCH TEAM

- Prof. Wiehann Steyn – crop production programme leader

Researchers

- Dr Elke Crouch
- Prof. Stephanie Midgley
- Dr Iwan Labuschagne
- Prof. Adriaan van Niekerk
- Ms Heleen Tayler
- Mr Jason Ladegourdie
- Dr Tara Southey
- Dr Esmé Louw
- Prof. Lee Kalcsits
- Mr Handré Viljoen
- Ms Chantelle Smit
- Ms I de Jong

Students

- Ms Portia Solomon – MSc student
- Ms Cara du Toit – MSc student
- Ms Ineke de Jong – MSc student
- Ms Roswitha Serfontein – MSc student
- Mr Tristan Dorfling – MSc student
- Mr Chad van Wyk - MSc student
- Mr Karel Vahrmeijer - MSc student

NEW PROJECTS:

- Understanding heat and light tolerance of different apple genotypes planted in three contrasting climates (E Louw, I Labuschagne, L Kalcsits and R Serfontein)
- Assessment of effectiveness of sunburn protectants on apples fixed shade nets (I de Jong)

- Suitability study for the South African deciduous fruit industry focusing on climate adapted plums (pilot study) (T Southey and A van Niekerk) – [see Dormancy](#)
- Role of growing region temperature and cooling rate on 'Cripps' Pink' membrane lipid oxidation, antioxidant levels and internal browning (H Tayler) – **See Storage Techniques**

CURRENT PROJECTS:

- Internal browning of 'Cripps Pink' apples – effect of growing region temperature on radial browning and effect of canopy position on long-term storage quality (E Crouch, H Tayler and I de Jong)
- Adaptability indexing of pome (apple and pear) and stone fruit (plum) cultivars in diverse South African growing areas (I Labuschagne, E Louw, P Solomon, C du Toit and T Dorfling) – [see Dormancy](#)
- Evaluate the effect of drape nets on the overall plum fruit quality (H Viljoen)
- Quantification of the effect of near-harvest temperatures on pitburn and heat damage in cold stored plums and prediction method development (H Viljoen)

COMPLETED PROJECTS:

- Evaluation of the effect of drape nets on pear quality and productivity (J Ladegourdie)
- Climate profiling and change analysis of the Elgin-Grabouw-Vyeboom-Villiersdorp (EGVV), Koue Bokkeveld (KBV) and Langkloof (LK) production areas specific to Pome fruit (T Southey) – [See Dormancy](#)
- Historic and future modelling and mapping of early season temperature patterns and extremes, and impacts for pome and stone fruit production in South Africa (S Midgley)

- Adaptability indexing of cherry cultivars in diverse South African growing areas (I Labuschagne, E Louw, C van Wyk, K Vahrmeijer) – [see Dormancy](#)
- Enabling the calculation of carbon sequestration in the Confronting Climate Change Initiative's online carbon calculator (C Smit)

PUBLICATIONS:

- [Fresh Quarterly Dec 2023](#): Steenkamp, E. Mitigating risk through strategic planning.
- [Fresh Quarterly Dec 2023](#): Steenkamp, E. Disentangling nature and nurture.
- [Fresh Quarterly Dec 2023](#): Mouton, A. The Hortgro climate change response strategy.



- [Fresh Quarterly Dec 2023](#): Mouton, A. Washington State feels the heat.
- [Fresh Quarterly Dec 2023](#): Mouton, A. Extreme is the new normal.
- [Fresh Quarterly Dec 2023](#): Mouton, A. Climate change FAQs.
- [Fresh Quarterly Dec 2023](#): Mouton, A. New but not normal.
- [SAFJ Dec/Jan 2024](#): Mouton, A. Die nuutste navorsing oor aanpasbaarheid: p. 66.

- *SAFJ Apr/May 2024*: Mouton, A. Giraffe Boerdery: p. 44.
- *SAFJ Apr/May 2024*: Mouton, A. Risikobestuur rondom hael: p. 50.
- *SAFJ Apr/May 2024*: Mouton, A. Bring die Klein Karoo weer op die been: p. 54.
- *Fresh Notes 211 – 17 January 2024*: Quality management of plums following heat waves during the harvesting season.

EVENTS:

- Hortgro Technical Symposium – 3 June 2024



Reproductive Biology

Research in this field is aimed at obtaining regular high yields of good quality fruit. Hence, projects tend to investigate flower initiation, pollination, fruit set, fruit thinning and alternate bearing.

Louisa Blomerus completed a project that investigated the effective pollination period (epp) of different plum cultivars. Her research shows the considerable variation in the duration of the epp from three days in Songold to more than 10 days in Laetitia. We advise that all new plum cultivars are screened for their epp to provide producers with an idea of how consistently a cultivar may set and allow them to plan accordingly.

EXPERTISE

Reproductive biology workgroup

RESEARCH TEAM

- Prof. Wiehann Steyn – crop production programme leader

Researchers

- Mr Matthew Addison
- Ms Louisa Blomerus
- Ms Ineke de Jong
- Prof P Addison
- Dr N Esterhuizen

Students

- Ms Ansuli Cronjé – PhD student

CURRENT PROJECTS:

- Study on the effect of dry matter content on storability and eating quality of Bigbucks and Cripps Red apples to facilitate better postharvest decision making (I de Jong) – *see Quality Management*
- Evaluation of managed bees and pollination efficiency in the pome and stone fruit industry in the South Western Cape, South Africa (M Addison, A Cronjé, P Addison and N Esterhuizen) – *see IPM*

COMPLETED PROJECTS:

- Reproductive Biology: Screening mainstream plum cultivars for the duration of the effective pollination period and other factors influencing successful fruit set (L Blomerus)

PUBLICATIONS:

- *Fresh Quarterly Jun 2024*: Mouton, A. Prepare to pollinate.
- *Fresh Quarterly Jun 2024*: Mouton, A. Honeybees 101.
- *Fresh Quarterly Jun 2024*: Mouton, A. The WCBA pollination standard.
- *Fresh Quarterly Jun 2024*: Mouton, A. Cross-pollinator considerations.
- *Fresh Quarterly Jun 2024*: Mouton, A. Compatibility explained.
- *Fresh Quarterly Jun 2024*: Mouton, A. Ten tips for pollination success.
- *Fresh Quarterly Jun 2024*: Mouton, A. The net effect on bees.



- *Fresh Quarterly Jun 2024*: Esterhuizen, N. Pollination efficiency in deciduous fruit.
- *Fresh Quarterly Jun 2024*: Mouton, A. Update on plum-pollination project.
- *Fresh Quarterly Jun 2024*: Mouton, A. The bees and the (gum) trees.
- *Fresh Quarterly Jun 2024*: Mouton, A. Precision pollination.
- *SAFJ Aug/Sep 2024*: Mouton, A. Heuningbye 101: p. 60.
- *SAFJ Aug/Sep 2024*: Mouton, A. Die net-effek op bye: p. 62.
- *SAFJ Aug/Sep 2024*: Mouton, A. Voorbereiding vir bestuiwing: p. 66.
- *SAFJ Aug/Sep 2024*: Mouton, A. Year-round food for bees: p. 68.





Irrigation and Nutrition

Water availability was identified as one of the top five risks facing our industry in the future. The Western and Eastern Cape provinces are water scarce; climate change is driving a drying trend and competition for water is increasing.

The crop production water strategy involves 1) determining how much water highly productive deciduous fruit trees use, 2) conducting research on various water-saving technologies and 3) conducting research to show growers the negative effects of over-irrigation on production and quality.

We are currently co-funding two projects with the Water Research Commission to determine the water requirements of high-yielding plum and pear orchards.

Engineering consulting firm Zutari was commissioned to develop a water strategy for the South African deciduous fruit industry incorporating the results of a completed study that characterized groundwater availability and groundwater use within the main Hortgro production areas. A study by Daniël Viljoen showed that moderate to severe water deficit has little impact on the storability of Fuji and Golden Delicious apples but might increase internal browning in Cripps Pink apples.

EXPERTISE

Irrigation and nutrition workgroup

RESEARCH TEAM

- Prof. Wiehann Steyn – crop production programme leader

Researchers

- Prof. Nebo Jovanovic
- Dr Eduard Hoffman
- Mr Daniël Viljoen
- Dr James Cullis
- Dr Johan van Zyl
- Dr Sebinasi Dziki
- Ms Lizanne Smit
- Prof. A van Niekerk



- Mr Anele Sidzumo
- Mr J Visser
- Mr Prince Dangare
- Mr N Giuliani
- Prof. Stephanie Midgley
- Dr Elke Crouch
- Mr J Pienaar

Students

- Mr Ubaidullah Mathews – MSc student
- Mr Wasim Mooajee – Honours student

NEW PROJECTS:

- Water status quo assessment and recommendations for a water response strategy for the deciduous fruit industry in South Africa (J Cullis)
- Spatial and temporal analysis of evapotranspiration, crop yield and water productivities in major fruit production sub-regions of the Western Cape (A van Niekerk, W Mooajee)

CURRENT PROJECTS:

- Response of apple tree performance and root development to low-flow drip irrigation (J van Zyl and E Hoffman)
- Quantifying the water requirements of high performing pear orchards (S Dziki, A Sidzumo, S Midgley, J Visser, E Crouch, P Dangare, J Pienaar and N Giuliani)

COMPLETED PROJECTS:

- Characterization of groundwater availability and groundwater use within the main Hortgro production areas, including recharge and run-off assessments (L Smit)
- The effect of a water deficit on fruit tree phenology, fruit production, fruit quality and storability of Fuji and Cripps' Pink apples (D Viljoen) – [See Quality Management](#)
- Water use of high-performing full-bearing Japanese plum (*Prunus salicina*) in two major production regions of the Western Cape (South Africa) (N Jovanovic and U Mathews)

PUBLICATIONS:

- [Fresh Quarterly Dec 2023](#): Mouton, A. A daily decision.
- [Fresh Quarterly Dec 2023](#): Mouton, A. Micro-irrigation at a glance.

- *Fresh Quarterly Dec 2023*: Mouton, A. Research rundown.
- *Fresh Quarterly Dec 2023*: Steyn, W. Strategic about water.
- *Fresh Quarterly Dec 2023*: Mouton, A. Keeping clear of Day Zero.
- *Fresh Quarterly Sep 2024*: Mouton, A. Roots to fruit.
- *Fresh Quarterly Sep 2024*: Mouton, A. Managing mineral nutrition.



- *SAFJ Feb/Mar 2024*: Mouton, A. From theory to practice: p. 54.
- *SAFJ Feb/Mar 2024*: Mouton, A. Monteith: p. 56.
- *SAFJ Feb/Mar 2024*: Mouton, A. Weltevrede: p. 58.
- *SAFJ Feb/Mar 2024*: Mouton, A. Mikrobessproeiing in kort: p. 61.
- *SAFJ Feb/Mar 2024*: Mouton, A. 'n Daaglikse besluit: p. 64.

EVENTS:

- Hortgro Technical Symposium – 3 June 2024



Farming Technology

Research in this theme focuses on orchard mechanisation and technology drivers such as big data, remote sensing, robotics, and GIS that will all contribute to changing the way we produce our fruit in our orchards of the future.



EXPERTISE

Farming technology workgroup

RESEARCH TEAM

- Prof. Wiehann Steyn – crop production programme leader
- Mr Marno van der Westhuizen – research implementation manager in charge of the orchard of the future programme

Researchers

- Dr Iwan Labuschagne
- Mr Matthew Addison
- Prof Adriaan van Niekerk
- Dr Karel Kruger
- Dr Willem Hoffmann
- Ms Rebecca Light
- Mr Garth Stephens
- Prof Anton Basson

Student

- Ms Marezé Smit – MSc student

RUNNING PROJECTS:

- Developing a centralised industry-driven industry/area-wide geographic database supporting the information needs of the pome & stone fruit industries (M Addison, R Light, A van Niekerk, G Stephens, K Kruger and A Basson) – *See IPM*

COMPLETED PROJECTS:

- An economic analysis focused on income or loss to



the fruit producer related to new deciduous fruit cultivar choice (W Hoffmann, I Labuschagne and M Smit)

PUBLICATIONS:

- *Fresh Quarterly Sep 2024*: Mouton, A. SNAP-E orchard systems.
- *SAFJ Oct/Nov 2023*: Mouton, A. Doornkraal: p. 52.
- *SAFJ Dec/Jan 2024*: Mouton, A. Chiltern Farms: p. 62.
- *SAFJ Apr/May 2024*: Mouton, A. Helderwater: p. 52.
- *SAFJ Jun/Jul 2024*: Mouton, A. Lindeshof: p. 68.

EVENTS:

- Hortgro Technical Symposium – 3 June 2024



CROP PROTECTION

Research on Integrated Pest Management, plant pathology, nematology, orchard floor ecology, phytosanitary and market access topics and precision agriculture.



2024

Crop Protection

RESEARCH PROGRAMME

INTRODUCTION

The crop protection programme includes both applied and basic research on nematology, entomology and plant pathology. The crop protection technical advisory committee assesses research outputs and research priorities. Entomology and pathology peer workgroups assess proposed and current research projects and provide guidance to the researchers involved in the programme. Various workgroups, including groups dealing with current crop protection issues, aid in identifying research needs and prioritising research projects.

Ensuring the sustainability of deciduous fruit production is a critical aspect of crop protection research and emphasis is placed on biological control, orchard ecology, biosecurity and phytosanitary threats and advanced technologies in agriculture.

Crop protection research during this season (2023/2024) has again been challenging, especially due to the detection of *Drosophila suzukii* (spotted-wing drosophila). A significant number of projects were completed during the season. The phytosanitary research facility (PHYLA) is now fully functional and several research projects are nearing completion. Research on the invasive polyphagous shot-hole borer and spotted-wing drosophila were initiated. Research on polyphagous shot-hole borer is focused on monitoring and finding preventative treatments. Initial work on spotted-wing drosophila included coordinated countrywide surveillance (in collaboration with SATI, South African Wine and BerriesZA) to determine the spread in South Africa, the establishment of a

multi-disciplinary research group, the compilation of several information guides, grower extension meetings (in-person and online) and the development of a comprehensive research framework.



Phytosanitary and Market Access

The threat posed by phytosanitary pests and diseases to market access is significant and ongoing. Current research projects at PHYLA address several issues including applied research on fumigation using novel materials and various storage regimes. The research programme is aimed at ensuring the effective management of phytosanitary pests and diseases and ensuring access to markets. Several biosecurity issues have arisen. The spread of polyphagous shot-hole borer and spotted wing drosophila within the Western Cape is of great concern.

EXPERTISE

- Phytosanitary and biosecurity workgroup
- Integrated pest management workgroup

RESEARCH TEAM

- Mr Matthew Addison – crop protection programme leader

Researchers

- Dr Renate Smit • Dr Julia Meitz-Hopkins
- Prof. Pia Addison • Dr Shelley Johnson
- Dr Minette Karsten • Dr Marelize de Villiers
- Prof. Gerhard Pietersen

Technical Assistance

- Mr Terence Asia
- Dr Nanike Esterhuizen
- Dr Daleen Stenekamp

Students

- Ms Marehette Liprini – Postdoctoral fellow

CURRENT PROJECTS:

- Postharvest treatment using ultra low oxygen environment to control external pests in pome and stone fruit (R Smit)
- Ozone fumigation as a post-harvest phytosanitary treatment for insect pests and plant pathogens (R Smit)
- Ethyl formate as postharvest treatment to control banded fruit weevil and red spider mites on pome fruit (R Smit and M Liprini)
- Updating the quick identification guide for phytosanitary pests of South African deciduous fruit (S Johnson)

COMPLETED PROJECTS:

- Improving integrated control measures against the grain chinch bug, *Macchiademus diplopterus* (S Johnson)

**PUBLICATIONS:**

- *Fresh Quarterly Sep 2024:* McDonald, D. Biosecurity and bugs.
- *Fresh Quarterly Sep 2024:* McDonald, D. Preventing the spread of plant pests and diseases.

EVENTS:

- Hortgro Technical Symposium – 3 June 2024

**Nematology**

The research programme on nematodes is scaling down as Prof. A Malan has retired.

The development of several potential biological control agents has progressed the commercialisation of locally produced EPNs. Applied research on the mass production of EPNs is ongoing.

Both plant parasitic and entomopathogenic nematodes are being researched. The research on the integration of entomopathogenic fungi is ongoing. The completed research on entomopathogenic nematodes and fungi on fruit weevils and the current work on polyphagous shot-hole borer is an example of this.

EXPERTISE

- Integrated pest management workgroup
- Orchard ecology workgroup

RESEARCH TEAM

- Mr Matthew Addison – Crop protection programme leader

Researchers

- Dr Nomakhholwe Stokwe
- Dr Rinus Knoetze
- Mr Sonwabo Boo
- Ms Gaylen Carelse
- Ms Caro Kapp

Students

- Mr Louis Fourie – MSc student
- Mr Andriko Fourie – MSc student
- Ms Erin Bond – MSc student

NEW PROJECTS:

- Elucidating the mechanisms of nematode suppression by organic soil amendments for management of nematodes and woolly apple aphid in apple orchards (N Stokwe and E Bond) – [See IPM](#)

CURRENT PROJECTS:

- A survey to determine the occurrence, diversity

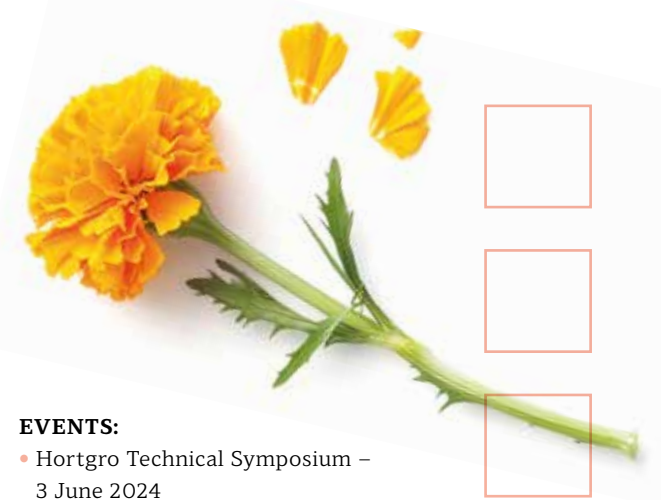


and pathogenicity of *Pratylenchus* species in South African stone fruit orchards (R Knoetze) – [See IPM](#)

- Dorylaimid nematodes as a vector for stony pit virus in pear nurseries and orchards in South Africa (C Kapp)
- The potential of organic soil amendments for the management of plant-parasitic nematodes and woolly apple aphid in apple orchards (N Stokwe and A Fourie) – [See IPM](#)
- Ring nematode (*Criconeimoides xenoplax*) resistance of South African-bred rootstock selections in potted plant trials and high-pH soils (S Boo
- Evaluating the ability of entomopathogenic nematodes (EPNs) for their ability to control populations of the obscure mealybug (*Pseudococcus viburni*) on apple foliage in field conditions (G Carelse) – [See IPM](#)

COMPLETED PROJECTS:

- Investigating the use of marigolds (*Tagetes* spp.) and brassicaceous cover crops as a tool for the management of lesion nematodes in apple orchards. Phase I - Pot trials (R Knoetze and L Fourie) – [See IPM](#)

**EVENTS:**

- Hortgro Technical Symposium – 3 June 2024



Orchard floor ecology

Research on soil health and orchard floor ecology remains an important emerging theme in agriculture. Current research is focused



on cover crops and mulches and their effects on soils, soil biota and fruit production. In addition, an extensive literature review and analyses is being conducted with a view to developing future research priorities.

EXPERTISE

- Orchard ecology workgroup
- Integrated pest management workgroup

RESEARCH TEAM

- Mr Matthew Addison – Crop protection programme leader

Researchers

- Mr Matthew Addison • Dr Nomakhholwe Stokwe
- Dr Aleysia Kleinert • Dr Charlene Janion-Scheepers

Students

- Mr Abdul Ghaseeb Jacobs – MSc student

NEW PROJECTS:

- Conduct a GAP analysis of regenerative agriculture (including orchard floor ecology and soil fertility) research needs in the deciduous fruit industry (A Kleinert)

CURRENT PROJECTS:

- Integrated use of organic mulches in pome fruit orchards in the Southwestern Cape, South Africa (M Addison)

COMPLETED PROJECTS:

- Soil health in orchards; the role of Collembola as key indicators (C Janion-Scheepers & A Jacobs)

PUBLICATIONS:

- *Fresh Quarterly Sep 2024*: Mouton, A. Farming with nature at ZZ2.

EVENTS:

- Hortgro Technical Symposium – 3 June 2024



Plant Pathology

The plant pathology research programme continues to address several important industry challenges. Ongoing research focuses on the incidence and distribution of fungal pathogens in young trees, crown gall, remote sensing for disease detection and various postharvest issues.

EXPERTISE

- Pre- and postharvest pathology workgroup
- Integrated pest management workgroup

PRE-HARVEST PATHOLOGY

Research Team

- Mr Matthew Addison – Crop protection programme leader

Researchers

- Prof. Lizél Mostert • Prof. Adele McLeod
- Dr Pieter Louw • Mr Tristan Dorfling
- Dr Yolanda Petersen • Prof. Adriaan van Niekerk
- Dr I Crouch

Students

- Mr Anton Boeksma – MSc student
- Ms Reshika Kallideen – PhD student
- Ms Anika Keuck – MSc student
- Dr Lindani Moyo – Postdoctoral fellow
- Ms Viwe Mbulawa – MSc student
- Mr Michael du Toit – MSc student

CURRENT PROJECTS:

- Compilation of a photographic compendium of deciduous fruit diseases in a South African context (I Crouch)
- Evaluation of apple rootstocks tolerance against specific apple replant disease (SARD) (T Dorfling and A McLeod) – *see Rootstocks and Nursery Tree Quality*

- Determining the risk of mulches in the spread of canker pathogens in apple orchards (L Mostert and R Kallideen)
- Tolerance of apple rootstocks against Phytophthora root rot (A McLeod and L Moyo) – [see Rootstocks and Nursery Tree Quality](#)
- The potential of organic amendment for managing apple replant disease (A McLeod, A Broeksma and M du Toit)
- Etiology of crown gall of apple in South Africa and potential for biocontrol (Y Petersen and V Mbulawa)

COMPLETED PROJECTS:

- Determining the presence of economically important viruses of apples in orchards of the main apple production regions of South Africa (G Pietersen)
- Evaluating the potential of hyperspectral imaging for remote detection of plum marbling viroid infested nursery and young orchard trees (A van Niekerk)
- Effect of mulching, compost and rootstock genotype on white root rot of apple (A McLeod and A Keuck) – [see Rootstocks and Nursery Tree Quality](#)



PUBLICATIONS:

- [Fresh Quarterly Sep 2024](#): Mouton, A. Keep your trees virus free.



- [SAFJ Oct/Nov 2023](#): Mouton, A. Current trends in crop protectants: p. 56.

EVENTS:

- Hortgro Technical Symposium – 3 June 2024

POST-HARVEST PATHOLOGY

RESEARCH TEAM

- Matthew Addison – Crop protection programme leader

Researchers

- Dr Cheryl Lennox
- Dr Julia Meitz-Hopkins
- Dr Pieter Louw
- Dr Zinash Belay
- Dr Ian Crouch
- Ms Inge Block

NEW PROJECTS:

- Postharvest decay control using alternative products for pome fruit and cherries (I Block)

CURRENT PROJECTS:

- Postharvest mould of pome fruit stems and calyx sepals – an investigation into the incidence, cause and management (C Lennox & I Block)
- Compilation of a photographic compendium of deciduous fruit diseases in a South African context (I Crouch)

- Atmospheric cold plasma (CP) treatment as an alternative non-thermal fruit surface decontamination (Z Belay)

- Thermal and non-thermal treatments of stone and pome fruit: Towards efficient phytosanitary measures (Z Belay)

PUBLICATIONS:

- [SAFJ Dec/Jan 2024](#): Mouton, A. Biocontrol research update: p. 68.
- [Fresh Quarterly Mar 2024](#): Mouton, A. The search for safer sanitisers.
- [Fresh Quarterly Mar 2024](#): Mouton, A. Stem and calyx mould in pome fruit.

EVENTS:

- Hortgro Technical Symposium – 3 June 2024



Integrated Pest Management

The IPM research programme deals with a wide variety of crop protection research questions. The basic research aim is to ensure the sustainable control of pests and diseases. Invasive insects and phytosanitary concerns have influenced the research programme

significantly during the year. Invasive polyphagous shot-hole borer and spotted wing drosophila research are seen as a priority. Various research projects are nearing completion including two applied research projects on polyphagous shot-hole borer. Current research includes work on sucking insects, biological control of mealybugs, pollination efficiency and the integration of spatial data in pest management.

EXPERTISE

- Integrated pest management workgroup

RESEARCH TEAM

- Matthew Addison – Crop protection programme leader

Researchers

- Prof. Pia Addison
- Prof. John Terblanche
- Dr Casper Crous
- Dr Karel Kruger
- Dr Shelley Johnson
- Ms Jonike Kemp
- Dr Steffan Hansen
- Prof. Robbie Pott
- Prof. Francois Roets
- Dr Minette Karsten
- Prof. Adriaan van Niekerk
- Ms Gaylen Carelse
- Mr Matthew Addison

Technical Assistants

- Mr Terence Asia
- Dr Nanike Esterhuizen

Students

- Ms Liana de Araujo – PhD student
- Ms Ansuli Cronjé - PhD student
- Mr AC Kleynhans – MSc student
- Ms Karyn Engelbrecht – MSc student
- Ms Emma Neethling – MSc student
- Ms Mia Vermaak – PhD student
- Dr Stefan Hansen – Postdoctoral fellow



Ms Melissa Powell – MSc student
Mr Leander Engelbrecht – PhD student

NEW PROJECTS:

- Investigation into the biological control of polyphagous shot-hole borer using phoretic mites and entomopathogenic fungi (F Roets and S Hansen)
- *Oxycarenus* species affecting stone fruit: evaluation of the problem and assessment of mitigation (S Johnson and M Powell)
- Biological control options against the grain chinch bug *Macchiademus diplopterus* (P Addison and L Engelbrecht)
- Optimising and applying a molecular identification tool to screen for polyphagous shot-hole borer (J Kemp)
- Exploring Wolbachia function in FCM (J Terblanche)

CURRENT PROJECTS:

- Exploring integration of parasitoids in an integrated pest management system for the obscure mealybug in pome fruit in the Western Cape Province (M Karsten and L de Araujo)
- Taxonomic and molecular revision of parasitoid wasps attacking false codling moth *Thaumototibia leucotreta* (Meyrick), with emphasis on *Trichogrammatoidea* (P Addison)

- Towards the development of an integrated pest management system for sucking insects in deciduous fruit orchards (M Karsten and AC Kleynhans)
- Assessing the threat of the polyphagous shot-hole borer beetle (PSHB, *Euwallacea fornicatus*) and its symbiotic fungus (*Fusarium euwallaceae*) to deciduous fruit trees in the Western Cape Province of South Africa (F Roets and K Engelbrecht)
- Sources and impact of the polyphagous shot-hole borer beetle (PSHB, *Euwallacea fornicatus*) and its symbiotic fungus (*Fusarium euwallaceae*) on deciduous fruit trees in the Western Cape Province of South Africa (C Crous and E Neethling)
- Towards the monitoring and management of polyphagous shot-hole borer, *Euwallacea fornicatus*, in deciduous fruit orchards (M Addison)
- Trophic ecology of predaceous mites in apple and pear orchards (J Terblanche and M Vermaak)
- *Phlyctinus callosus* species complex and post-harvest control (S Johnson)
- Bio-fermentation of an insect chemical-attractant (R Pott)
- Establishing a barcoding database of local pests of deciduous fruit (P Addison)
- Developing a centralised industry-driven industry/area-wide geographic database supporting the information needs of the pome & stone fruit industries (M Addison) – See [Farming Technology](#)
- Evaluation of managed bees and pollination efficiency in the pome and stone fruit industry in the Southwestern Cape,

South Africa (M Addison and A Cronjé) – [See Reproductive Biology](#)

COMPLETED PROJECTS:

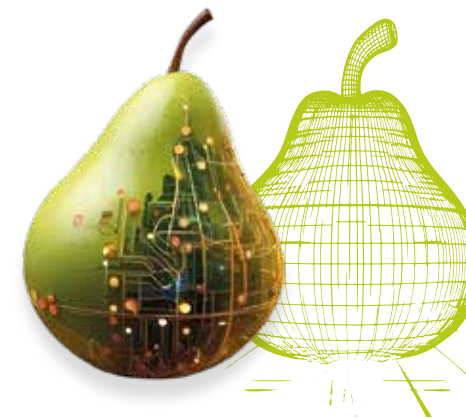
- Testing various insect trapping methods to improve trapping efficiency when collecting/monitoring *Euwallacea fornicatus* (G Carelse)
- Phylogeny and biological control of weevils (Curculionidae) in the Western Cape Province (P Addison and S Hansen)

PUBLICATIONS:

- [Fresh Quarterly Dec 2023](#): Karsten, M. Insect pests in a warming world.
- [Fresh Quarterly Sep 2024](#): Mouton, A. A rational approach to biocontrol.
- [Fresh Quarterly Sep 2024](#): Mouton, A. Charting a new course.
- [Fresh Quarterly Sep 2024](#): Mouton, A. There is life after chlorpyrifos.
- [Fresh Quarterly Sep 2024](#): Mouton, A. Spotted wing drosophila.
- [SAFJ Oct/Nov 2023](#): Mouton, A. Geïntegreerde plaagbestuur: p. 60.
- [SAFJ Oct/Nov 2023](#): Mouton, A. Toekomsbestande plaagbestuur: p. 63.
- [Fresh Notes 214 – 30 May 2024](#): Notification of the presence of spotted wing Drosophila (SWD) in South Africa.

EVENTS:

- Hortgro Technical Symposium – 3 June 2024



Precision Agriculture

The development and application of new technology in the industry is vital. Aspects such as the development of more efficient spray application and evaluation methods are central to pest and disease control. Coupled with this is the use of artificial intelligence and advanced analytical methods. Current research focuses on the integration of industry data into an industry-wide database.

EXPERTISE

- Spray application workgroup
- Integrated pest management group
- Database group

RESEARCH TEAM

- Matthew Addison – Crop protection programme leader

Researchers

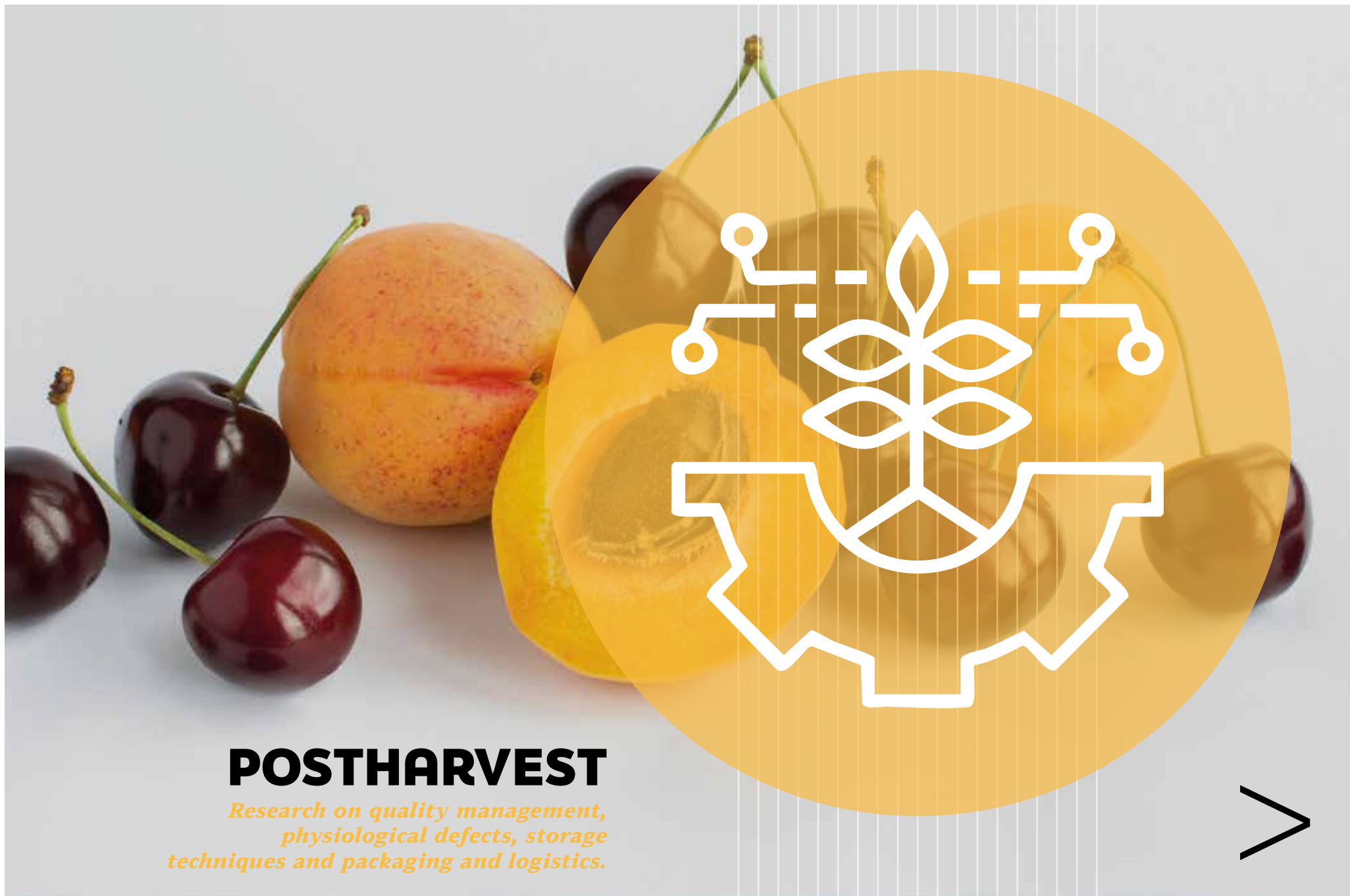
- Prof. Adriaan van Niekerk • Dr Francois Bekker

PUBLICATIONS:

- [SAFJ Apr/May 2024](#): Mouton, A. Optimale spuitaanwending vir hoëdigtheidsaanplantings: p. 48.

EVENTS:

- Langkloof Seminar – 22 November 2023
- Hortgro Technical Symposium – 3 June 2024



POSTHARVEST

*Research on quality management,
physiological defects, storage
techniques and packaging and logistics.*

2024

Postharvest



RESEARCH PROGRAMME

INTRODUCTION

Postharvest supports and enhances the processes throughout the supply chain critical to ensuring that intrinsic product quality is maintained and that a quality product is available to the end-consumer in local and distant global markets. Postharvest covers producers, packhouses, marketing coordination, logistics and shipping, receivers/wholesalers and end-consumers.

The postharvest research programme is structured into four themes, namely quality management, physiological defects, storage techniques and packaging and logistics. The research strategy for each theme is determined by a workgroup (one workgroup per theme) consisting of exporters, pre-and postharvest technical specialists, industry consultants and researchers. Additional workgroups are formed as and when needed.

When considering research strategy, the work-groups always keep in mind the objectives of the postharvest research programme, which are the following:

- To increase the marketable tons of fruit delivered per ton of fruit loaded.
- To present clients all along the postharvest value chain extending to the consumer with a safe product of reliable, good quality.
- To reduce wastage and losses from defects and pathogens (see the crop protection programme for postharvest pathology research).
- To increase efficiencies throughout the postharvest value chain.

- To increase the sustainability of postharvest practices.
- To reduce risk within the postharvest value chain.

Research needs relating to pre-harvest factors that affect postharvest quality and storability are addressed within the crop production programme.

Regular meetings and continuous discussion between the crop production, crop protection, and postharvest programme managers ensure that research between the three programmes is well integrated.



Quality Management

Quality management involves maintaining quality throughout the logistical chain until the product reaches the end consumer. Knowledge of preharvest factors, such as water deficits and fruit ripening patterns in the orchard, aids in making informed decisions regarding postharvest treatments, storage durations and regimes, and marketing strategies. The work conducted by Daniël Viljoen and his team at ExperiCo on deficit irrigation, as well as the ongoing research by Jason Ladegourdie on apple starch concentration and its rate of conversion in the orchard, addresses these industry needs and shows promising results. Shrivel, a major



postharvest defect for both pome and stone fruit, remains a key research focus area. Due to logistical challenges between harvest and cooling, breaks in the cold chain, extended fruit storage periods, and growing concerns about plastic packaging, innovative projects and solutions to manage moisture loss in different cultivars will continue to be a priority for the postharvest research programme.

EXPERTISE

- Quality management workgroup

RESEARCH TEAM

- Dr Mariana Jooste – Postharvest programme manager

Researchers

- Dr Anél Botes
- Mr Matthew Addison
- Mr André Viljoen
- Dr Elke Crouch
- Mr Jason Ladegourdie
- Dr Zinash Belay

NEW PROJECTS:

- Improving the post harvest quality of cherries (A Botes)

CURRENT PROJECTS:

- Moisture loss studies in pears (A Botes and E Crouch)
- Evaluate edible coatings on plums and nectarines currently used worldwide (H Viljoen) – [See Packaging & Logistics](#)
- Assessment of apple starch concentration and rate of conversion during maturation at different canopy positions and the effect thereof on post storage quality (J Ladegourdie)
- Digital twin for the Hortgro phytosanitary facility (M Addison)

- Scanning plum cultivars for CO₂ sensitivity and the effect of closed vents in shipping containers on relative humidity and CO₂ levels (H Viljoen)

- Integrated postharvest ethylene management along the value chain (Z Belay)

COMPLETED PROJECTS:

- Assessment of the use of the DA meter to increase the rigour of fruit sampling for release date determination in strip-picked orchards and to generate additional information for packhouses on the maturity of select pick fruit (D Viljoen)
- The effect of a water deficit on fruit tree phenology, fruit production, fruit quality and storability of Fuji and Cripps' Pink apples (D Viljoen) – [See Irrigation and Nutrition](#)

PUBLICATIONS:

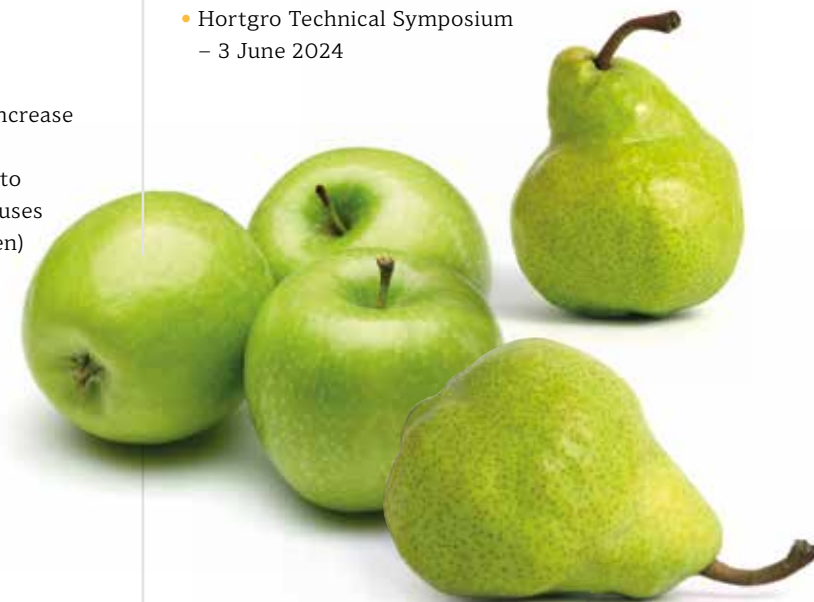
- [Fresh Quarterly Mar 2024](#): Mouton, A. Bring bruising under control.
- [Fresh Quarterly Mar 2024](#): Mouton, A. The link between pre- and postharvest quality.
- [SAFJ Dec/Jan 2024](#): Mouton, A. Verminder vrugverliese as gevolg van kneusings: p. 60.



- [Fresh Notes 213 – 26 March 2024](#): Forelle Early Market Access (FEMA) Programme.

EVENTS:

- Langkloof Seminar – 22 November 2023
- Hortgro Technical Symposium – 3 June 2024



Physiological Defects

The main internal quality defects receiving research attention are heat damage in plums, and superficial scald and internal browning in apples and pears. Research is aimed at understanding the underlying causative factors (both pre-and postharvest) and biochemistry of these defects to allow the development of technology to limit or prevent their occurrence. Other aims are to generate best practice guidelines for handling fruit both pre-and postharvest and to develop indicators to predict the risk of various defects in each season. Dr Ian Crouch



and his team at ExperiCo are developing much needed photographic compendiums of pome and stone fruit disorders, which are in the final stages of completion. They are also compiling a document containing the symptoms and causes as well as control measures of pome defects.

EXPERTISE

- Physiological defects workgroup

RESEARCH TEAM

- Dr Mariana Jooste – Postharvest programme manager

Researchers

- Dr Elke Crouch
- Dr Ian Crouch
- Mr Handré Viljoen

Students

- Ms Zandile Mthembu – MSc student
- Ms Monja Gerber – PhD candidate

NEW PROJECTS:

- Literature research and assimilation of descriptive text for pome disorder database including causative factors, symptoms and control (I Crouch)
- 'Granny Smith' superficial scald prediction (E Crouch, Z Mthembu, M Gerber and M Jooste)

CURRENT PROJECTS:

- Influence of fruit micro-structure on gas exchange and tissue damage (E Crouch)
- Compilation of a photographic compendium of stone fruit disorders in a South African context (I Crouch)
- Quantification of the effect of near-harvest temperatures on pitburn and heat damage in cold stored plums and prediction method development (H Viljoen)

COMPLETED PROJECTS:

- Pitting in cherries: a literature review (M Jooste)



PUBLICATIONS:

- *Fresh Quarterly Mar 2024:* Smith, C. A pack-house perspective on postharvest challenges.
- *Fresh Quarterly Mar 2024:* Mouton, A. Improve postharvest outcomes with preharvest ethylene inhibitors.
- *Fresh Quarterly Mar 2024:* Botes, A, Crouch, E, Crouch, I, Griessel, H, Marais, A, Mouton, B, Theron, A and Theron, D. Best practices to prevent superficial scald.
- *Fresh Quarterly Mar 2024:* Mouton, A. Successful storage to prevent superficial scald.
- *Fresh Quarterly Mar 2024:* Mouton, A. Low-oxygen strategies against scald.
- *Fresh Quarterly Mar 2024:* Mouton, A. Save grannies from scald.
- *Fresh Quarterly Mar 2024:* Mouton, A. Superficial scald 101.



Storage Techniques

A key outcome of research in this area is the development of best practices and protocols to prevent or reduce the incidence of disorders and maintain fruit quality. The evaluation of storage technologies and protocols primarily focuses on non-chemical scald control and the prevention of internal browning.

EXPERTISE

- Controlled atmosphere storage group

RESEARCH TEAM

- Dr Mariana Jooste – Postharvest programme manager

Researchers

- Dr Anél Botes
- Mr Daniël Viljoen
- Ms Heleen Tayler
- Dr Elke Crouch
- Dr Mariana Jooste
- Dr Ian Crouch

Students

- Mr Jason Ladegourdie – MSc student
- Ms Anmari Kriegler – MSc student
- Ms Ineke de Jong – MSc student

NEW PROJECTS:

- Role of growing region temperature and cooling rate on 'Cripps' Pink' membrane lipid oxidation, antioxidant levels and internal browning (Ms H Tayler, E Crouch and M Jooste) – [See Growing Season Climate](#)



CURRENT PROJECTS:

- Effect of humidity control, using bin liners and bin lids, on fruit quality during long-term storage of apples and pears (D Viljoen)
- Influence of harvest maturity, storage temperature and duration and 1-MCP on postharvest physiological disorders (with special reference to internal browning) and fruit quality of the new 'Cripps' Pink' apple strain 'Lady in Red' (H Tayler)

- The effect of different postharvest technologies on the quality of 'Golden Delicious' apple (A Botes)
- Internal browning of 'Cripps Pink' apples – DCA-CF and long-term storage with best practice protocol (E Crouch, I de Jong, I Crouch and M Jooste)

COMPLETED PROJECTS:

- Soft scald development in new apple cultivars (A Botes, E Crouch, J Ladegourdie, I Crouch and M Jooste)
- Investigate the effect of stepwise cooling on internal browning in apples (A Botes, E Crouch, A Kriegler and M Jooste)



Packaging / Logistics

Logistics projects focus on optimising the utilisation of shipping container space, while packaging projects aim to improve fruit cooling and optimising the maintenance of fruit pulp temperatures in transit. Additionally, they explore alternatives to non-recyclable, single-use plastics without compromising fruit quality or the structural integrity of the packaging.



EXPERTISE

- Packhouse action group
- Plastics workgroup

RESEARCH TEAM

- Dr Mariana Jooste – Postharvest programme manager

Researchers

- Ms Heleen Tayler
- Mr Handré Viljoen
- Mr Jason Ladegourdie

CURRENT PROJECTS:

- Development of knowledge to react to possible banning of single-use petroleum-based plastics that impact on post-harvest management of stone and pome fruit quality (H Tayler)
- Evaluate edible coatings on plums and nectarines currently used worldwide (H Viljoen) – [see Quality Management](#)

COMPLETED PROJECTS:

- Evaluating a novel carton design to improve the efficiency of forced air cooling and refrigerated containers in the pome industry (J Ladegourdie)



STATISTICS

*Funding leverage, allocation,
number of projects, funding per focus
area, and post-graduate students*



2023/24 Statistics

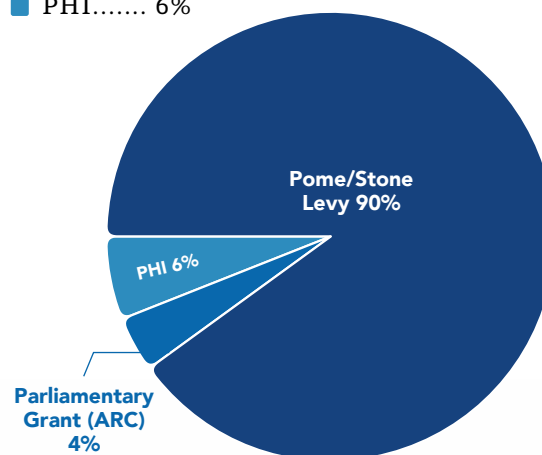


THE YEAR AT A GLANCE

TOTAL RESEARCH PROJECTS 124
AVERAGE COST PER PROJECT.... R237 276

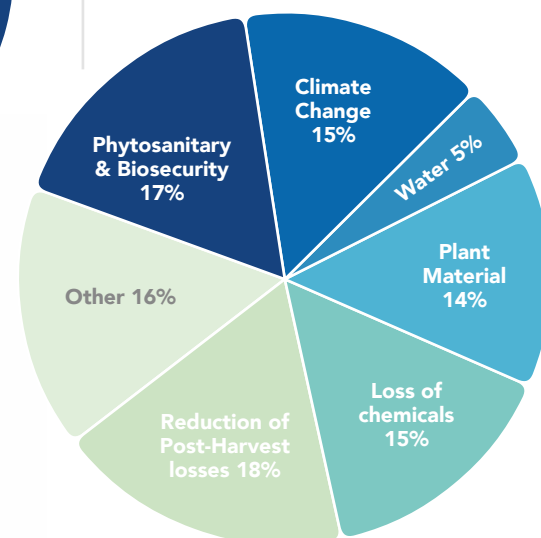
Funding Leverage 2023/24

- Pome/Stone..... 90%
- Parliamentary Grant (ARC)..... 4%
- PHI..... 6%



Funding allocation by key focus area 2023/24

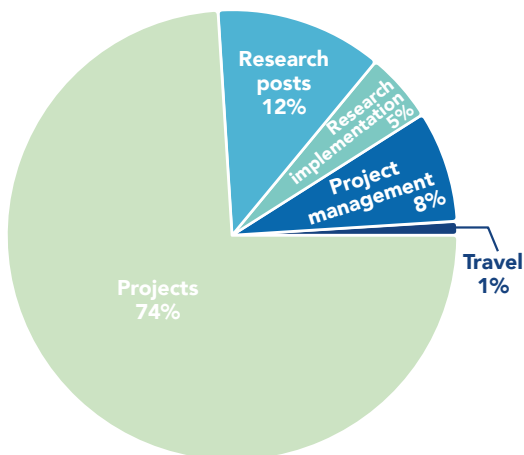
- Phytosanitary & Biosecurity..... 17%
- Climate Change 15%
- Water..... 5%
- Plant Material 14%
- Loss of chemicals..... 15%
- Reduction of Post-Harvest losses . 18%
- Other 16%





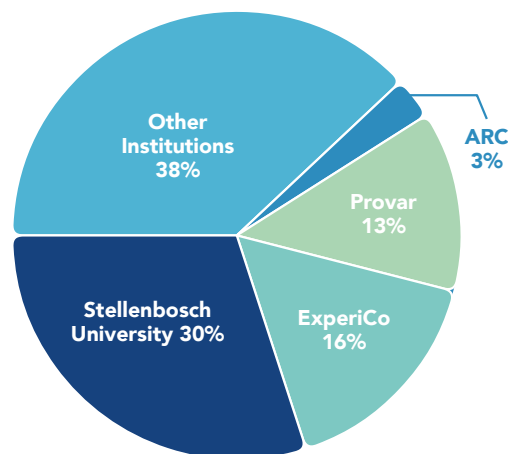
Funding allocation 2023/24

Projects	74 %
Research posts	12 %
Project management	8 %
Research implementation	5 %
Travel	1 %



Funding Allocation 2023/24

Stellenbosch University	30.0 %
Experico	16.0 %
Provar	13.0 %
ARC	3.0 %
Other Institutions	38.0 %



Number of projects per institution:

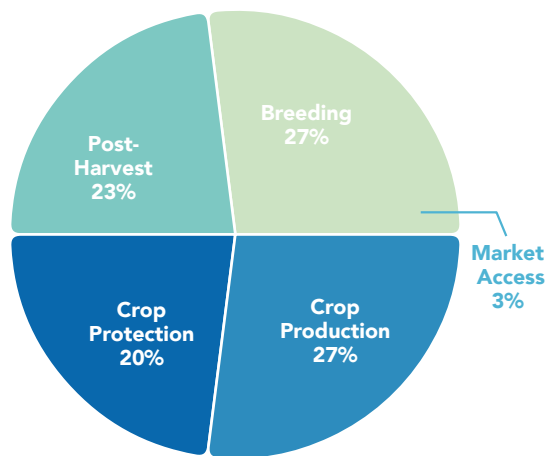
US - Horticulture	8 %
US - Pathology	6 %
US - Entomology	24 %
US - Other	4 %
Experico	21 %
Provar	19 %
ARC	10 %
Other	6 %
HGS Projects	1 %

NUMBER OF PROJECT COLLABORATIONS:

10 projects are being run across more than one department/ research institution.

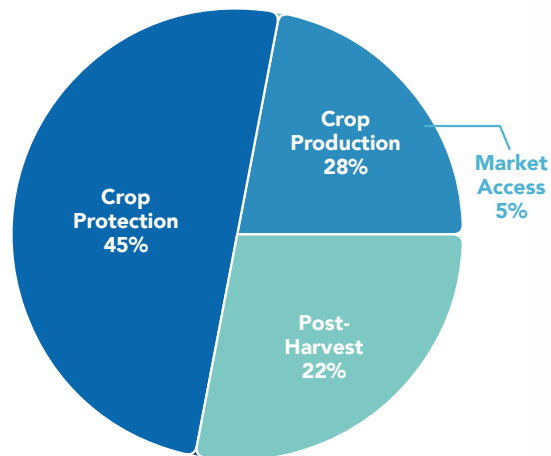
Funding per programme 2013/14

Crop Production	27.0%
Crop Protection	23.0%
Postharvest	23.0%
Breeding	27.0%



Funding per programme 2023/24

Crop Production	28.0%
Crop Protection	50.0%
Post-Harvest	22.0%



Post-Graduate Students:

Female	56%
Black	24%

MSc students - 19
PhD students - 8
Postdoctoral fellows - 3



2023/24

COMPLETED PROJECTS:

Pome 22
Stone 6
Pome &
Stone 8

CONTINUING PROJECTS:

Pome 55
Stone 16
Pome &
Stone 23

NEW PROJECTS:

Pome 11
Stone 7
Pome &
Stone 12

TOTAL PROJECTS:

Pome 66
Stone 23
Pome &
Stone 35



Hortgro Science TEAM

Prof. Wiehann Steyn

General Manager
Crop production programme manager

Matthew Addison

Crop protection programme manager

Dr Mariana Jooste

Postharvest programme manager

Marno van der Westhuizen

Research implementation manager

Anita van Staden

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