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New innovative research PHI-4

The South African fresh horticultural produce industry is the largest contributor, by value, to South African agricultural exports.

More than 90% of income derived from fruit and Cape flora cut flower earnings is from foreign exchange, with a total export value of more than R30 billion per annum. These industries – key employers in the South African economy – provide direct employment to an estimated 460 000 people and play a vital role in sustaining rural livelihoods. It's, therefore of national importance that they remain profitable, sustainable and internationally competitive.

The goal of the Postharvest Innovation (PHI) Programme – a public-private partnership between the Department of Science and Technology (DST) and the Fresh Produce Exporters' Forum (FPEF) – is to enhance the global competitiveness of the South African fresh horticultural produce industry by finding scientific solutions to pressing postharvest issues.

Pressing postharvest challenges to address in PHI-4 include:

BLUEBERRIES

Investigating cold treatment as an option to ensure effective disinfection of fruit-fly-infested blueberries while maintaining fruit quality. This data is essential to penetrate lucrative new markets such as China.

AVOCADO

With losses estimated between 10% and 100% caused by anthracnose and stem-end rot diseases, finding efficient treatment is vital. These diseases affect fruit quality, marketability and shelf life of avocados, resulting in disillusioned consumers who have to discard 50 to 90% of their purchased fruit because it's inedible. Furthermore, the widely used fungicide, prochloraz, is likely to be banned by the European Union (EU) due to residue concerns. The research team is investigating the effectiveness of rapid hot water treatment and yeast antagonists, with the aim of finding an environmentally-friendly alternative.

POMEGRANATES

Phytosanitary pests, such as false codling moth, require cold shipping treatment as a means to control the spreading of insect pests to importing countries. Our researchers are investigating the effect of different storage temperatures to control false codling moth without negatively affecting fruit quality, thereby securing market access to restricted countries.

POST-HARVEST INNOVATION PROGRAMME a public-private partnership between science & technology fpef

	TIME FRAME:	NUMBER OF R&D PROJECTS:	FUNDING:	ALLOCATION TO PARTICIPATING RESEARCH INSTITUTIONS:
PHI-3	January 2015 to December 2018	41	PHI (R19.395million) and industry (R10.019million) = R29 414 000	Universities (70.6%), private research organisations (24.1%), science councils (5.3%)
PHI-4	January 2019 to July 2021	29	PHI (R13 293 305) and industry (R13 293 305) = R26 586 610	Universities (51%), private research organisations (47%), science councils (2%)

To this end, PHI prioritises partnerships with various industry associations to safeguard its global competitiveness. The objective is to identify and co-fund research projects that address postharvest challenges relevant to their respective commodities.

Projects under PHI's auspices cover a broad spectrum of technologies and research questions. Their focus ranges from the most established crops such as citrus and deciduous fruit, to the newer pomegranates and blueberries.

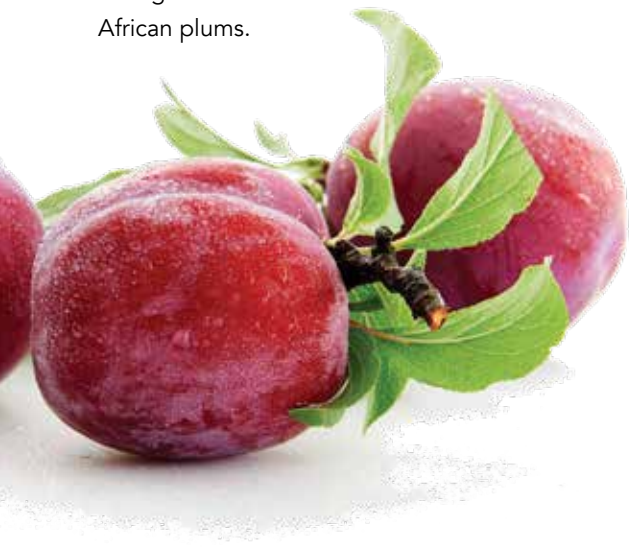
Since the inception of PHI in 2008, more than 90 research projects were carried out in three phases over the past 10 years. The 41 research projects conducted during the third phase of the PHI programme (PHI-3) that started in January 2015, were successfully completed in December 2018.

The fourth phase (PHI-4) was kick-started in January this year with a total of 29 research projects to the value of R26 586 610. This phase has eight participating industry associations: Hortgro Science, Citrus Research International, Subtropical Growers' Association, Tomato Producers' Organisation, Pomegranate Producers' Association, Cape Flora SA, South African Berry Producers' Association and the Kiwi fruit industry.

An additional amount of R675 000 is earmarked for the development of a postharvest online short course for emerging farmers.

PLUMS

The commercial success of plums is limited due to its short shelf life, resulting from excessive moisture loss and decay. Moisture loss manifests through shriveling, wooliness and mass loss. Therefore, the fruit arrives in the export market with significantly reduced fruit quality and size. It also predisposes fruit to decay and accelerated senescence. Although there are packaging solutions to reduce shrivel in stone fruit, shrivel incidence remains high. Postharvest treatments have to be found, therefore, to slow down physiological processes and, hence, shrivel; as well as to extend the shelf life of plums. The Hortgro Science research team is investigating the application of bioactive, edible coatings formulated with natural antimicrobial peptides produced by soil organisms, as a 'green' solution to alleviate shrivel and extend storage life of South African plums.



CITRUS

Sour rot and *Penicillium* (green mould decay) are the two foremost decay issues in citrus. Since the banning of guazitine, the sour rot control remedy in 2016, green mould decay increased drastically. This is due to the fact that *Penicillium* overtakes sour rot as a secondary pathogen. To date, primary *Penicillium* infections have been kept under control using imazalil. The impending banning of imazalil by the EU by 2020, is one of the most serious threats faced by the South African citrus industry.

There are a few other active ingredients registered to control *Penicillium* decay, but they are considered less effective than imazalil. However, they have only been used as secondary or supplemental remedies. Now they have to be revisited and evaluated as primary control measures against *Penicillium.*