



HORTGRO SCIENCE TECHNICAL SYMPOSIUM GAME OF FRUIT – THE SURVIVAL GUIDE

SUMMARY REPORT 2017



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Symposium: Game of fruit – addressing future challenges

NOT EVEN THE WORST CAPE STORM IN THREE DECADES COULD PREVENT FRUIT GROWERS, INDUSTRY REPRESENTATIVES AND RESEARCHERS FROM ATTENDING THE ANNUAL HORTGRO SCIENCE TECHNICAL SYMPOSIUM 2017 HELD FROM JUNE 5 TO 9, AT ALLÉE BLEUE IN SIMONDIUM.

This year HORTGRO Science hosted 24 sponsors and exhibitors, and more than 640 people during the week-long event.

The symposium aptly themed 'Game of Fruit – the survival guide' focused on business relationships in the new South Africa and the value of diversity, seeing opportunities in challenges and overcoming adversity, exponential technology growth, how to make money in the fruit game, understanding consumers, growing the trees that growers want, and intensifying fruit production in a sustainable manner.

This year delegates from a far afield as Gauteng, Free State, Eastern Cape and Western Cape attended the event which has its roots in the Cape Pomological Association. It has grown into its current format over several decades.

This was the second time that the symposium included the new grower day – aimed at new entrants in the industry, and a postharvest day. This is the sixth year it has run under the banner of HORTGRO Science (previously known as DFPT Research and Fruitgro Science).

The scene was set with the pome fruit field day which was attended by a record number of 321 delegates in the Warm Bokkeveld of the Ceres Valley and was organised by Piet Nieuwoudt. The stone fruit field day/workshop shifted this year to Montagu, again under the competent management of Charl Stander, with 114 delegates attending.

Four of the 55 speakers were overseas experts in their various fields, they were: Dr Roger Harker (Plant and Food Research, New Zealand), Joan Bonany (IRTA, Spain), Han Fleuren (Dutch orchardist and owner of Fleuren Nursery), and Michael Zoth (Competence Centre Obstbau Bodensee Bavendorf, Germany). These international industry champions spoke directly to challenges using the latest research and experiences from their respective countries.

The New Grower Day focused on integrated pest management with delegates having an interactive

afternoon session with scientists where they had the opportunity to look at codling moth, fruit flies, weevils, nematodes and false codling moth under the microscope. The Western Cape Beekeepers Association also told delegates about the importance of bees and what it takes to be a responsible beekeeper and environmental champion (see Bee Charter).

Hugh Campbell, HORTGRO Science General Manager and the Technology Transfer Advisory Committee Chair said the symposium was an opportunity to expose industry players to new ideas, learn, re-align thoughts and self-evaluate. "This year delegates were challenged on different levels to think and do differently."

According to Campbell the 101 day was an entomological journey, explaining how integrated pest management (IPM) works in orchards and culminating into what the consumer's want.

For the pre-harvest day delegates time-travelled and assessed mega-trends and it was interesting to see the different changes that took place over the last ten years, he said.

"The biggest mega-trend drivers were producing the right quantity, the right quality and the right variety. It was also encouraging to see that our industry's yield increased considerably over the past ten years and that that ensured the sustainability of the industry.

"We still have an opportunity to unlock potential from the on-tree pack-outs per hectare. On the technical side we have to focus on improved production and efficiency, by improving our nursery tree quality. Joan Bonany also spoke about this aspect as well as the intensification of production," he said.

From a Hortgro Science perspective, Campbell said that it was good to see that the Orchard of the Future project is strongly aligned with international best practices as explained by overseas experts like Michael Zoth and Joan Bonany.

On the 'soft side', Campbell said that the message to all South Africans was clear: "In order to improve business relationships we need to get back to basics and recognise the person you are dealing with by building trust. We need to put ourselves in others' shoes and grow our emotional intelligence. Diversity creates tremendous opportunities in our country."

Deciduous fruit industry signs Bee & Pollination Charter

DECIDUOUS FRUIT GROWER BODIES FALLING UNDER THE HORTGRO UMBRELLA SIGNED A BEE & POLLINATION CHARTER AT THE HORTGRO SCIENCE TECHNICAL SYMPOSIUM 2017 - THE CHARTER SEEKS TO ADDRESS THE PLIGHT OF BEES IN SOUTH AFRICA.

The initiative came amid a global concern about honey bee populations which have seen drastic declines and fears that the species might face extinction.

The scale of the problem is massive as between 50% and 80% of the world's food supply – fruits, vegetables, seeds – is directly or indirectly dependent on honey bee pollination.

Campbell said bees are a key part of the industry supply chain and without bees production capacity would be diminished.

"It's strategically important that they are protected and the charter forms a framework around which we can ensure that we can have a sustainable bee population in the South African context," he said.

The Charter was signed by representatives on the South African Apple and Pear Producers' Association (SAAPPA) and the South African Stone Fruit Producers' Association (SASPA).

The Western Cape Bee Industry Association representative Nelson De La Querra said that the agreement will prevent producers from spraying pesticides while bees are active and that chemical representatives will provide products with clear instructions to producers.

"This is a big breakthrough for the bee farmers ... that the producers agree to honour the principles of the Charter and undertake to stick to it," he said.

Find the Charter here: <http://bit.ly/2rGYZif>



Business relationships in the new South Africa

SOUTH AFRICANS ARE SHAPED BY THEIR PAST, whether they like it or not, and the future of how we conduct business in SA will be determined largely by whether we can align our diverse mind sets.

This was business analyst and coach Mike Boon's core message at the HORTGRO Science Technical Symposium 2017.

Boon said that in relationships you cannot give what you haven't got. "If you don't understand who you are, and who you are dealing with, what kind of relationship is that going to be?"

Boon encouraged delegates to get serious about understanding other South Africans' language, cultures and beliefs.

"When you do business with someone different to yourself, the least you can do is to greet that person in his/her language. Language is a critical communication tool, but behind that is an entire culture that you need to understand, otherwise the risk of misinterpretation is too big.

"In the South African agricultural arena different groups have had different perspectives of history. Today that divide is perpetuated with one group being sophisticated and the other group being poor and uneducated. In cultural diversity there is no right or wrong, there is only different," he said.

So how do we deal with each other? Boon urged growers to create 'togetherness on the inside' which he said is as critical as productivity. "But the most important component is respect, without that, you will not get anywhere."

Boon said that historically South Africans have been conditioned to think about other groups in a specific way. "To move forward in business we have to deliberately break that mould and develop a different take on reality and what the truth is."

Boon used the example of how Western and African groups would deal with project problems. "If the project fails, Westerners tend to say 'it's water under the bridge, let's learn from this and move forward'. While in the African context the stance would be: 'the ancestors have turned their back on us, things went wrong in the past that have never been set right'. The African group cannot move forward until they have dealt with the past."

Boon said that there were huge differences in the concept of time among different groups in SA. "In the Western paradigm time is linear, whilst time in the African context is circular. We have to accommodate one another."

"It is then easy to see how different people see things differently when we address sensitive issues such as land ownership. We have to learn to walk in each other's shoes, if we want to move forward. Understand the other person's needs, behaviour, hopes and aspirations."

Boon further said that cultural insight does not come naturally to anyone. "We are naturally programmed to make assumptions about each other based on our own perceptions



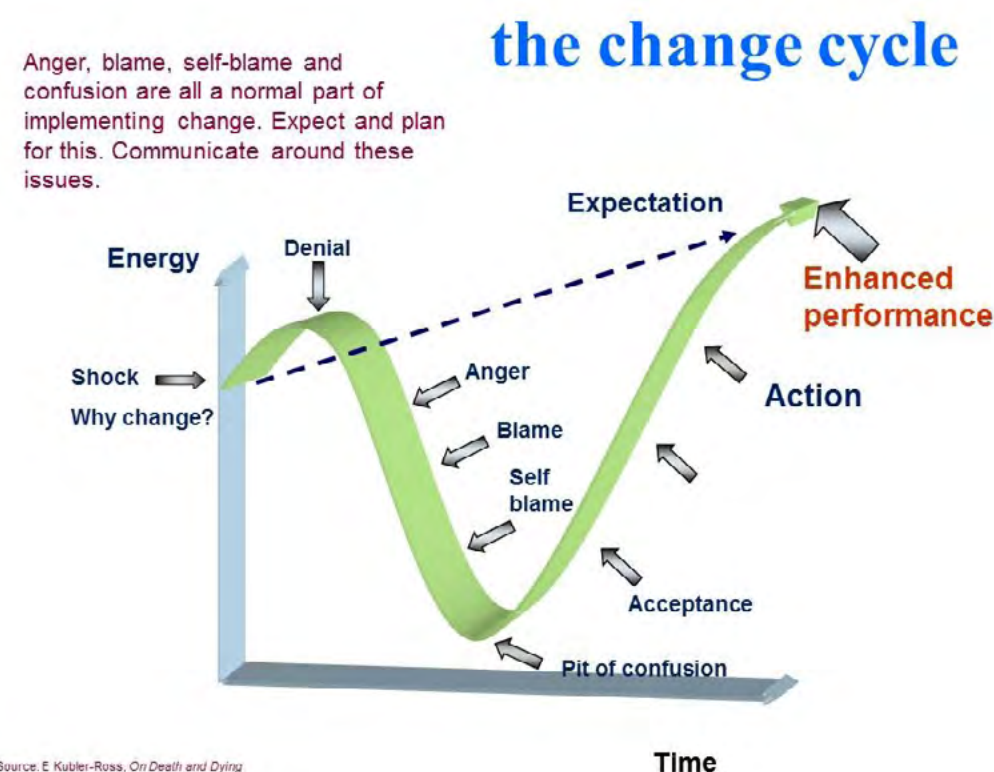
and cultural beliefs. This creates a situation that when we are locked-on to something we lock-out other possibilities. It is very difficult to see others' realities and once we decide something is true our subconscious produces evidence to support this."

Boon challenged delegates to deliberately make efforts to see other truths – even if it is uncomfortable. "Discomfort has to occur before change occurs," he said.

Boon explained the 'change cycle' and said that anger, blame, self-blame and confusion are all elements of change. "We have to show each other our humanity, before we can create a new reality, and move forward.

"It takes effort to find out about other people, to explore our differences. But when we do, we gain so much. We can learn so much from one another and ultimately become stronger."

Boon said South Africans can enhance their business performance on the world stage if they are willing to create a new world perspective and open up to one another.



IPM: Integrated Pest Management

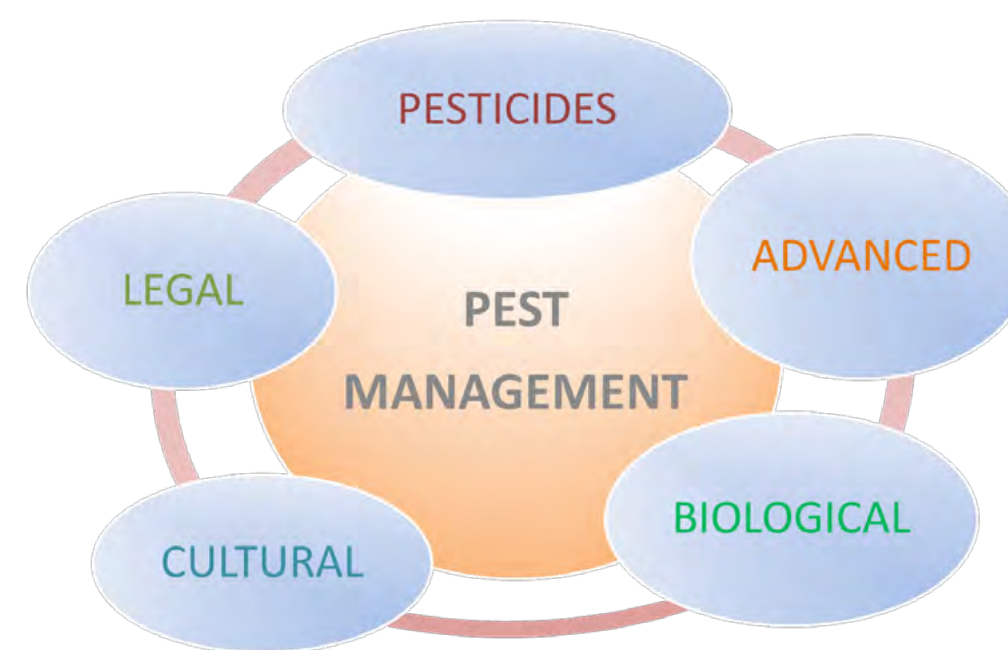
IPM at a glance

"There is substantial economic value in the use of integrated pest management (IPM) and biological control, yet growers are still challenged by the concept and easily fall back to spraying as a method to control pests and diseases. Therefore we as an industry need to internalise and incentivise IPM to accelerate adoption for the private and public good."

This was the message from Matthew Addison, HORTGRO Science's Crop Protection Manager at the Fruit Growing 101 Day of the technical symposium, which is specifically aimed at new industry entrants.

Addison explained IPM as follows: Integration means using more than one method, pests refer to destructive animals or plants, and management refers to controlling. "And we all know without measuring there is no controlling."

Addison further said that IPM should be seen as a loop system and that the loop should be closed for it to be effective. "That way you can use the monitoring results that you have gathered in future seasons to adapt your management behaviour. It is ongoing and there is a philosophy attached to IPM that results in sustainability and resilience."



The management of pests & residues as seen through the eyes of the consumer

Consumers know best, but they are not always right, Kobus Pienaar from Woolworths told delegates on the

topic of managing pests and residues. He spoke from a retailers perspective.

"Consumers who walk into our stores are informed and sophisticated. They choose wisely, ethically, easy. They want to know is the produce safe? Was pesticides used? Were the people, animals and the environment in the supply chain treated ethically? The customer wants to know, what is in it for me?"

Pienaar said consumers are concerned about future farming and the ecological footprint, yet, growers and retailers still need to make a profit and "therefore we all need to find a balance".

He highlighted the perception by consumers that pesticides are linked to diseases. These perceptions are fuelled by lobbyists that advocate that pesticide use is a "failed human experiment that must be ended". The problem is, he said, that we cannot just stop using chemicals.

"There will be consequences for food security and food safety. That said, sustainable farming is your responsibility."

He urged growers not to use chemicals unnecessarily. "We need to change our minds about how we produce food. The challenge is to keep a balance in nature."

According to Pienaar, Woolworths has a 'farming for the future' programme that works alongside other industry initiatives like Global Gap.

"We have an IPM grading system to help us understand what and why certain chemicals are being used. Woolies have a pesticide policy – we want to provide safe food. We work with the government and the registrar. Our growers are only allowed to use chemicals that are registered and safe."

Pienaar said to growers that there are reasons for optimism "if we apply our minds and work together. We need new relationships with our biosphere and farmers ... [we] are all stewards of the land".

IPM in practice

Hendrik Pohl, Ceres orchardist explained to delegates how he uses IPM to manage pests and diseases. "Thirty years ago farmers didn't bother with the eco-system, keeping produce pest free was their only concern, but today growers are aligning with 'nature farming'".

Natuurboerdery® or nature farming is the agricultural practices and processes aimed at using the best technology in harmony with the laws of living nature, of which the most important are probably efficiency and adaptable sustainability. It can also be described as moving away from “hard” industrialised farming concepts by including more sensible concepts of organic farming. Natuurboerdery®-based farming principles encompass more than agricultural practices – they also govern our entire association with our natural environment.

Pohl said that there are numerous advantages to IPM one of which is to create a stress buffer for your orchard. So where does one get started?

“The use of compost and mulch, monitoring of pests and biological agents, the use of forecast models and by applying management rules like biological pest management, and your choice of chemicals.”

Pohl said that growers had an obligation to put the eco-system back in balance.



“Ten years ago we were excited to see earthworms in our orchards, today we are seeing organisms that we haven't seen in orchards before, like this little fellow here...” Pohl proudly showed the audience a picture of a little indigenous frog.

“With IPM it is possible...”

PRE-HARVEST DAY 1

Fruit industry mega-trends

IN THEIR TALK ABOUT MEGA TRENDS IN THE FRUIT INDUSTRY, HORTGRO'S MARIETTE KOTZÉ AND JACQUES DU PREEZ MAKES IT CLEAR THAT THIS INDUSTRY BEGINS AND ENDS WITH CONSUMERS.

“Over the past couple of decades consumers have changed drastically. Today consumers are informed, choosy sometimes even fickle. They are complicated,” this was the message from HORTGRO's trade and markets manager, Jacques du Preez to delegates in an overview of the past, present, and future of the industry.

Du Preez posed the question whether the deciduous fruit industry was ready for the consumers of the future - Generation Z?

Du Preez said that the impact of technology changed the market, specifically where timing of the seasons is concerned.

“Technologies like SmartFresh make it possible to change our marketing window in traditional markets. In 1997 CA and DCA technologies made it possible to move 660 000 bins. In 2017 we are looking at around 1.3m bins. The industry is further influenced by world politics, policies, shifts in world order and power. We are in an era of protectionism and self-interest. The dynamics of trade and relationships are under fire and will influence market access.”

In South Africa, he said, the environment is further influenced by political instability and corruption.

“Market access will be an ongoing concern for the industry to ensure that producers' fruit has a home.”



JACQUES DU PREEZ



MARIETTE KOTZÉ

He pointed out that the retention and access of markets would not get easier in future, but remained an important priority for the industry.

“Tariff and non-tariff barriers and requirements will only get more stringent. Whilst food safety and reduced chemical applications are other factors we need to address. As is climate change.”

According to HORTGRO operations manager Mariette Kotze climate change has serious impacts on the industry as the majority of fruit production areas would experience a reduction of water by a broad margin of 20% depending on location, while pack-outs and fruit quality could also be affected.

To summarise:

- Tempo of change just keeps on increasing
- Pressure on industry to keep up with global shifts
- Embrace technology
- Ride the ups & downs
- We are resilient
- We can adapt (or die!)
- We will prevail

Success lies in productivity and new orchards – Koos Badenhorst

INCREASED PRODUCTIVITY - AND NOT ONLY A FAVOURABLE EXCHANGE RATE - HAS BEEN THE SAVIOUR OF THE DECIDUOUS FRUIT INDUSTRY OVER THE PAST DECADE. A 30% rise in production during this period has been made possible thanks to the combined efforts of researchers, technical advisors and farmers.

This is according to Koos Badenhorst of BDK Auditors in Caledon, who provided insights to the HORTGRO Technical Symposium about the economic ups and downs that the industry has experienced over the past eight years, in particular.

He noted that producers' operating costs have risen by a compounded 11.47% per hectare and 7.96% per ton since 2008.

During this same period the Rand depreciated by 10.7% per year whilst the Consumer Price Index (CPI) was 5.8% per year. Income per ton growth of 10.3% also tracked the exchange rate depreciation of 10.7%.

Badenhorst shared insights from an ongoing agricultural economics benchmarking study that BDK Auditors have been conducting over the past 20 years. The study compares the relative performance of around 44 farms in the EGVV region against one another, and covers 37% (3687ha) of the apples and 33% (873 ha) of pears being grown in the district. The study considers factors that influence a farm's

profitability. It calculates benchmarks for best practice performance, and compares participating farms with each other on a confidential basis.

According to Badenhorst, the top 25% of producers in the study made R50 528 more profit per hectare (before interest, depreciation or tax) than the average farmer did. Their income was R44 277 more per hectare, while they paid R6 252 less per hectare in expenses. The main reason for this was an increased production of 16% per hectare.

“The best producers only earned 5% more per ton for their fruit, but they incurred around R387 or 18% per ton less when it came to expenditure,” said Badenhorst. He also noted that farmers' spray and fertiliser bills have seen a steep increase of 12.35% per hectare in recent years.

He said that despite rising input costs of 11.47% per year the top 25% of producers made enough to be able to replant new orchards, and to be sustainable in the process.

Badenhorst acknowledged that the gap between “average” and “top” producers was widening. He used the information gleaned from the study to reflect on the types of practices that set the best



KOOS BADENHORST

performing producers apart from those who were merely average. According to Badenhorst successful farming boils down to increased productivity, and a greater focus on producing the right quality of fruit of the right variety.

Top producers know how to ensure that the quality of fruit on the trees are the best possible. In the process, more tonnes of fruit eventually make the grade and reach the pack-out stage, rather than end up being sent to juice factories.

“There is a lot of value to unlock when you increase the quality of fruit on the tree,” said Badenhorst. He illustrated that a specific farm group increased its pack-outs from 66% to 79% of fruit on the tree. This resulted in R53 500 per hectare of extra profit for the producer.

In 2017 the Top 25% of producers managed to produce 99 tons of Goldens per hectare, and in 2015 they produced 82 tons of Galas. This compares well to the 2010 figures of 72 and 59 tons respectively. This increase of 37.5% and 39% respectively did not lead to a reduction in pack-outs.

He also believes that the producers who are now smiling are the ones that have listened to what the market requires, and have planted the right varieties.

The tech future means there's no more 'business as usual'



“IF IT’S ALREADY POSSIBLE TO 3D PRINT A TASTY HAMBURGER PATTY THAT IS THE SAME ON A MOLECULAR LEVEL AS A REAL BEEF BURGER, WILL IT THEN ONE DAY ALSO BE POSSIBLE TO PRINT AN APPLE OR A PEAR?”

This was the question on the minds of many attendees of the HORTGRO Science Technical Symposium after Willem van der Post, CEO of the Exponential Africa Institute, provided them with quite a mind-blowing virtual tour of some of the latest tech developments across the globe.

The attendees were left without a doubt: the stuff of many a sci-fi or special effects movie is in fact the future. If it can be imagined, it can most probably be developed.

Van der Post’s job takes him around the world – from Silicon Valley to Europe and Asia – and allows him to stay abreast with the cutting-edge designs

The increasingly popular Pink Ladies-variety has for instance seen a market growth of 8% to 11% between 2010 and 2016, while Fuji apples have gone from 3% to 9% over the same period.

The popularity of the more traditional apple varieties such as Granny Smith and Goldens, on the other hand, are on the decline. According to Badenhorst, such “older” varieties often provide a lower gross income per hectare than newer ones. Six years ago, the “older” varieties such as Granny’s, Goldens and Top Reds accounted for 66% of the total hectares of apples planted. This has since dipped to 53%.

Badenhorst relayed the example of a specific farm group that over the past five years has been able to limit the number of man days needed per bin of fruit produced from 2.62 in 2012 to 1.33 in 2017. This was done by implementing better management systems that saves on labour costs, and putting incentive schemes in place that have increased the productivity of workers.

- Producers wanting to participate in the audit can visit www.bdkauditors.co.za for more information

and developments currently being worked on in laboratories, home offices and garages across the globe.

He provided an overview of latest research being done in robotics, machine learning, artificial intelligence (AI), virtual reality, Big Data, synthetic biology, DNA snipping and zipping, and how these are being used to among others develop driverless vehicles, automated call centres, drones and enhanced sensory abilities, and for military purposes.

Advancements in 3-D printing, for instance, will make it possible for people to tailor-make their own perfectly fitting shoes, or even print the building material for a new house or a set of orthodontic braces themselves. Such advances have financial implications on how for instance shoe manufacturers, builders and dentists go about their jobs, and will almost certainly affect their bottom lines.

Van der Post also noted that many of the current and future developments have ethical implications and often also unintentional social consequences. People should therefore be sure about what their beliefs and moral codes are on certain subjects, before pursuing or endorsing such developments.

Van der Post says that because of technology enhancements it might soon be possible to outsource repetitive, menial jobs to robots. He among others referred to research being done in this regard worldwide. In the US, for instance, a series of untethered, nimble robots with long-lasting batteries that work with voice prompts and use machine learning techniques in real time are being tested that can adjust to new terrains and tasks – without the hindrance of any cables or cords.

“Such technology has far-reaching implications,” noted van der Post, showing a video of a robot that went about packing boxes for hours on end. Such robots could also be of value in disaster areas, when it is too risky to send in humans to perform certain rescue-related tasks.

He mentioned that the Exponential Africa Institute, in collaboration with Stellenbosch University’s Business School, is currently working on a project for the Western Cape Department of Agriculture to imagine what the social impact of robotics could be on the local agricultural sector.

“If robots are to be used one day to do certain jobs, it will mean labour reform. Such developments emphasize the need for a greater focus on education and reskilling people,” he said. He also noted that robotics and enhanced software will not only have an impact on ‘blue collar’ workers, but also on the job security of ‘white collar’ employees in certain professional fields.

According to van der Post, robots do not necessarily mean job losses. “Think exponentially, because new jobs will be created around the field of robotics and people will need to be reskilled,” he challenged the audience.

He listed education as one of the biggest challenge facing humankind. “How do we take the current labour force and unteach the stuff that people have become used to over the last hundred years, as well as the way that business has been done up to now? How do we reteach new skills so that individuals can reposition themselves and can change business processes?” he asked.

“You will often have to unwind what you have learnt over hundreds of years in your industry,” he warned.

He also warned attendees at the symposium to “future proof” their organisations, and to be ready for the exponential growth of new technologies that is set to happen. He said that many emerging technologies that are currently still flying under the radar could through an exponential take-off fundamentally change the way in which many industries currently function.

By way of example he referred to 3-D printing, which most people think is a development of the past decade but has in fact been around since 1983, but is now only coming to the fore in a big way.

• The Exponential Africa Institute was established in partnership with Stellenbosch University to expose decision makers to rapidly advancing technologies. Its vision is to create a new way of thinking exponentially that will enable the next technological breakthroughs. Visit www.exponentialafrica.co.za for more information.



The photo below shows 3D printed hamburger meat created by the bioengineering company Modern Meadows and Dr Mark Post of Maastricht University. Will 3D printed fruit be next?

Transformation is not easy from a place of privilege – Goodnews Cadogan

THOSE WITH OLD AS WELL AS NEW MONEY ARE ALL DISADVANTAGED IF THEY STAY THE SAME, DO NOT TRY TO UNDERSTAND THE NEW SYSTEM OR DO NOT TRY TO CO-DEVELOP IT TO EVERYONE'S ADVANTAGE.

This was the message to delegates at the HORTGRO Science Technical Symposium from leadership and change consultant Goodnews Cadogan of The Village Leadership Consultation in Pretoria.

"It is not easy to imagine transformation from a place of privilege, whether you are white or black, but we should do everything possible to move society in the right direction," he said. "Those who have the means will have to make the first move."

His talk focused on the need for transformation and sound leadership, and reflecting on the past.

According to Cadogan, a society works well when it relies on four pillars of leadership: the public sector, the private sector, non-profit organisations and co-operative ownership. "These must all work together in concert if a society wants to go forward," he said. For Cadogan there is a vast difference in how business leaders in many successful countries are involved in the economic agenda governing their countries, compared to what is the case in South Africa.

"Most CEOs in South Africa are either beholden to the 'mother ship' head office that is usually offshore, or they drive a narrow local shareholder mandate," said Cadogan. "In both cases, short term gains and benefits for the few prevent a long term focus and the creation of an inclusive economy."

He highlighted how patriotic many of the CEOs are in the developed economies of the world and how their governments involve them in shared decision making. They operate from a position of support rather than conflict.

"In South Africa over the past twenty years, the so-called 'clever black' and the 'white monopoly capital' have stayed away from politics," added Cadogan. This has created a void in leadership that is in part to blame for South Africa's current political and economic crisis. Because some of the leadership pillars were not in place or collaboratively pulling their weight, a lack of oversight has allowed others to "become overbearing".

Transformation towards sustainability

For Cadogan transformation is a positive step that will provide sustainability in the fruit industry, among its member businesses and among the families involved in it.



"These three levels of existence are pivotal to actively drive the agenda, for people's own benefit as well as for the sake of the nation as a higher order collective, without losing their own need for survival, which indeed, will turn into thriving as a way of life," he noted.

"Strive for relationships that make you want to go for profit as a collective, and creates professional intimacy," he challenged.

Genuine ownership schemes and efforts to draw more young people into agriculture are needed. Cadogan also added that transformation "should never be at the expense of delivering the goods, because too much blood, sweat and tears have gone into getting businesses to where they currently are at".

Cadogan reasons that one should strive for growth on the one side, and good relations on the other. He however stated that no progress can be made "from a place of victimhood or victor."

Keep the past in mind

"Societies that do not look at their history do not move forward. History offers us the common place of reference from which we can create a common future," he said. Cadogan quoted Harvard sociologist Thomas Barrington Moore Jnr who said that if people of the future are to break the chains of the present "they will have to understand the forces that forged them".

He acknowledges the pros and cons in tackling the past head on. It can be liberating and is the only source for real transformation. It can help create a shared awareness and a platform from which to move forward, as well as a strong foundation for growth and unity. Such a process can however be messy, and is not easy. A focused intention is required to ensure

that the transformation process does not destroy what is good, is not used to settle scores or is hijacked through politicking.

After reflecting on the tumultuous history of restitution, redistribution and tenure in South Africa in recent years, Cadogan concluded that real change in industry is still possible if people are prepared to go through a fundamental shift of mind and heart.

"Engage in the difficult ongoing dialogue that brings to the surface that which is hidden in our culture and allows personal transformation to translate into cultural and systemic change," he challenged.

Such dialogue and focus should happen on different levels:

- personal (through deep personal change)
- among families (robust values-driven family conversations)
- in business (through a strategy that focuses on transformation and sustainable business)
- in industry (through research and development that is on par with scientific research)
- nationally (through public policy innovation and developing new markets).

According to Cadogan, the examples of Solms Delta farm near Franschhoek and Du Toit Agri have shown that such transformational processes can work.

In pursuit of a shared future

Consider the following when tackling transformation:

- Do not just barge in.
- Take care to understand the dynamics of a system.
- Ensure that there are insiders who can provide system intelligence and are your allies.
- Ensure that you have emotional and social intelligence.
- Accept that you might be considered an outsider when you start such a transformative process.
- Find your meaning and link these to the founding principles of our Constitution.
- Adopt a growth mindset.
- Nurture your insights (through research and development).
- Participate in all spheres of societal and government existence.
- Develop good judgement.
- Remain humble.
- Accept that there will always be a boss.
- Serve your apprenticeship.
- Value your progress, by celebrating success.
- Get more than just legal advice, but also use expert support in the form of for instance a transformational leadership coach.

Those who adapt best will survive, says Dutch nurseryman

WHEN THE SISTER AND WIFE OF DUTCH NURSERY OWNER HAN FLEUREN CAME UP WITH THE IDEA OF PACKAGING MINIATURE APPLE AND PEAR TREES IN PERSONALISED GIFT BOXES THAT CAN BE COURIERED, THEY HAD NO IDEA THAT THEIR INTERNET BUSINESS WOULD BE SO POPULAR.



"Mieke and Corine started their MiniTrees online shop because they wanted to fund their holidays, but now they have no time for those anymore," joked Han Fleuren, director of the Fleuren Boomkwekerij in the Netherlands. He was one of the international presenters at the HORTGRO Science Technical Symposium.

He explained that the small-sized trees seem to be more popular for their blossoms than for the fruit they eventually bear. The trees only need 50 centimetres space around them to grow, and are therefore ideal for small town gardens. There is no need for pruning or spraying, which means that the new owners of the trees need no prior knowledge about apple production.

"Sixty percent of people will probably tell you that they have never picked an apple," he noted.

According to Fleuren, the miniature trees are a good way of introducing more people to fruit growing, and will hopefully also translate into a rise in consumption.

The MiniTrees product range is one of many innovations to have come from the Fleuren Tree Nurseries in recent decades. Others have been the Knip tree, the 3K tree and Q-Eline rootstock for pear trees.

Fleuren is already the third generation to head the Fleuren Boomkwekerij (tree nursery) in the Netherlands. It was started in 1922 by his grandfather, Henri, in the village of Baarlo. His father, Karel Fleuren, took over the operations in 1972, and expanded it to a production area of 85 hectares. The company provides plum, pear and apple trees to growers in 30 European countries, and therefore abides by a variety of export requirements. It counts among the top cherry tree nurseries.

According to Fleuren, the nursery aims to:

- produce trees that give fruit growers the best results and the highest profits
- be the leader among cherry tree growers
- constantly introduce new and better rootstocks, better shaped trees and new or better varieties
- cooperate with companies with whom it shares the same goals and philosophy.

Fleuren said that the company made a strategic decision a few years ago to focus on growing cherry trees, because the market for young apple trees is saturated. The company has since gone on to develop a cherry tree that produces a far larger “two bite” fruit than what consumers have been used to.

He says that one of the advantages of the Dutch nursery system is that all plant material is sourced from one independent, trusted and virus-free source. Vermeerderingstuinen Nederland falls under supervision of Naktuinbouw.

Fleuren believes in providing healthy tree that will eventually give fruit grower the best result and highest profit.

He emphasized the importance of having good client relationships, and listening to what growers want. “If our clients die, we die; if our clients make money, we make money,” he said. “It is not the best or the biggest that will survive, but the ones that adapt best.”

“Our clients want trees that have more branches, and they want to be certain that biosecurity measures are in place and that trees are certified,” indicating trends which have been identified.

The growing organic market is also having an influence on their activities. “Therefore 12% of our

nursery is already organically certified,” he explained. The building of cold stores has further allowed Dutch tree nurseries to respond to their clients’ need for a later planting season in spring.

Did you know?

Karel Fleuren developed the first “Knip” tree in the 1970s. The technique was named as such after a journalist wrote that “after growing for a year at the nursery, the tree is topped.” “Knippen” means “to cut” in Dutch. It has become the standard for trees bought by apple growers in Europe, and allows for earlier cropping.

The technique entails cutting a one-year nursery tree at the 65 cm height. In the second year of growth, the upper buds remaining on the trunk develop first. By only retaining the upper shoot and removing all the other “wild” shoots in spring, an explosive growth is stimulated which creates a many-branched two-year old tree with a one-year-old crown.

Karel Fleuren also developed the 3K-tree – an older knip-tree with short branches that usually end in a mixed terminal bud (blossom and leaf). The abbreviation “3K” refers to the Dutch words for quality, kilograms and colour.

Visit www.fleuren.net/innovation for more information.

Fleuren’s tips to the trade

- Surround yourself with people who are better in certain skills than you are.
- It’s not the biggest or the best that will survive, but the ones that adapt best to what the market wants.
- If M9 rootstock for apple trees works well, why change?
- Fruit growers in wet picking climates who plant cherry trees should invest in quality plastic covering, then in trees.
- Do not mix varieties in your nursery. If you make mistakes during the grafting process, take those trees out once they have become obvious, to minimize confusion.

Take note: The International Stone Fruit Conference takes place in Borgloon in Belgium from 25 to 26 May 2018.

Sustainable Intensification: fruit farming for the future



GLOBAL CLIMATE AND RESOURCE CHALLENGES ARE REAL AND WILL REQUIRE A NEW GROWER MIND-SET TO KEEP THE INDUSTRY SUSTAINABLE AND PROFITABLE.

Joan Bonany from IRTA, an agricultural and technology research institute owned by the Catalan government in Spain, spoke out of a European context but said that global challenges were similar and referred to the Western Cape’s intense drought conditions as an example.

“Some specific challenge might be different from one place to another. But at the end the overall objective of sustainability is the future, there’s no [way] around that,” Bonany told HORTGRO Science.

According to Bonany the agricultural industry has much to be proud of considering the diversity of safe and affordable food products it provides to the global population, but the success has come at a cost. Some of the negative effects of increased industrialization of farming have been excessive use of fertilisers and fossil energy.

Contemporary challenges include obesity, undernourishment, biodiversity loss, pesticide impacts on the environment, and water stress. All happening alongside a burgeoning global population (set to hit 9.5 billion by 2050) and increasing atmospheric CO2 levels.

Bonany said that in order for the agricultural industry to be socially responsible, a commitment was needed from growers to face these challenges.

According to Bonany we have to produce more with less resources or less of certain resources and more of other kinds. And the answer might lie with the seemingly contradictory concept of ‘sustainable intensification’.

Sustainable intensification

“The goal of sustainable intensification is to increase fruit production while minimising

pressure on the environment,” Bonany said. Bonany said that these two terms at first appears contradictory, but that “the words are two faces of the same coin”.

Technological innovation to achieve SI would be driven by focus areas which included light interception (orchard design), genetic resources, soil and fertiliser management, pest, disease and weed control, water resources, and labour vis-à-vis mechanisation.

Light interception – The goal is to achieve >85% light interception by decreasing between row distance (e.g. planar systems) with fruit walls and increasing the harvest index (with simpler canopies and no secondary structures). “Intensification of light utilization leads to higher productivity with the same land resources,” said Bonany.

Genetic resources – The use of genetic resources will need to be intensified in a smart way. A European project called FruitBreedomics attempted to breed parents that have resistance to many Apple scab races, Powdery mildew, Fire blight, and Rosy apple aphid – the project made available 39 genotypes and 24 progenies. The way we do breeding also needs to be considered: it takes 15 years to get material that can be of some interest where after it takes another 15 years to send it around the world to make sure it works – this is inefficient. Technologies are becoming available that could considerably speed up cultivar development. There is a need though for careful management of germplasm repositories.

Soil & fertiliser management – Soil is a non-renewable resource which sustains food systems, filters and regulates the flow of freshwater, stores vast quantities of carbon, and supports flora and soil fauna. Soil health is critical to meet the demands for food production and sustainability. We need to move from conventional soil management to alleviating ‘soil fatigue’ through alternative solutions like soil substitution, organic matter application, and biological disinfestation.

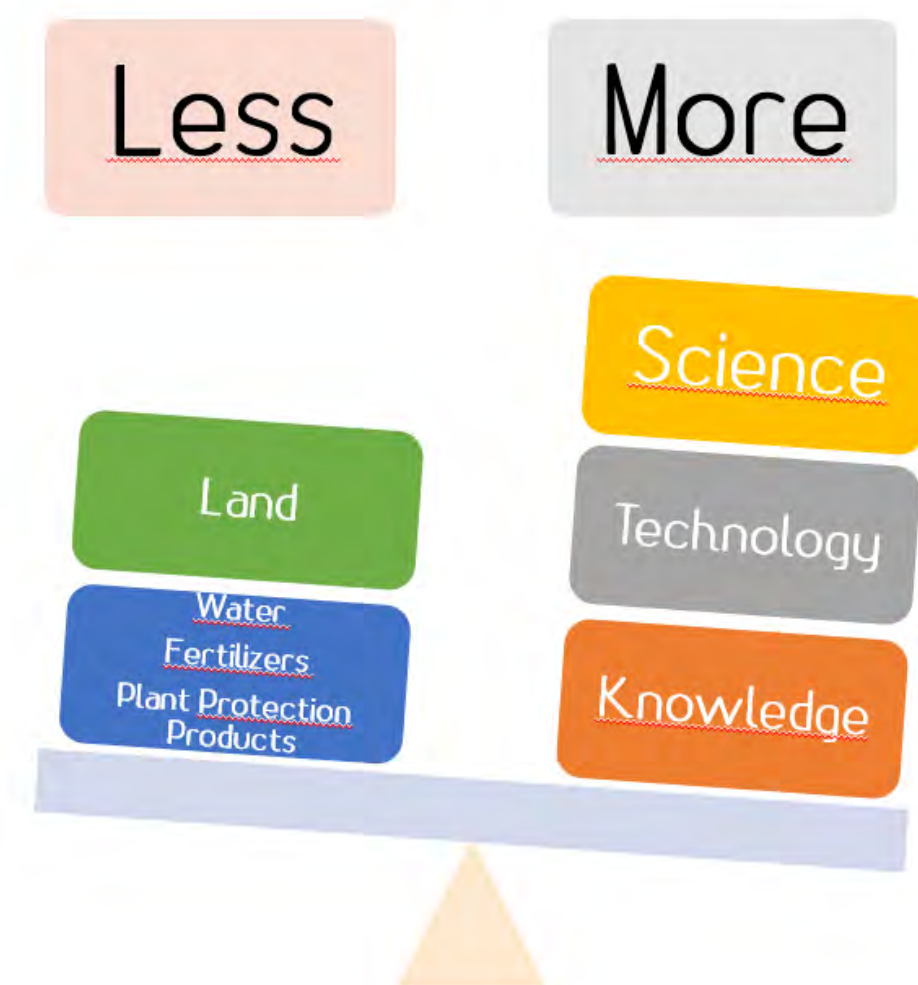
Water resources – It is clear that this is one of the most limiting resources that we are facing. In the last 10 years there have been severe droughts globally (e.g. Australia, Catalonia, and California). Irrigation water use efficiency is achieved not only through changing technology, for example, from flood to drip irrigation but also using applied knowledge to optimise the technology. New technologies include ‘remote sensing’ and the use of sensors (or Internet of Things – connection of sensors to the internet enabling them to send and receive data) which can result in water saving of up to 35%.

Pest, disease & weed control – Pest, disease & weed control – Society requests less chemical residues in fruit. Integrated Pest Management (IPM) is allowing us to reduce pesticide use. For example, in Almeria in the south of Spain around 30 000 ha of crops are grown in plastic greenhouses as a pest management measure. In ten years the region moved from 128 ha under biological control to 26,600 ha.

Labour - We need to mechanise key processes (pruning, thinning, and harvesting) of fruit production due to labour costs.

In summary Bonany says that the key technologies that will enable sustainability include: genomics, robotics, precision farming, Internet of Things, and big data.

“If we use less land, water, fertilisers, and plant protection products, but we use more knowledge, science, and technology, perhaps we will be able to face the challenge of staying competitive, respect the environment and still feed the population.”



Nuts and bolts of installing and managing under shade nets

SHADE NETS (SNs) HAVE CAUGHT THE ATTENTION OF INDUSTRY AS A TOOL TO OPTIMISE FRUIT PRODUCTION AND PROTECT CROPS AGAINST THE ELEMENTS; MICHAEL ZOTH FROM BODENSEE IN GERMANY SPOKE TO DELEGATES AT THE HORTGRO SCIENCE TECHNICAL SYMPOSIUM ON WHAT TO CONSIDER BEFORE SETTING UP.

If you are a grower and wondering whether you should do it yourself, Zoth says DIY should definitely be an option for those who are able and interested in a challenge.

“I think that growers can do it themselves like our growers (in Germany) do it to save money. It is the best way to know that the [shade] net system is as stable as possible. What you do with your own hands, you know how you did it, and if it is the way you intended it,” he told HORTGRO Science.

Two SN systems are generally considered, namely the ‘Trampolin’ (Flat) or ‘Roof’ (Gabled) systems. The roof system allows for more light interception and is preferred in the Bodensee region.

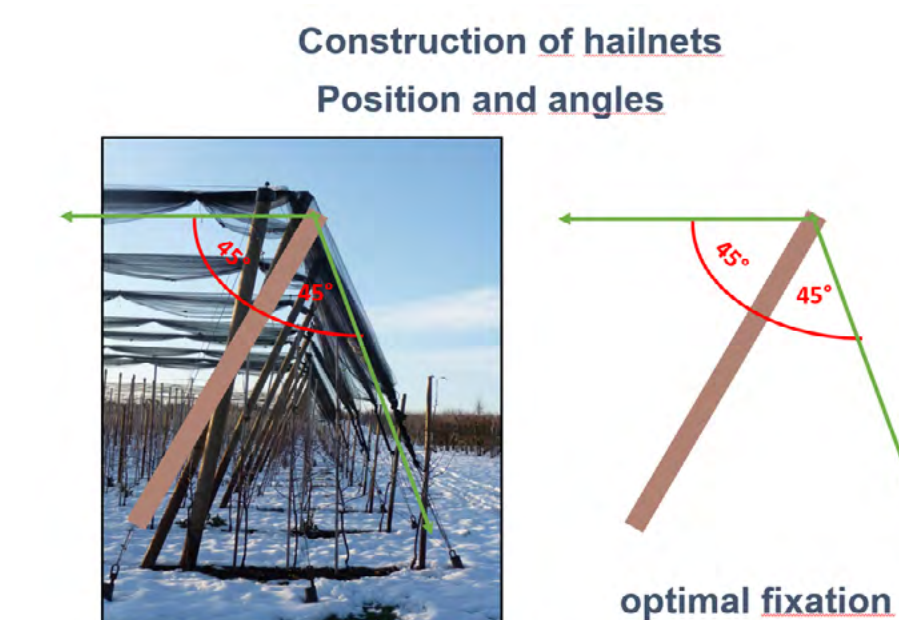


IMPORTANT NOTE	MATERIAL	SETUP	COST
Stable construction with anchored posts	Wooden/concrete posts with large diameters, non corrosive wires, chains, strings, long-life net material (UV-stabilised)	Either DIY with rented machines or paid specialists/hired teams	€20-25k/ha = R300k-R400k/ha

The SN is synthetic material made out of high-density polyethylene. Colouration of the nets were traditionally black and achieved with carbon dust while more recently SNs can be found in green/red/blue using coloured particles. The filaments also require ‘softeners’ and UV-stabilisation which protects the nets from long-term UV degradation. This is often expensive (high price=better stabilisation). In Bodensee, says Zoth, black nets last for 15-20 years, while transparent/coloured/grey nets last 8-12 years.

Before setting up the grower needs to measure and plan his/her field considering planting distances (2.7-3.2m to 0.6-1m), number of rows for the field, row direction (north to south ideal), and number of shade net posts (6-8m distance). All outside posts should get an additional anchor post with a metal anchor fixed into the ground or concrete base. Zoth suggests that growers do their calculations, compare offers, and order good material.

The steel cables in ‘row and cross-row directions’ serve the purpose of stabilising the entire structure. “They take up traction and tension forces in case of hail in the nets and the pulling of the ice weight.” The cables should be able to withstand pulling forces of around 150kg/mm² (6-8mmØ). Positioning of anchor posts are important and should be 45° to the ground anchor and 45° to the cross-row cable for ‘optimal fixation’.



Laying of the net can be done by hand depending on the area to be covered but usually it is done by machine, says Zoth. It will then be fixed into position – in the past it was sewn onto the top cable but nowadays clamps are used.

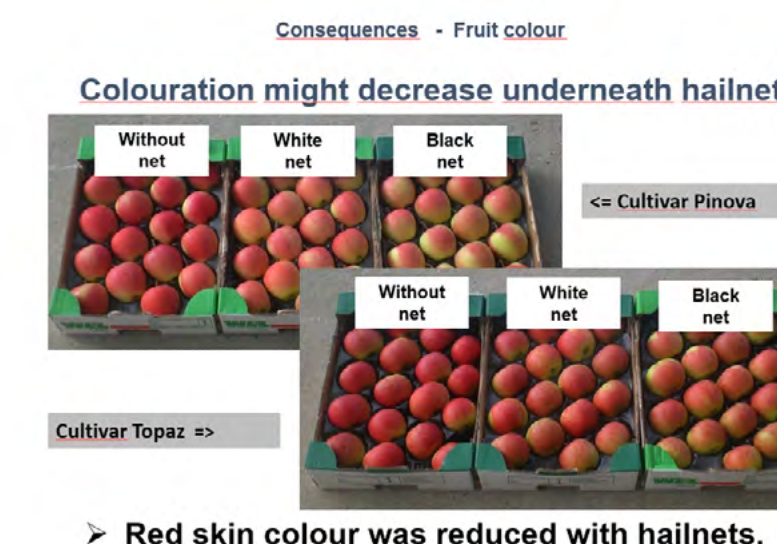
According to Zoth the setup of the SN system needs special machines and devices which will mainly be

offered and procured by the seller of the shade net.

“Without experience the best [approach] is to inform [the seller of your requirements] and help build the hail net so as to get used to the system and get the practical skills,” says Zoth. “About 1 third to half of the costs are labour. To be skilled saves a lot of money”.

Finishing touches to your SN might be to adjust the tension of the cables to further stabilise the structure. Latest developments in SNs include Zebra-net with strengthened connection areas, complete netting for better pest control, rain protection saves fungicides, zipper systems for opening and closing nets faster, and single row SN protection which is cheaper due to less requirement for ‘stabilising’ components.

Zoth says that while SN protection is effective, it is never 100% fail proof – the system can buckle in extreme events. So, once the SNs nets have been set up, what can the grower expect other than protection against extreme weather events?



Zoth’s research shows the following:

- Shade nets (depending on colour) are reducing light in both clear and cloudy conditions
- A 3-month study in Bodensee calculating cumulative photon flux density showed that white nets filtered out 15% of the photosynthetically active radiation, and the black net about 25%
- Trees are growing stronger underneath the nets with one-third more 1-year-old shoots, with different coloured nets having different specific effect on growth (e.g. longest shoots under black nets, most dense canopy under white net).
- For many fruit cultivars, colouration will decrease under SNs. Varieties show different levels of colour loss therefore the grower should choose a ‘suitable net colour, cultivar, and clone’.

The SIZA environmental module



ABOUT SIZA

The Sustainability Initiative of South Africa, is a non-profit and membership based programme designed to assist growers with ethical labour and environmental practice compliance whilst minimizing costs. It is a South African standard, developed, owned and operated in South Africa but aligned to Global best practices through the GSCP and other relevant programmes. SIZA aims to have a cost effective approach for growers by supplying one standard and one audit no matter which market a producer supplies.

SIZA membership is growing at a pace in South Africa and we have an effective and modern platform with more than 1500 active members registered currently who are benefiting and relying on SIZA. Both the industry and the retailers see SIZA as a solution for the fruit industry to manage international ethical labour practice requirements and to farm cost effectively. SIZA aims through the platform, to give visibility throughout the value chain to retailers and exporters on their suppliers.

THE SIZA ENVIRONMENTAL PILLAR OF SUSTAINABILITY

In support of the longer term SIZA vision to include environmental stewardship as an integral offering within sustainability, SIZA has partnered with WWF-SA (the World Wide Fund for Nature, South Africa) to develop an Environmental Standard and appropriate tools to support improvement based on environmental indicator measures and management practices. Specifically, SIZA and WWF SA have been developing and testing a sustainable farming tool, with the end goal of using this as the foundation of the environmental module within the SIZA platform, to complement the existing social standard of sustainability.

What does it include?

The SIZA Environmental Performance Assessment (EPA) has been designed to assist growers in evaluating their current compliance and environmental risks, both at a farm and regional/catchment level. This process is accomplished through the completion of a Self-assessment Questionnaire (SAQ), the results of which feed in to a risk profile report, which can be used to address market requirements, whilst also informing the drafting of site-specific improvement plans. The questions included in the EPA run from minimum legal requirements to leading practice across four main topics – 1.) Water 2.) Soil 3.) Energy, materials & waste; and 4.) Farm ecosystems & biodiversity and includes sections addressing Policy, Risk Assessment and Management processes.

How does it compare to others?

The comprehensive Environmental standard has been benchmarked against several prominent international environmental standards to ensure a compatible level of assurance, while taking in to consideration locally relevant environmental factors. These standards include SAI FSA, Rainforest Alliance (SAN), Global Gap IFA v.5, and the SEDEX SAQ amongst others with the aim of driving convergence of multiple market requirements with one home-grown tool.

What to expect over the next year:

- An additional SAQ based on the SIZA Environmental standard will be available on the SIZA Platform effective by the mid July 2017.
- This will allow SIZA, on behalf of its members, to complete the SAQ on Sedex as required.
- Further development will take place and a full SIZA Environmental module will be available on the SIZA platform over the next year which will be ready and launched by mid-2018.
- SIZA and WWF SA, in collaboration with the industry bodies, export and retailer groups, are also supporting the implementation of this SAQ with a limited number of regional training workshops. These are planned from July-December 2017 and will be targeted specifically for the technical representatives within export companies, retailers and industry associations as well as agricultural extension officers – those that will be supporting the producers in completing and implementing the SIZA SAQ. Further training will be hosted in to 2018 around the use of the online tool, once available.

For more information contact SIZA at Tel **086 111 1568** or email to info@siza.co.za.

Use your 'near death experience' as a lever, says Dutch nurseryman

JANUARY 2009 IS A MONTH HAN FLEUREN WILL NOT EASILY FORGET. FLEUREN NURSERIES HAD LOST 60-70% OF ITS NURSERY TREES AS THE MERCURY HIT -22°C AND SNOW PREVAILED.

The situation was so desperate that Fleuren Nurseries had to sell some of its land to survive. For the 92 year old nursery it might have been the end, he thought at the time. He described it as his 'near-death experience'.

"I think nurseries in SA or anywhere can learn from a near-death experience like the one we had with a collapsing nursery (because of weather conditions). We could blame nobody. But it forced us to rethink what we are doing," Fleuren told HORTGRO Science.

In the aftermath of that winter Fleuren and his team used the crisis as a lever, advising growers to "never give up". The biggest advantage was the lessons learnt and the crisis research they were forced to carry out.

Innovation mind-set

They found out that Q-Eline® was a frost resistant pear rootstock – amid the crisis there could be no doubt about its frost resistant properties. Crisis-research by one of the nursery trainees during a second bout of frost in 2012 using a thermographic camera showed that part of the tree just above the snow got warmer when the surface layer of frost was removed.

The finding convinced the team to remove snow cover around the base of the nursery trees, first manually and then adding bespoke brushes to a shovelling machine for efficiency.



According to Fleuren a positive spin-off was the effect on people. The trainee has decided to pursue further studies in precision farming and is thereby adding value to the business.

The 'near death experience' has cultivated an innovation mind-set at Fleuren Nurseries where the entire staff is in a perpetual state of curiosity. Out of this environment the team found a way of 'talking to the trees'.

Fleuren had the idea of linking each tree trunk size measurement on a GPS so "that we know all the trees in our nursery's exact GPS positions (and the size) and if we monitor the trees every week, the trees will tell us if they like what we doing or not ... so this would be talking to the tree," he said.

The camera is in the prototype stage of development and gives an indication of tree trunk size using colours like green (positive – tree doing well and red (negative – tree not doing so well).

Big data

Another key decision was to build their own weather stations to generate 'big data' in-house rather than depend on outside companies. "Data is the oil of the future," according to Fleuren. So they're integrated

all the measuring equipment with cameras into an autonomous self-driving device.

One of the biggest challenges facing nurserymen in the Netherlands is replant disease and the conventional practise of not replanting land within 100 years of prior planting. According to Fleuren the Dutch nursery industry has accepted this as the norm, and a limiting aspect of the business.

To overcome this challenge the group has expanded their nurseries into Serbia and Germany with the added benefit of a country like Serbia having good trade relations with the significant Russian market. "Out of this crisis came new opportunities, we would not have progressed on our own, we needed a near-death experience or a problem or a crisis."

Innovation within the group has also led to exploring different crop options like cherries. Fleuren is currently growing big cherries (>14.5g) which he describes as a good seasonal product commanding better prices than his traditional crops.

Business transformation

Fleuren's pride and joy, however, has come from an uncharted corner of his business – selling directly

to consumers. Fleuren Nurseries had always viewed itself as dealing in the 'business to business' supply of nursery trees.

A recent innovative breeding programme has given rise to apple trees which grow in small hedges suitable for organic growing, mechanical pruning, and harvesting of the future. It is even suitable for small spaces, which might allow consumers to grow their own fruit. This led to the next product innovation.

He had no idea that what 'space-travel was to aviation' and 'Formula1 was to the automotive', 'mini-tree' would be to Fleuren Nursery. 50 000 families around Europe have already received small apple trees packaged and shipped individually in boxes. Fleuren cannot help but smile as he recounts the surprising success of the product and the exciting twist it has brought to his business.

Fleuren's parting advice to growers who would like a similar trajectory of success and innovation was that "once every year you should do something that is completely useless," adding with a smile, "only once every year".

"You will find things you have never seen before..."

Overcoming adversity: Citrus industry tackles black spot

IT IS 'BUSINESS UNUSUAL' FOR GROWERS GIVEN THE EUROPEAN UNION'S STANCE ON CITRUS BLACK SPOT (CBS) RELATING TO CITRUS IMPORTS FROM SOUTH AFRICA.

The local citrus industry is working hard to eliminate interceptions of shipments with black spot, said Justin Chadwick, CEO of the SA Citrus Growers' Association. Chadwick shared his insights on maintaining access to EU markets while dealing with phytosanitary regulations and trade rules.

Chadwick, speaking at the HORTGRO Science technical symposium 2017, said it remains hard work to maintain their share of the EU market. He pointed out, "The import measures and new certification requirements regarding citrus black spot are nothing other than trade protectionism in disguise.

"Yet robust science has shown that our fruit is not a pathway to spread black spot and that the (EU) climate is not suitable for the disease."



While harmless to humans, this fungal disease causes unsightly lesions on fruit and leaves. Growers in Europe fear it could take hold in their orchards. Efforts are underway to keep South African citrus fruit from EU tables.

'Sound science'

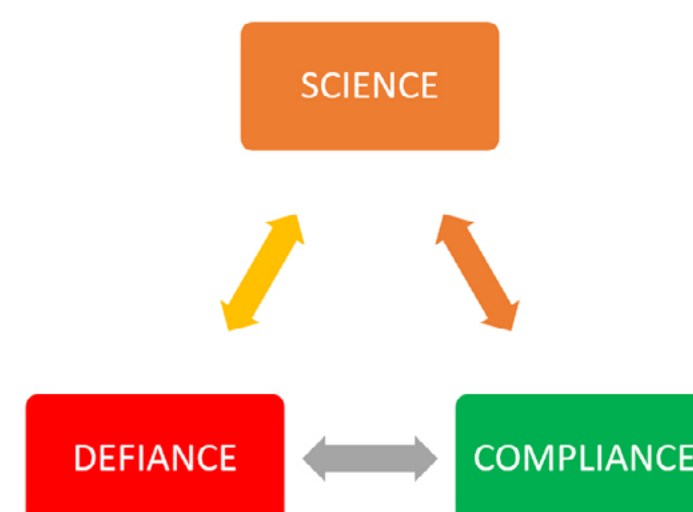
The black spot crisis has united this R17 billion industry, he said. Currently, efforts to limit the risk of interceptions cost local growers R1 billion a year. Said Chadwick, "Our growers now rally around three intervention strategies, namely science, compliance and defiance to tackle it."

Chadwick said proper checks and tracking of fruit origin is necessary. Growers must ensure that sound science backs their interventions and that a paper trail is kept.

Chadwick said the local citrus industry had almost exhausted international dispute resolution procedures to raise their trade concerns regarding the EU's stance's on black spot in shipments. They have, for instance, highlighted this issue at the World Trade Organisation. "We have done everything possible to convince the authorities there that there is no risk and we are still not getting anywhere. So we now put our efforts on more compliance.

"The industry has invested in a robust risk management system that has been lauded internationally. Our growers have adopted it. As a result, we are minimising our interceptions. We upgrade it annually based on what happened the year before and include all the stakeholders in this process.

STRATEGIC INTENT WITH CBS



"If we have non-compliance, we address it immediately. We do a full audit on the farm by experts, and we find out what went wrong to improve our system. We also go to the country that had problems with the shipment to establish the processes followed."

'Grow alternative markets'

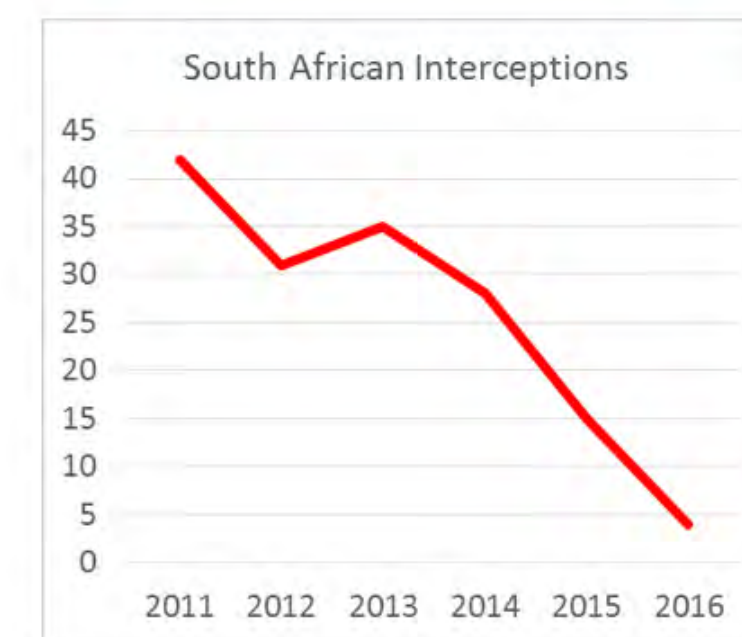
Last year the industry, which sends 700 000 tonnes of citrus to the EU, only had four interceptions of

produce with black spot. "It must mean we are doing something right."

Chadwick said local deciduous fruit growers must be prepared for a long, costly battle if phytosanitary trade measures become an issue for exporters. "You have to understand the EU's regulations, structures and the environment, collaborate with other countries with similar issues and make sure the relevant stakeholders supports the industry's plans for dealing with problems," said Chadwick.

"Be proactive in addressing non-compliance and continue to upgrade and refine your risk management system. Grower buy-in is important. Your industry may need to take difficult decisions as we did to voluntary cut our export season shorter to reduce risk. On two occasions we have now closed the industry in recent years while the guys were still packing. That is a huge decision. Growers need to understand the risk.

COMPLIANCE



"Do the research – science is the bedrock on which all our efforts revolve. You need to make sure that every grower understands the importance of research and putting money behind it."

"You must also ensure that government backs your strategy. Government support and alignment is essential. Make sure that government and industry are on the same page and have proper stakeholder structures and communication plans in place."

"Lastly, grow alternative markets. We have, for instance, been working very hard on gaining and optimising access to Asian markets. Don't be too dependent on one market."

Variety is core of business, says Spain researcher

PRODUCERS SHOULD BE MORE INVOLVED IN EFFORTS TO FIND NEW AND BETTER VARIETIES THAT WORK FOR LOCAL CONDITIONS.

This is according to IRTA's Joan Bonany, who spoke about lessons learned through the Spanish research institution's breeding and evaluation programme in Catalonia.

"We believe variety is at the core of the (fruit) business," he said. "So the right choice of combination of variety and rootstock is critical [so that] all the goodness spreads across the [value] chain. If we make a mistake in choosing the right mix of variety and rootstock, everything else suffers."

Currently, IRTA runs almost 70 research programmes. It is funded by the Catalan government, research grants and the fruit industry.

Spain is one of the world's leading fruit producers, and Catalonia produces about 25% of its total production (including apples, pears and nectarines). About 12 900 producers and 300 fruit companies are active in the region.

IRTA is, amongst others, involved in independent and objective evaluations of cultivars and rootstocks of apples, pears, peaches and nectarines from different breeding programs around the world, he explained. This work is done to identify the best-performing cultivars and rootstocks for commercial production and to give growers a competitive edge.

"It is, for instance, feasible to produce good coloured and good textured fruits in warm climate conditions – but to find all that in one individual is not always easy."

In Catalonia, they have tested approximately 1500 varieties and 118 rootstocks on three locations. These varieties come from all over the world, including France, Italy, New Zealand and South Africa.

This research slots into the larger cultivar and rootstock evaluation programme of the European Fruit Research Institute Network. Data is shared in terms of an agreement with other research institutions across Europe. Recently, they have also standardised an experimental contract for variety testing purposes with breeders.

Cultivar and rootstock evaluation enables IRFA to give growers a long-term perspective on how certain

varieties are doing, for instance on the performance of Royal Gala and its evolution into varieties like Galafab.

This information is essential for their local growers because of unique conditions, i.e., hot, dry summers rainfall in spring and autumn. Not all cultivars suitable for other regions in Europe perform well under these conditions. Bonany explained that IRTA is aiming to find new varieties, including a replacement for Golden Delicious, that will perform well under Catalan conditions. The evaluation programme enables IRTA to say which varieties might be of interest to local growers.

Information on variety and rootstock attributes and potential help reduce the risk for the producer and can be integrated into a fruit company's long-term variety strategy.

It is only through rigorous testing that the best adapted and most profitable varieties can be found, he said. Because of the variation in conditions, cultivars need to be tested in different regions to determine which ones would be best suited.

Testing new varieties often take a long time. Of the 490 apple varieties IRFA tested since 1994 only five are for instance considered of interest to producers. This includes Gala mutations. Similarly, only 81 varieties (10%) of the 777 peach varieties tested shows promise.

"Given the frustration in finding varieties of interest and the poor performance of most cultivars bred in other breeding programmes in our region, the need for a breeding programme aimed at local needs became apparent."

IRTA is now involved in the so-called IRTA-PFR-Fruit Futur breeding programme that works towards breeding high-quality cultivars, including high-yield fruit cultivars adapted to warm climates.

Their apple breeding programme combines advanced breeding lines with some varieties well adapted in the Ebro Valley. More than 192,000 seedlings have been obtained as part of this work (average 16,000 seedlings per year). So far they have released high-yield 20 cultivars of peach and nectarines bred for local conditions.



JOAN BONANY

Pushing the limits with the 'Orchard of the Future'

AS THE THEME OF 2017'S HORTGRO SCIENCE TECH SYMPOSIUM – GAME OF FRUIT SURVIVAL GUIDE – SUGGESTS, THERE IS PRESSURE ON THE APPLE INDUSTRY TO KEEP UP AND REMAIN COMPETITIVE. THE ERA OF 'ADAPT OR DIE' IS LIKELY HERE TO STAY.

InteliGro's Tobie van Rooyen, who has been involved with the project since its inception, said 'Orchard of the Future' was initiated about 10 years ago with the objective of pushing the limits of fruit production with "outside of the box" orchard designs and a call to embrace technology.

Broadly, the goals were set to inspire industry to use more dwarfing rootstocks, optimise orchard efficiencies, and create demo sites where growers, technical advisors, and researchers could learn and experiment together.

More specific targets were set for aspects including genetic material, production, labour efficiency, water use, soil, precision farming/mechanisation, and reduction of synthetic chemical inputs.

Orchards of the Future (OoF) were established at Oak Valley (Two-A-Day), Graymead (Fruitways), Paardekloof (DuToit Agri), and Bokveldskloof (ZZ2).

Each OoF has its own set of objectives which seeks to cast a net as wide as possible for knowledge on aspects such as interplay between rootstock, cultivar, soil, planting distances, growing under nets, harvest systems, precocity, fruit quality, productivity, and profits.

Preliminary financial figures from Fruitways look promising when comparing the M9 OoF Orchard with a normal block. Since planting in 2012, the OoF has earned more than double in cumulative income.

Thus far the OoF project has not only pushed the limits of what is possible, but has also been a 'great learning school' as mentioned by Du Toit Agri Research Manager Willie Kotze.

OoFs are producing more class1 fruit with better productivity and efficient resource use (i.e. labour, pruning, thinning, and harvesting). While higher density planting with the right rootstock has allowed OoF custodians to plant the area full.



TOBIE VAN ROOYEN

According to Van Rooyen one of the greatest outcomes has been that growers have observed what was being done in OoFs, taken the ideas, and "are now running further and faster than industry".

Focal areas for the Orchard of the Future by technical advisors

Planning for profitable orchards in a changing climate (Anton Muller, Kromco) – Future challenges include less water, higher temperatures, less winter chill, increasing Class 1 tonnes per ha, achieving colour and fruit size wanted by market. Have a clear and detailed plan for your orchard/material with climate change in mind. Reduce impacts by adjusting the micro-climate of the orchard. Adapt your orchard material by planting proven winner varieties, with taller nursery trees at narrower widths. Keep planting to save water – young orchards use less water than old, mature orchards – and try to grow a more water-efficient, fruit producing canopy. Way up the pros and cons of having drape net versus a fixed structure.

Water for the future (Nelius Kapp, Soil2Root Technologies) – The Western Cape will have 30% less rainfall by 2050 along with generally higher water usage and poorer water quality. Growers are advised to take the following actions: draw up a water budget, improve irrigation system capacity, install more filters, ensure maintenance of systems and filters, make use of flow meters, and setup buffer dams. In terms of water efficiency the OoF will be high density with an increased number of trees on dwarfing rootstocks. Growers with heavy soils (e.g. clay loam) should beware of runoff due to a slow infiltration rate. Water management in the OoF will require special attention to the crop water requirement, scheduling, and irrigation system capacity.

Apple planting systems and rootstocks for the future (Nigel Cook, Propphyta) - The OoF will no longer include big trees and will include 2000-3000 trunks/ha. Tall spindle training systems on M9 and M7 will be most effective. Crop load in cumulative tonnes is an important measure. The amount of fruit produced relative to the size of the tree is the most important measure when selecting a rootstock. 2000-3000 trees per ha is most efficient to manage in terms of pruning time. Soils are very important, not all rootstocks perform equally well in the soils, SA soils are more varied. M9, G202, M7, G222 are viable at this stage dependent upon conditions.

Stone fruit training systems (Petru du Plessis) – The road map to profitability is adequate fruit size, tons per hectare, cartons per hectare, and consistency in achieving them. A training system for maximum yield has an optimum fruit:leaf ratio, maximum bearing capacity, and is standardised and easily understandable to the labour force. Stick to one orchard system on the farm to get increased productivity from labour. Get the basics right in terms of mulching, irrigation, fertilisation, and cross pollination, while netting can confer benefits there remain some questions around the efficacy of drippers.

Crop protection in the future (Bekker Wessels, ProCrop) – There will need to be more emphasis on weed control. Higher tree density and dwarfing rootstocks will enhance weed competition with detrimental effects on growth. Promote a good root system from day 1 establishing a healthy soil microbial ecology. The influence of netting can affect pest control measures, but negative factors are manageable and not a concern. Spray application in high density orchards is a 'totally new ball game'. The change in tree architecture brings a new set of demands for sprayers. Best results will be achieved with high profile sprayers with vertical cross flow air distribution. Better spray economy can be expected.

Growing fruit with consumers in mind – Roger Harker



WHY DO PEOPLE BUY FRUIT? HOW CAN WE GET CONSUMERS TO BUY MORE? THE ANSWERS TO THESE AND OTHER QUESTIONS REQUIRE THE INDUSTRY TO CONSIDER EATING QUALITY, CONSUMER BELIEFS, ATTITUDES AND PERCEPTIONS.

This is according to Dr Roger Harker from Plant and Food Research in New Zealand. Harker's presentation at the HORTGRO Science Symposium 2017 focused on the importance of fruit size, taste and appearance factors in consumer behaviour.

Harker, the science group leader on consumer and product insights at Plant and Food Research, unpacked how consumers buy and experience fruit.

"Everyone in this room lives in their own flavour world," he said. "No two people are the same. But we do know there are some similarities when it comes to food cultures and food consumption in different regions of the world."

Harker said their researchers have now moved beyond looking at only demographics when it comes to understanding consumer choices. "We are increasingly looking at attitudes and consumption, trying to understand consumers better." The scientists have also done work on the genetics of flavour perception. They use human genome databases to determine global variability in consumer sensitivity towards certain flavour compounds.

The researchers also look at the uniqueness of a product and the reasons why people consume fruit or decide against it. Said Harker, "We believe that every apple we grow should be one we can sell." The product has to be of the right quality for the right consumer, have the right appearance and be of the right size.

Consumers indicated that there were particular types of fruit they consumed at different times of the day. Bananas and kiwifruit are, for example, more traditionally eaten in the morning and at breakfast time. Apples are often eaten at all times of the day and citrus from before lunchtime till late afternoon.

The situation in which fruit are consumed is important. "If you are going to sit down for lunch next to your boss you won't take a fruit that is messy to eat. You are going to take something simple, like an apple. The situation and the place where you sit down affects it."

Harker said the industry must focus more on the values of consumer consumption. "People make choices based on price, availability and convenience. Increasingly, consumers are using their fruit knowledge to make purchase decisions."

Eating quality remains key, he said. This refers to all the characteristics of food that lead a consumer to be satisfied with the eating experience.

Their research also confirms that consumers are visually very attuned.

"What they see is what they think they can taste. Consumers are conditioned to look at something. They discard the unusual and detect blemishes quickly. When we look at natural products, it is even more important.

"Consumers buy with their eyes. Consumers become attuned to the appearance of products that they regularly see when shopping. They discard the unusual. Poor appearance is often associated with poor food safety."

"The shape of a pear is for instance very important, followed by the colour followed by the russets. There are clear 'rules' about preferred colours, shapes and symmetry." Harker said texture, taste and aromatics have an impact on the buying behaviour of customers.

At the laboratory, they used experimental auctions to see how much consumers would be willing to pay for different fruit. Said Harker, "Consumers indicated that the eating quality (flavour, taste, texture) is very important when they decide to buy fruit. Once the fruit has been tasted, its texture and flavour become even more dominant."

Considering consumer responses to fruit size, dry matter content and price help fruit growers make decisions about taste standards and new cultivars, he said. Looking at dry matter content enables producers to decide early on which markets to target and when to harvest and sell their fruit.

Growers and packers can have a direct influence on demand by growing, harvesting, and storing apples in ways that optimise eating quality. Harker said, "No matter how healthy an apple is consumers are reluctant to repurchase fruit unless it tastes good."

Producers have control over eating quality through selection of cultivars, management of orchards and fruit maturity at harvest. Harker concludes, "The value of apples to consumers is defined by the interplay between eating quality and price."



Choosing the right apple and peach varieties for consumers



INCREASED FRUIT CONSUMPTION CAN BE ACHIEVED WHEN THE RIGHT CULTIVARS ARE GIVEN TO THE RIGHT CONSUMERS.

The latest research in this regard was highlighted by Prof Joan Bonany, Director of the Pip and Stone fruit programme at IRTA-Mas Badia. Bonany, an expert in deciduous fruit production systems, is involved in the IRTA pear and peach breeding programme and the evaluation of new cultivars in Spain.

IRTA and its research partners participated in the ISAFRUIT project to evaluate how new and better quality fruit cultivars can help to increase fruit consumption. This research is the largest study to date of consumer acceptance of existing, innovative apple and peach varieties throughout Europe. The scientists are interested in how to encourage increased consumption of fruit and to improve consumer health and well-being. They also developed detailed consumer preference maps.

Approximately 5000 consumers in countries like France, Netherlands, Germany, Poland, Switzerland, Italy and Spain participated in this investigation.

The researchers looked at how consumers choose which fruit to buy. The spotlight fell on their choices of eleven apple varieties and ten peach and nectarine cultivars. The varieties selected were representative of the full taste and texture spectrum.

The standard apple cultivars were Golden Delicious, Jonagold and Fuji and the less well known were Pink Lady (Cripps' Pink), Ariane cov, Wellant, Junami (Milwa), Kanzi (Nicoter), Rubens (Civni), GoldChief and Ligol.

The test locations for consumer panels included Warsaw, Hamburg, Haarlem, Utrecht, Lausanne, Paris, Bordeaux, Bologna, Rome, Girona, Barcelona, Valencia and Madrid.

The researchers identified two major population segments, namely consumers who prefer sweet fruit varieties and those who prefer acidic varieties. Both groups can be subdivided further based on their consumer preference. In this study, 68% of

consumers preferred sweet apples, while 32% liked tart, firm apples.

In France, Italy, Netherlands, Poland, Spain and Switzerland most consumers preferred sweet apple varieties. With regard to nectarines, 87% of the consumers preferred sweet peach varieties compared to 13% acidic varieties. Polish consumers showed a major preference for sweet varieties while Germany had the highest percentage of consumers who liked the acidic varieties (25% of the participants).

It appears that there was no clear 'north' and 'south' divide between countries where people preferred sweet apples versus more acidic apples. There was no clear distinction in the choices of the different age groups. There was also no relationship between visual appearance and flavour acceptability.

These outcomes suggest that fruit consumption can be increased by ensuring that consumers have access to the cultivar types they prefer (i.e. sweet or acidic). The results will help to bring better varieties to relevant markets in future, Bonany said.

Bonany believes this kind of research should be an ongoing process, especially seeing that new varieties are released annually. More research on consumer preferences is needed, especially in countries not covered in the present study. There are still segments of the population that industry knows very little about, including children.

Bonany concluded, "This kind of consumer research is very valuable for producers, breeders and marketers alike," he said. "The industry can do better to communicate about flavour characteristics and expose consumers to cultivars."



Dealing with superficial scald – Henk Griessel



DEALING WITH SUPERFICIAL SCALD REQUIRES MORE THAN JUST A SINGLE ACT OR A SINGLE TREATMENT. SCALD IS A COMPLEX REACTION THAT REQUIRES MORE RESEARCH, SAID HENK GRIESSEL, QUALITY ASSURANCE MANAGER FOR TRU-CAPE FRUIT MARKETING (PTY) LTD.

Griessel said it still not clear what caused the big Granny Smith scald event detected on 1 September 2016 on fruit that arrived in Malaysia. The situation, however, created the opportunity to do a big commercial trial that could benefit the industry in future.

All the affected apples were treated with the ethylene inhibitor 1-MCP (known as SmartFresh) within four days of picking at recommended concentration. The apples were kept under regular atmosphere conditions and step wise cooled for four weeks to prevent any CO2 and ethylene building up before CA conditions were applied. Griessel said, "For all practical purposes our measures would have prevented scald. We did everything according to the manual."

Superficial scald is a physiological disorder causing brown or black patches on fruit skin that appears during or after storage on apples and pears. It is defined as a chilling injury and intensifies at room temperature after cold storage. If not controlled, the market value of the fruit is reduced.

Griessel said they are still baffled to what caused the severe scald and have subsequently gone "back to the basics" to understand the inner workings of an apple in storage.

Different post-harvest methods to control superficial scald were considered. Griessel mentioned using antioxidants to inhibit oxidation, as well as recent developments in controlled atmospheres, ethylene inhibitors and low oxygen

stress treatments. Said Griessel, "After looking at different areas of control, we had to take an informed decision to deal with the situation. What we realised is that the best control we got is when we apply a second treatment.

"We couldn't use DPA because we didn't want to contaminate our fruit. So we decided to move all the fruit from normal controlled atmosphere storage to dynamic controlled atmosphere storage. We stressed the fruit right at the end of storage, two weeks before it would be moved. We wanted to have the fruit leave the dynamic atmosphere control conditions with enough alcohol to prevent further damage.

"The result was that we saved the crop. Although the fruit looked a bit yellow, we could sell all of them. In some rooms, however, the level of stress applied to the apples was too low and the treatment did not work."

Most of the fruit were stored till January without scald. Some slight internal browning/core flush did occur due to severe stress. We could sell these to customers who juiced the fruit and where external condition were more important than slight internal off colour.

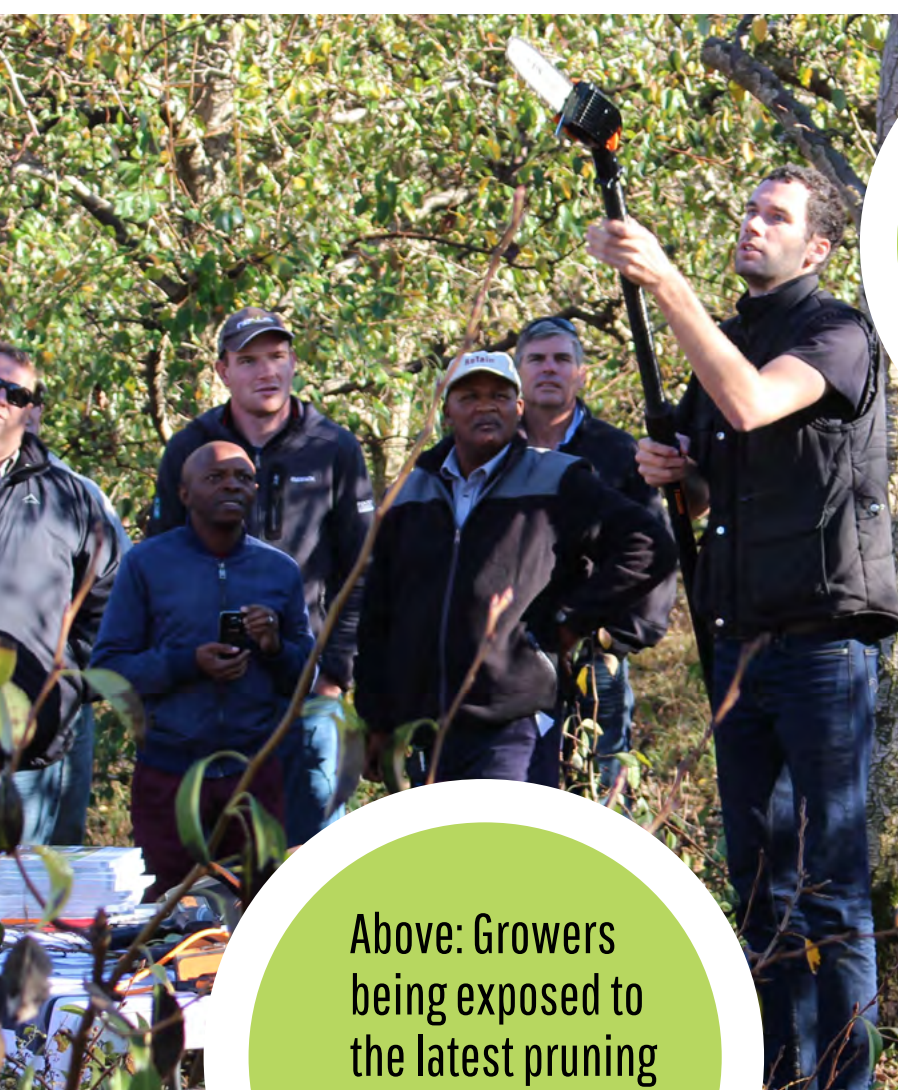
Said Griessel, "We do not actually know what level of stress should be applied, but we are aware it must be relatively high because you have to leave enough alcohol in the apples to prevent further damage."

The industry now needs to find out exactly why these interventions worked. Griessel believes the target for Granny Smith apples should be to store them for at least ten months without scald. "Now we need to find out why this worked and what level of stress to apply to refine our protocols. We need more research on this issue," he said.

Pome Fruit Field Day – Ceres

The Pome Field Day took place in Ceres and covered a broad range of topics including High Density Orchards, Training Systems, and growing under nets. Delegates visited the following orchards:

- Laastedrif Boerdery (Klein Vlake)
- Karsten Boerdery (Hoogland)
- Buchuland
- Oast Farms (Loxtonia)



Above: Growers being exposed to the latest pruning technology and equipment



Right: Wolfpack's Christo Strydom sharing his wisdom in a highly productive pear orchard.



Louterwater Grannys and Panorama Goldens under neatly constructed hail nets at Oast Farms (Loxtonia)



Right: Kobus Koegelenburg gives delegates advice



Left: Piet Nieuwoudt sharing his knowledge



Stone Fruit Field Day – Montagu

The Stone Fruit field day took place in the stone growing 'hub' of Montagu. The day was divided into two parts a workshop and orchard visit. The workshop covered various aspects of False Codling Moth (FCM) and irrigation, especially during water shortages. The visits to nectarine and plum (Ruby Sun and African Delight) orchards focused on winter pruning and cultivar characteristics.

Above: The guys enjoying some early morning coffee.

Registrations desk in capable hands.

Charl Stander and Hugh Campbell making sure everything is on track.

Everyone is ready for the day's practical.

Owner of Scheepersrust Farm and venue host for the day, Johan Esterhuizen, introducing his farm to attendees.

Technical advisor, Charl Stander, giving advice on a Ruby Sun plum orchard block.

Pruning demonstration on an August Red nectarine block.

Above: Pruning expert, Gielie Bester, sharing tips and tricks with attendees on an African Delight plum orchard block.

Daan Strydom award goes to Piketberg farm boy

The 2017 recipient of the HORTGRO Science/Daan Strydom Award for the best student in Horticulture at Stellenbosch University is a farm boy from Piketberg – CP Van der Merwe.

This 25-year old already boasts a number of academic achievements. In 2015, as a third-year student, he also received the Ballie Wahl Award as the best student in citrus studies, and last year he was awarded the SU Faculty of AgriSciences Perold Medal.

Van der Merwe who grew up on a farm outside Piketberg, has been in the academic spotlight since his school days. Not only was he the head boy during his matric year at Piketberg High School, he also claimed the honour of being the school's Dux student.

Studying horticulture was prompted by Van der Merwe's love for farm life and his natural curiosity about how plants grow, and how plants can be manipulated to increase yields. On the family farm where he grew up the Van der Merwe's cultivated table grapes.

"I chose horticulture as a career because there are many challenges in the industry, and because I rarely say no to a good challenge," he said. He believes in the value of good mentoring as this enables one to gain experience and knowledge and will to establish himself one day as a horticulturist.

CP is currently working in the farming department of AnB Investments. CP's advice to future and current students is:

- Choose a field of study that resonates with you and that you will enjoy.
- Go to the trouble of working on a farm for a week or two to find out whether plants and other horticultural activities are really your fields of interest.
- Talk to lecturers and people in the industry to get a clear picture of what the work entails.
- Decide what aspect of horticulture you are interested in and focus on that.
- Put effort into your studies.
- Tap your lecturers for knowledge and information and make use of every learning experience.
- Job shadow people in the industry to get a foot in the door.
- Talk to your lecturers about future options.
- Make time for old and new friends – they will become your future industry contacts.



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