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Matso Vetiwe tends to  
Macadamia nut tree seedlings at a nursery owned and operated by  
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KwaZulu-Natal south coast.  
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As one of the fastest growing and vibrant new sectors in South Africa’s agricultural industry it is fitting that there is now a publication dedicated to telling the stories of growers, technicians, horticulturalists and processors who are paving the way for one of the most important contributors of forex to the country’s domestic economy.

In Mpumalanga, for example, macadamia nut exports are the highest contributor of foreign exchange to the provincial economy after coal.

In KwaZulu-Natal the sector is growing at a rapid rate as farmers diversify their sugarcane operations in the face of cheap sugar imports flooding into the country and the European Union’s decision to lift the ban on domestic sugarbeet quotas, which has resulted in an exponential drop predicted for sugar exports from Africa and Mauritius to Europe.

In this first edition we feature one of the country’s top seedling nurseries, high level technical advice, as well as profiling some of the most successful farmers and processors in the country’s macadamia nut growing regions.

We also attended the opening of the new and largest processing factory on the continent by Green Farms Nut Corporation in Mpumalanga.

South Africa is currently the largest producer and exporter of macadams in the world, with output expected to double by 2020. In the 2017 harvesting season, 42 000 tons nut-in-shell (NIS) and 13 000 tons of nut kernels were harvested and exported mainly to the European Union and China.

As a result South Africa’s farmers are having to adopt top level precision farming and quality control practices to meet the stringent import controls demanded by countries such as Holland among others in the European Union.

We have four editions of the magazine scheduled for this year in which we plan to celebrate the stories and achievements of these farmers and their support industries who are contributing to the success of South Africa’s agricultural economy.

From the Editor

Gareth Wright

It is with great pride and a sense of achievement that we are able to say that the very first edition of Macadamia SA is now a reality.

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T&T Agric is a reliable partner offering a wide variety of macadamia trees nurtured by top horticultural experts. We are perfecting the latest techniques in tree grafting and utilising only the most progressive technology throughout our nursery.

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Macadamias have of late become a buzz word in South Africa’s agriculture industry as market prices soar amid increasing demand. The global macadamia industry is worth $822 million (over R9 billion) and since South Africa is the largest producer and exporter of the nut, the country is in a prime position to capitalise on the popularity of the crop. High prices are however not always sustainable and the global industry is in agreement that much will have to be done to develop this relatively new industry to ensure that demand matches the exponential increase in supply.

**PRODUCTION**

The local industry is predominantly spread over three provinces namely, Mpumalanga (49%), Limpopo (21%) and Kwa-Zulu Natal (20%). Limited plantings have taken place in the Eastern and Western Cape as the climate in these regions is not ideal.

It is predicted that in 2018 South Africa will produce a bumper crop of 54 000 tons NIS (nut-in shell at 1.5% kernel moisture content), up approximately 21% from last year. South Africa is in the top spot in terms of global macadamia nut production, with Australia following closely behind with 43 000 tons NIS (3.5% kernel moisture content).

Last year the total global macadamia crop reached over 200 000 tons. But, with the rapid uptake of macadamia farming this figure is expected to reach 500 000 tons by 2020. The Southern African Macadamia Growers’ Association (SAMAC) reports that South Africa alone has tripled plantings during the last four years from 1250 hectares in 2013 to 3870 hectares in 2016.

**KERNEL VERSUS NIS MARKETS**

Since the Chinese market opened up for South Africa some ten years ago there has been much controversy over how processors split the exports between Eastern and Western markets. While the Chinese market prefers nuts to be exported NIS, the Western markets want kernel processed in various styles, from whole nuts to chips.
SAMAC reports that the kernel market is gaining strength once more, with 55% of the 2018 crop expected to be processed to kernel, compared to approximately 49% in 2017.

The Chinese “grey” market has caused numerous disturbances over the last few years as buyers aim to bypass the import duties amid random crackdowns by the authorities resulting in temporary closure of their markets. The Chinese import duties are currently at 12% for South African macadamias. While the duty was reduced from 19% in November last year, there is still industry speculation that the availability of these routes will continue regardless.

SAMAC does however report that the reduction in the duties should have a positive effect in supporting the higher volumes of South African NIS macadamias due for shipment to the Asian markets this year. Considering the low processing costs and higher profitability of the NIS market, many processors currently opt to split their crops between the Western and Eastern markets, preferring not to place all their nuts in one basket so to speak.

COMPETITION FROM ABROAD

While South Africa has held the number one position in macadamia exports for the last few years, competition from Australia, Kenya and China is growing.

The Australian Macadamia Society is concentrating its efforts on marketing campaigns to increase consumption of specifically Australian macadamias to the local and Asian markets.

Furthermore they have succeeded in reaching an agreement with China to have their import duties phased out completely over the next few years, giving them a competitive advantage over South Africa.

Kenya has increasingly become a source of strong competition for South Africa. Macadamia nut production is increasing rapidly and since the crop is still relatively new, the pest load is still at a minimum. This means the quality is of a higher standard while lower labour costs result in lower market prices. Reports coming out of China suggest that the industry is expanding with two million trees each year. These orchards should start coming into production by 2019. If the proper yields are realised, the country could become self-sufficient resulting in a drop-off in imports.

MANAGING AN EVER BIGGER CROP

Alex Whyte, general manager of Green Farms Nut Company (GFNC) believes it is imperative to increase processing capacity to ensure long term viability for the industry and farmers.

"Industry figures project a 40% increase of NIS to 64 800 tons in 2020. To absorb this astronomic supply increase, our approach rests on three key pillars: processing capacity, sophisticated product marketing and value add, all of which are inextricably linked to being able to sell at currently buoyant prices in the future. With China reporting extensive domestic plantings, a balanced marketing NIS and kernel approach across the globe continues to be front of mind," Whyte said.

Substantial investments in the processing industry bode well for the sector and the increase in employment opportunities creates a further positive effect on the local economy.

CONSUMPTION

While record high prices for macadamias prevail, there is concern that should adequate marketing campaigns to promote consumption fail to get underway, a price drop will be inevitable when the supply increases to the levels expected.

Around 98% of South Africa’s crop is exported and very little has been done to increase consumption locally, when compared to countries like Australia who consume 30% of their crop.

Whyte said that investing in marketing efforts to increase consumption in South Africa was not financially viable unless the industry could prevent the high percentage of stolen and poor quality nuts from being sold locally.

“We do believe our local market could hold substantial potential. But if we can't stop stolen nuts being sold locally even in retailers, it makes no sense trying to develop the local market.”

Since macadamias make up just 1,42% of the tree nut basket, there is much room for growth. It also means that macadamias are a niche within the health foods sector, giving some justification for the higher price.

Whyte said that the biggest challenge facing the industry in 2018 is the increase in global supply. “There are some substantially bigger crops from both Africa and Australia, while China, which is South Africa’s biggest market, is very quiet due to the late New Year and the large inventory levels in this market. We therefore expect a slightly softer price for NIS to China in 2018. However much of this concern is being offset by a buoyant kernel market and these prices remain stable at the current historic levels for the time being.”

Nico van Schalkwyk, marketing manager at Golden Macadamias said that despite higher volumes, the demand still outstrips the supply and most of their company’s crop was already sold. “The quality feedback from our growers is also positive for this season,” van Schalkwyk said.
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World's Largest Macadamia Factory
Opens in Mpumalanga

South Africa's Green Farms Nut Company (GFNC) has launched the world's largest macadamia processing facility in White River, Mpumalanga.

This multi-million Rand agri-processing development is the single largest investment into the macadamia industry on the African continent with the first two phases completed in time for this year's macadamia harvest which starts each year in March and ends in November. The national crop is expected to increase from 48 000 tons processed last year to 54 000 tons this year.

At the launch General Manager of the company, Alex Whyte said the industry projected a 40% increase of nut-in-shell (NIS) from 38 500 tons in 2016 to 64 800 tons by 2020.

“To absorb this astronomic supply increase our approach now rests on three key pillars; processing capacity, sophisticated product marketing and value-add, all of which are inextricably linked to being able to sell at (the) currently buoyant prices in future,” White said.

He said the massive infrastructure development demonstrated the company's long term view for a sustainable industry through creating value-add and marketing capability domestically, as opposed to outsourcing processing to China, for example.

“This approach will ensure we remain price givers rather than price takers in years to come,” Whyte said.

As the industry’s longest serving processing businesses together with it’s partner marketing company, Green & Gold (the globe’s largest supplier of macadamias) the investment he said represented confidence in, and commitment to, a sustainable macadamia sector.

“We are invested for the long run. We will cultivate our business alongside growth in the crop and based on (the) historic and ongoing exponential (tree) planting, our view is that it is imperative to increase processing capacity to ensure long term viability for the industry and our farmers.”

INCREASING PROCESSING CAPACITY

According to the Southern African Macadamia Growers’ Association (SAMAC), new macadamia tree planting in South Africa has tripled in the last four years from 1 250ha in 2013 to 3870ha in 2016, with planting almost doubling between 2015 and 2016 from 2000ha to 3 870ha.

Currently there are 28 000ha of established macadamia orchards with the largest growing region being Mpumalanga followed by Limpopo and KwaZulu-Natal.

This aggressive planting strategy is projected to continue, hence GFNC’s investment in the mega factory.
AT THE LAUNCH KEY COMPONENTS OF THE NEW FACILITY INCLUDED:

- Processing capacity increased by 40% in phase one from 5 500 tons to 8 000 tons NIS (this will be increased to 25 000 tons in phase two).
- Factory size has been increased to 10 000m² from the current 3 000m² with state of the art technology and latest sterilisation techniques.
- The installation of world class optical sorters that will drive efficiency through increased processing speed.
- Expanded value-add capabilities to better serve customers and latest techniques to ensure food safety.
- Reduced water usage through improved technology.
- Electricity cost saving by burning macadamia nut shell by-product to dry NIS and kernel nuts.
- Additional 250 tons drying bin storage capability, totalling 800 tons, and
- Increased facility efficiencies ensuring processing fees are kept to a minimum.

“A fragmented processing industry is unlikely to deliver the best economies and ultimately robust prices back to farmers. Being aware of how the landscape may look in future is key. Also food safety standards are becoming more stringent and macadamia buyers are demanding sophisticated techniques and technologies from processors,” he said.

FUTURE PLANS

Through its marketing business, Green & Gold Nuts, the company is confident of achieving the right mix in a three tiered strategic approach. With China reporting extensive domestic plantings, a balanced marketing NIS and kernel approach across the globe was continually front of mind, Whyte said. The company, he said, was looking into value-add activities such as retail packing, roasting and macadamia oil to ensure relevance in their agri-processing business evolution.

“Building direct relationships, cutting out the middle-man, creating market stability and security to ideally deliver higher prices for our farmers are our driver. We are first to market in making sure we’re ready for the anticipated bumper crop in 2018 and our doors are always open to all growers,” said Whyte. Completion of phase two of the project is estimated by 2020, with key components including total processing capacity upwards of 25 000 tons dry NIS, further technology and equipment upgrades as well as increased storage and warehousing.

The company has the largest processing capability in the country with factories in Mpumalanga, KwaZulu-Natal and Limpopo. The Limpopo and KwaZulu-Natal factories were recently expanded, and together the operation has 12 200m² under roof at present. Whyte said macadamia production was not only growing exponentially but from a small base. As a result it meant the environment was fast changing and in the process of maturing.
Selecting macadamia varieties to plant in commercial orchards is a complicated and subjective challenge for growers and nurseries as performance varies from region to region and there is no perfect variety for all climatic and management conditions, says Managing Director of Red Sun Hortitech, Mark Hassenkamp. Having dedicated clonal mother blocks for propagation of all commercial South African macadamia varieties, RedSun is approved by CitroGold to propagate and distribute Australian Hidden Valley macadamia varieties to Southern African growers. Experts at the company suggest factors such as yield benchmarks, climate, management capacity, equipment, and most importantly, yield, income, cost and profit per hectare must be considered as decision making drivers.

**THINK IN TERMS OF FIRST GRADE KERNEL PER HECTARE**
Many comparisons between varieties report yield of nut in shell (NIS) per tree, but this is in general a poor measure of tree performance, they say. Growers are effectively paid for first grade kernel free of rejects. Yield of first grade kernel is the measure that is most closely related to income. Yield first grade kernel (kg) = Yield NIS (kg) x sound kernel recovery (SKR %) x first grade (%). A variety may have a high yield per tree, but if trees have a low spacing and are excessively large they may still perform poorly when assessed on a per hectare basis. Equally, small trees planted on a wide spacing will also not achieve acceptable yields per hectare. Yield first grade kernel per hectare (kg) = first grade kernel per tree (kg) x trees per hectare = first grade kernel per tree (kg) x 10 000 / between row width / within row width where trees will fit at nominated trees/ha.

**DECIDE ON PLANTING DENSITY**
The first question should be what tree density is intended for the orchard and that is informed by climate and variety.

There is an almost unlimited range to choose from, for example:
- Low density – 10 m x 5 m (200 tree/ha)
- Medium density – 8 m x 4m (312 tree/ha)
- Medium-high density – 7 m x 3 m (476 tree/ha)
- High density – 5 m x 2 m (1 000 tree/ha)

Most new orchards are planted at medium densities (312 @ 8x4).

It is unlikely that a semi-dwarfing, small, compact upright tree like A16 will fill the orchard at low densities, leaving a large area of the orchard unproductive with lower returns per hectare. Similarly, planting a larger precocious variety such as 695, 842, and 849 at high densities would mean intensive management to keep the orchard under control in later years.
Hidden Valley macadamia varieties which are defined by an A prefix are assessed on their ability to produce high first grade kernel yields per hectare. In general, Hassenkamp says, they were selected with a preference for medium to small size trees suitable for medium to high planting densities to improve total returns per ha.

**IMPORTANCE OF VARIOUS TRAITS**

To a degree the importance placed on various traits is a subjective decision and will also depend on the mix of climate and varieties under consideration. Some varieties are more heat stress susceptible. For example, another Australian selection, A4 is a very precocious tree able to produce commercial yields in three years. It has a medium spreading tree shape with an open willowy canopy susceptible to wind damage. It has excellent quality and size kernel with a mid-season nut drop. It is however more susceptible to stress from high temperatures but performs well in milder regions, A4 needs extra fertilizer to compensate for its early cropping ability. In contrast, A16 is a slow growing and wind tolerant variety but a high yields with excellent nut quality and would achieve high yields, and returns per hectare, if the trees are planted at higher densities.

Many growers consider it desirable to have all varieties ready for harvest at the same time, to achieve a short harvest window. Other growers prefer to spread the harvest out to reduce stress risk and minimise the need for large capital equipment to handle the harvest. Another important aspect to consider is to select varieties that are more or less the same tree size across orchards.

Hassenkamp says while kernel characters are important, in general, any commercialised variety will have acceptable kernel qualities related to flavour and appearance. Although, there are some debates at the moment as to whether small or large kernels are more desirable. “Processors prefer large kernels, because they are less costly to handle, simply because there are less of them for any given weight”. Others may prefer small kernels for confectionary chocolate coating for example.

“If a grower chooses this option, they must guarantee the variety has a larger percentage of whole kernels, rather than small halves which are more expensive for processors to sort,” Hassenkamp says.

Pollen compatibilities have also gained prominence in recent years. However, there is still more work to be done before its importance can be exactly determined.

**DESIGN AND PLANT THE ORCHARD ACCORDING TO POLLENISER COMPATIBILITY**

Select at least three varieties to reduce the risk of varieties not performing up to expectations. It creates the potential to maximise pollination. It extends the flowering and harvest periods. And, once varieties are selected, the grower should design the orchard in such a way to maximise cross pollination – planting the most compatible combinations close to one another, Hassenkamp says. “Keep flowering periods in mind as well. We recommend solid blocks of a certain variety should be planted.”

Red Sun currently has two experimental varieties on controlled release namely A203 which has a medium to large uneven sized nut with white kernels which drop mid-season. The variety is hardy and may suit more marginal areas and A268, a medium to large tree with an open spreading canopy, a mid-season nut drop and very large, good quality nuts which have creamy, white kernels. It appears to be hardy and may do well in cooler regions, however whether or not the tree is frost tolerant has yet to be determined.
PERFECT MACADAMIAS
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QUALITY - INTEGRITY - INNOVATION
Kobus Visser from the African Honey Bee, a Christian social enterprise that is assisting people in poverty in deep rural areas to learn how to build sustainable micro-beekeeping businesses, said the organisation was now in the process of conducting critical research on the impact of proper beekeeping management in macadamia orchards in Mpumalanga. The research he said was started last year and was as yet not available to the public. He said, however, that there was concern as to how demand for beehives in the growing macadamia industry orchards was to be met.

"If you look at the recently published Australian research which suggests three to six hives per hectare, although that is not proven to be the ideal number, so let’s say a minimum of 2 hives per hectare. It has been predicted that the number of hectares under macadamia orchards will increase by 13 000ha in Mpumalanga in the next year alone, that means we need to be able to supply 26 000 hives. And then we haven’t thought about the bees required for avocado orchards, they are also on the increase. It is going to be incredibly difficult for the beekeeping industry to build up to that capacity," he said. Visser said the organisation’s research also correlated with the Australian research that showed a significant yield improvement when beehives were placed in well-managed orchards.

"But, it is not just a case of taking the beehives and putting them into the orchards. There is still significant work to be done over the next couple of years, more research and then farmers will have to adopt practices that are bee friendly. The way they manage pesticides for example and how those pesticides impact on the bees," Visser said.

Andrew Sheard and Rohan Orford from Mayo Macs Technical Services said reducing the pesticide spray impact on bees included constant scouting for pests, choosing the correct pesticides, spray at night when the bees are not active, to stop spraying altogether when the trees are in flower. Also, to make sure the hives were strategically placed in the orchard and that the hives were removed timeously once the trees had stopped flowering.

"Importantly, growers need to know the risk of combining two or more pesticides together, which maybe “bee-safe” on their own, but can be harmful to bees when mixed together. Some pesticides have been shown to be almost twice as toxic to honey bees in the presence of a fungicide," Sheard said.

In the 2017 season a number of study groups in Kwa-Zulu Natal focused on bee pollination and bee safety. The key pointers that emerged from the studies were improved timing of sprays, increased use of bee-safe products and creating bee habitats on-farm during the off-season to make sure the sustainability and health of the swarms.

Both Sheard and Orford agreed, however, that key to the successful use of bees as pollinators in the industry was to improve communication between beekeepers and the growers.
Hands on Management

Vital for Top Quality Macs

Intensive management is vital if macadamia nut trees are to produce top quality and improved yields year-on-year. Ryan Taylor, who has managed the extensive DR Mattison Group orchards on KwaZulu-Natal’s south coast since 2015, says despite the crop becoming one of the fastest growing industries in South Africa’s agriculture sector, consistent and daily hands-on maintenance and operational strategies remain fundamental for consistent high yields.

Before the sun rises on most days in the picturesque hills inland of Port Edward, pest control expert Jace Chetty and his two scouting teams are already in the vast DR Mattison Group macadamia orchards checking for insect infestation.

“We go into the orchards when it is still dark because the insects start to fly when the sun comes up. If we find more than four bugs across ten trees we notify the management team immediately,” Chetty said, adding that it was also critical to spray as early as possible to avoid any harm to birds and other insects such as bees and ants.

Opening up a hard cover exercise book Chetty demonstrates the meticulous columns of records he has kept since he started in the job three years ago. “Each day I write down exactly what bugs we find, how many of them and in which orchards,” he said.

Ryan Taylor, who has managed the 400ha macadamia operation for more than two years, said the adoption of an integrated insect management strategy was paying off. “We have had good success with bringing in softer environmental products into our spraying programme. We are also looking at other options to ensure we do as little harm as possible to the environment,” he said.

The trademark yellow Delta Traps, which have pheromones hung from the roof or placed on a sticky card inside them to attract and trap male moths, are hung high in the orchards every one to ten hectares. Taylor said Chetty’s record keeping was also beginning to show trends across the orchards. “Those records might seem a simple thing, but they are invaluable to us. They provide critical and detailed research on the health of our orchards and how pests are responding to our prevention programme. We also keep detailed records of the yields of each variety and each orchard right down to the produce of an individual tree. For me what separates good and bad farmers is how consistent they are in their maintenance programme.” While research and technical expertise on the growing and harvesting of macadamia nuts is developing fast in the industry, Taylor said sticking to the basics, such as keeping a constant eye on pest infestation, daily moisture level checks, regular grass cutting, weed control and pruning each tree annually for maximum light, had resulted in an increase in harvest tonnages and the quality of the nuts processed at the Paddock-based Mayo Macs processing plant.

**Right** Ryan Taylor, manager at DR Mattison Farms, shows the small macadamia nuts beginning to set on the trees.
“Every tree is pruned annually. And we are no longer pruning for a pretty Christmas tree shape. We are rather aiming to allow as much sunlight in as possible to increase yields,” Taylor said.

Pointing to heavy clusters of dark green fruit hanging in abundance on branches close to the trunks of the trees, he said it was clear the results speak for themselves. The trees are irrigated based on computer-linked continuous logging soil moisture probes.

“I can check on my phone or laptop any time of the day or week what the moisture content is in the orchards. Keeping the moisture content consistent together with proper nutrition programmes are critical for optimum harvests. We are also looking at drone technology now to improve our moisture content and tree maintenance,” Taylor said.

The Mattison family was one of the first in KwaZulu-Natal to plant Macadamia orchards as long ago as 1977.

“These older trees, according to Taylor, were mainly of the Beaumont variety which can be harvested as late as July and August.

“We have a wide variety of cultivars on the farm including 788, 816, A4, A16, 842, 772, 791, 741, 800, Nelmack 2, and Beaumont which is very good for cross pollination. The average age of our trees is about 15 years, although the development and planting of new orchards is ongoing. We are not planting any more Beaumonts as we find they are ready to harvest quite late in the season and we have this mad rush for about two months to get them all to the factory.”

In 2015, the Mattisons were the first macadamia nut farmers in South Africa to achieve a 50% sound kernel recovery from their mature orchards - not only record breaking in the domestic industry but considered a first worldwide!

Annually the unsound kernel produced is under 2%. The farms deliver the nuts to the Mayo factory during the harvesting season from mid-February to August. Pruning of the trees starts in April while the Beaumonts are pruned in August and September. The group employs about 200 seasonal and permanent staff.
Mayo Macs Technical Manager Andrew Sheard discusses pruning methods used in the orchards to increase light into the trees with the group’s farm manager, Ryan Taylor.

Top pest scouter on the farms Jace Chetty with a Delta Trap that uses pheromone lures to attract the male moths of the Macadamia Nut Borer and False Codling Moth insect species.

DR Mattison Group farm manager Ryan Taylor checks on DFM moisture content probes on the extensive macadamia nut producing operation on the KwaZulu-Natal south coast. Taylor says the probes are a “game changer” in hi-tech orchard management as not only have they resulted in better moisture control but are preventing over watering.

Mature and newly planted orchards on the DR Mattison Group farms on the KwaZulu-Natal south coast. South Africa’s crop is in huge demand globally with the entire crop being exported to mainly China, the USA and Europe.

The orchards are kept meticulously clean as part of the integrated pest programme although Taylor is now starting to adopt a new mulching programme to ensure a constant moisture and improved organic matter content over the macadamia feeder roots.
A vibrant hands-on management style plays a leading role in the success of KwaZulu-Natal’s largest macadamia nursery, T&T Agric, with qualified nurseryman and the company’s managing partner, Colin Rand saying attention to detail and a consistently transparent relationship with growers, was his success story.

Colin Rand moves fast, speaks fast and seems to think even faster! And his attention to detail in KwaZulu-Natal’s largest macadamia seedling nursery is not only making sure the operation runs like clockwork, but his passion and knowledge on each aspect of the development of the young trees is proving invaluable to the growing number of farmers who are planting the crop in the province.

A qualified horticulturalist and a trained nurseryman, Rand has a passion for his profession and encyclopaedic knowledge that rolls off his tongue at a rate of knots.

“Timing is everything. Also you have to constantly keep an eye on the growing trees. One mistake that causes a delay means our customers lose money. There is absolutely no room for error here,” Rand says.

The father of two who is also a managing partner at the T&T Agric facility said the operation was audited in December and was now a fully accredited nursery under the auspices of the Seedling Growers’ Association of South Africa (SGASA).

“All nurseries that were accredited by the South African Macadamia Growers’ Association (SAMAC) now have to be audited by SGASA as well and we are.”
The nursery, near Ifafa Beach on the KwaZulu-Natal South Coast, is the largest in the province and Rand now has his eye on growing the operation to be the biggest commercial macadamia tree nursery in the country. A vast sea of green seedlings spread under a haze of misty spray and shaded by acres of black cloth gleams with good health in the morning sun. “The trees will tell you, they will show you when they are stressed,” he says.

**KEEPING TRADE SECRETS CLOSE**

And while playing his cards close to his chest on some of his top trade secrets, Rand explains how the nursery mixes its own growing medium which is designed not only to get the trees off to a good start but to protect against pathogens and root diseases, bacteria and fungi.

“While studying art I had the most fabulous herb garden in Cape Town. I just have to grow plants wherever I am!”

Cutting short his art studies he enrolled for a horticulture course at the Cape Town Technikon before qualifying as a nurseryman. Then Rand said he “took a chance” on a job at a banana nursery, which was part of a community project at Levubu in Limpopo.

In 2010 he then moved to a local macadamia estate where he was trained as a junior farm manager. He started the first micro-grafting project in Limpopo before making his way to KwaZulu-Natal following a chance conversation over a braai fire while camping in the Kruger National Park.

**DIVERSIFICATION ON THE CARDS**

Now his plans include diversifying into citrus and avocado seedling production and to assist farmers to get permits to grow guavas as a cash crop alternative.

“We have obtained our permit and are trialling a high-density orchard, we also have a permit to produce and sell guava seedlings once an interested farmer has his permits in place. South African legislation requires that both growers and nurseries in KwaZulu-Natal apply for permits to grow guava seedlings as they are listed as a Category 3 invasive species in the province. Over 5 000 macadamia seedlings leave the nursery each month to fill orders from farmers who in some cases, have had to wait up to 15 months for their trees.”

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**Top**

Boniswa Phakathi and Zandile Nyaza carefully attend to the macadamia nut tree saplings at T&T Agric on the KwaZulu-Natal south coast. The nursery is the largest accredited and certified nursery of its kind in the province.

**Right**

Noxoliso Sigaga whose main task is to transplant the young trees from seedling trays into bags.
“We just can’t keep up with the demand. It is a long time to wait, but the farmers also have to have time to prepare their orchards. It can cost more than R100 000 a hectare to plant macadamia trees or R20 000 a hectare annually over 5 years, so the preparation of the soils and irrigation infrastructure ahead of time are critical.

“From our side there is no room for error because if the farmer has prepared his orchard, it is ready for planting and he has ordered his seedlings from us to be ready in accordance with his timetable, any delays mean loss of time and income both for us and the farmer. And I can tell you I don’t ever want to have to make that phone call to a farmer to say there is a delay.”

Currently the nursery houses 240 000 trees with another 10ha in a year-on-year phase-in process. The nurseryman has also manipulated the bag size the young trees are grown in to make optimum use of the space available in the nursery. “And then on top of all that we still have to make the place look pretty,” he said. The T&T Agric nursery employs about 45 workers who are mainly women. The seedlings take 30 months from the start of the growing process to being ready for delivery to the growers.

MACADAMIAS A GOOD NEWS STORY

The growth and success of South Africa’s macadamia nut industry is a good news story that seems to go largely unheralded. The country is the largest exporter of the nuts in the world, and the quality of the crop is of such a standard that the manufacturers of Haagen Daz ice cream, for example, will use only nuts grown here for their world famous desserts.

In 1996 there were one million producing trees in South Africa. That number increased to 6.5 million by 2016, spread over 21 500 ha of land mainly in Mpumalanga and KwaZulu-Natal. In 2017, the industry produced 42 000 tons in shell and 13 000 tons out of shell which were all exported.

Alex Whyte, who is the marketing manager for one of the largest producers of macadamia nuts, Green and Gold Nuts in Mpumalanga, says output is expected to double by 2020, particularly as more and more sugarcane farmers diversify their operations. Returns can reach up to R200 000 a hectare after costs. The trees produce a profitable yield every year and the return is on a much less intensive crop compared with sugar cane.
The trees must be pruned annually before they flower. The pruning is aimed to keep them at six metres in height making for easy harvesting access and to provide “windows” of light.

**TREES CAN BEAR FRUIT FOR YEARS**

In some cases, trees that were planted as long ago as 1969 in KwaZulu-Natal are still producing on an annual basis, although on average, Rand said they usually bear fruit for anything up to 15 years. Certain varieties, such as A4, which Rand describes as a “precocious” tree, can produce commercial yields in three years. Other popular varieties include 816, an upright and moderately dense tree with a very high percentage kernel recovery and Beaumont, a variety suitable for moderately dry subtropical areas. “We also grow 695, A16, 814, 849, 842, A36 and 863.”

And now the T&T Agric nursery has started exporting the seedlings as far afield as Zambia. “I can tell you the next macadamia nut production boom is going to happen in Mkushi in central Zambia and guess where they are buying all their seedlings from? South Africa!”

*Far Left* Nursery supervisor, Mhlengi Sibiya and one of the many women employed at the operation, Nelisiwe Tsibiyana carry a crate of saplings which are almost ready to fill the orders placed by farmers sometimes years in advance.

*Left* Simba Rankwara works with some macadamia nut saplings that have just been through the grafting process. Rankwara originally from Zimbabwe, has been working as a nurseryman in the industry since 2011. He first worked in Mpumalanga and moved to T&T Agriculture with the head of the seedling operation, Colin Rand.

*Below* Phuthuma Majola works with the tiny seedlings that are now ready for the grafting process.
Drought Drives Precise Planning

For Soil and Water on Oribi Nut Farm

Luke Dunstone and dad Eric, who run their family farm deep in the rural area of Oribi Flats just inland from Port Shepstone, say they are now on a massive drive to soil map their land and to up their game on precision water management systems in a bid to future proof their operation against drought.

“"In the driest years – 2015 and 2016 - our yields dropped from 187 tons to 120 tons of macadamias delivered to the factory in the harvesting season. The drought was a real eye opener for us,” Dunstone said.

For example, he said, they were able to identify which of the tree varieties coped better with less water.

"Over the years we have planted seven varieties which include 344, 788, 816, 842, Beaumonts and then the A varieties (A4 & A16) to spread the risk in the event of drought or a disease outbreak. The Beaumonts are hardy and coped quite well without optimum water and the 788s came back quickly after the drought. The 816s coped with the heat and sunburn but they struggled to come back when the rains eventually did come. We are learning new things about this industry every day and the drought was a critical lesson for us,” he said.

However, while the drought may have been a setback, plans to increase the land under production from 400ha to 1000ha or 140 000 trees in total by 2020, are well underway. The strategy is coupled with sophisticated irrigation infrastructure to ensure an adequate water supply regardless of any future drought on a farm where the soil is sandy with little clay content.

“At the moment we are drawing water from farm dams for irrigation, but we are also in the process of applying for water use licences for two dams planned to irrigate the new orchards. When completed the dams will give us an additional 500 000m$^{3}$. The water will be pumped into two reservoirs each with a capacity of 4 500m$^{3}$.”

Dunstone said he was optimistic the licences would be approved within the next two years.

Currently the trees are irrigated using micro-jets and 800mm Irricheck soil moisture probes have been installed in a number of orchards. “We have a study group of 12 farmers in this area and a number of us are using the Irricheck application. I can get onto my phone or laptop and check the moisture content of the soil across our orchards at any time.

That has been a real game changer for us. We can adjust our irrigation scheduling according to the feedback we get from the probes, resulting in more efficient water use and massive savings on water costs.”

In addition, making their own husk compost and growing up to 80 000 seedlings in their on-farm nursery, were strategies that would assist to make the operation sustainable into the future, Dunstone said.

“After the drought we pruned quite heavily and we really want to make sure we have good mulch under the trees all the year round - this is another strategy we have gained as a lesson from the drought. We do not remove any material from the orchards and create a natural mulch from the mulched leaves and branches and the husks. We have a big drive on at the moment to get that right. I also don’t believe it is sustainable for us to grow without having our own seedling nursery to draw on.”

Article & Images
Colleen Dardagan
Dunstone, who qualified as a BTech (civil engineer) at the Durban University of Technology (DUT) before returning to the land where he grew up, said while precision planning was now fundamental to the success and sustainability of the operation, the gift of “hands on” farming was something he had learned from his father, Eric.

“All soil health is absolutely critical if we want to harvest good quality nuts and have high yields. We have found that the sub-soil acidity was in a really bad state particularly in the sugarcane fields that we are converting to macadamia orchards. By 2020 we want the whole farm to have been converted to macadamias and essential oils,” he said.

Dunstone said interest in macadamia nut farming was also growing among the neighbouring rural communities. “The potential is really good to increase production of the nuts and it’s the type of farming that would really suit small scale farmers. So we are offering as much advice and support for anyone who asks for it. It is so important that we all help each other here as the existing small farmers were also badly affected by the drought,” he said.

“The potential is really good to increase production of the nuts and it’s the type of farming that would really suit small scale farmers. So we are offering as much advice and support for anyone who asks for it. It is so important that we all help each other here as the existing small farmers were also badly affected by the drought.”

- Luke Dunstone
THE IDEAL FULL COVERAGE IRRIGATION

WHAT IS FULL COVERAGE IRRIGATION?

Full Coverage Irrigation focuses on a holistic approach in managing the production environment in the most effective way, by enlarging the water-and nutrient reservoir. A large root area will maximize the absorption of ancillary rainfall. Irrigating the plant’s whole canopy and the roots around it, will give the grower/farmer superior agronomic control over the farming system. By implementing the Floppy Sprinkler full coverage irrigation system, the grower will optimize his Macadamia yield and maximize the return on his investment. The system can be automated, reducing labour significantly.

Why Full Coverage Irrigation?
There are multiple benefits by applying full coverage irrigation, these include:

**The total root area is irrigated** - Roots grow many meters wider than the tree’s drip line. Even small trees have a larger root area than expected. For this reason it is imperative to irrigate the total root area. Total root area irrigation promotes the development of a large and healthy root system that optimizes the plant’s water and nutrient intake, also when natural rain occurs. At the same time plants are also washed clean with each irrigation cycle for better photosynthesis.

![Image of tree root systems]

**Cooling** - Plant stress is reduced during periods of heat or flowering. Macadamia trees flourish in temperatures of between 25-30°C. When temperature during extremely hot days reaches 35°C and more, the stomata on the plant leaves close, and photosynthesis stops. This means that the plant stops growing and results in a loss of production. High temperatures during the flowering stage cause flowers to be weaned resulting in massive losses. Even nut growth and quality are affected by extreme temperatures. (Too high temperatures result in smaller kernel and produce less than 72% oil).

A unique benefit of the Floppy irrigation system is that plant cooling can easily be done to keep temperatures constant between 25 - 30°C.
Full coverage irrigation focuses on a holistic approach involving the production of water, the most efficient of all, delaying the rate and duration of irrigation. A large root area will enhance the absorption of rainfall. Irrigating the plant's whole top and the roots around it, will give the best/foreground support. By utilizing the Floppy Sprinkler full coverage irrigation system, the ground/foreground will optimize his Macadamia yield and enhance the aesthetic utility of his investment. The system is auto-watered, elevating labor significantly.

Why Full Coverage Irrigation?

There are multiple benefits by applying full coverage irrigation, these include:

The total root area is irrigated - Roots grow outside the tree's dip line. Every tree has a large root area expected. For this reason, it is imperative to irrigate the total root area. Total root area irrigation promotes the development of a large and healthy root system that optimizes the plant's uptake and the natural drought. At the same time, plants are also flashed with each irrigation cycle.

Cooling - Plant stress is reduced during periods of heat or flooding. Macadamia trees flourish in temperate settings of 5-20˚C. When temperatures during hot days are 5-8 °C above normal, the shoot water of the plant leaves decreases, and photosynthesis stops. This means that the plant stops growing and results in a loss of production. High temperatures during the flooding stage cause flooding to the leaves resulting in water losses. Similarly, high temperatures result in sallow keel and production less than 7%.

A unique benefit of the Floppy irrigation system is that plant cooling is easily done to keep temperatures constant 5-10˚C.

Micro-life, soil health and nutrition are stimulated - Mulching is the process of covering top soil with plant material such as grass, leaves, twigs, crop residues, straw etc. Decomposed mulch enhances the activity of soil organisms such as earthworms. It increases organic matter in the soil which improves soil structure and increases ventilation. It is well known that earthworms in the ground mean high potential soil. Mulch must be kept moist for decomposition, which is easily done with full coverage irrigation.

Application of fertilizers, foliar feeds and chemicals – Full coverage irrigation allows for application of chemicals, fertilizers and foliar feeds. The Floppy Sprinkler full coverage irrigation system is a solid set overhead system with a built-in flow controller in the sprinkler which ensures even application of fertilizer, foliar feed and pesticides through the system with ease and in a cost effective manner.

Salinity management - Salinity is the concentration of dissolved salts that can have a negative effect on plant root development. With a part coverage irrigation system salts are pushed to the outside of the wetted pattern. Full coverage irrigation can be used to deep leach salts below the active root zone.

A test was done to compare the effect of Full Coverage Irrigation versus Partial Coverage Irrigation on production and water consumption on young avocado trees. Different sprinklers were used. The results are demonstrated in the following graphs:

The test was done on young Avocado trees, different irrigation systems were used during this experiment. The graph shows a substantial increase in yield when irrigating the total root area, compared to part coverage irrigation. The Floppy Sprinkler used the least water per ton produced compared to the part coverage irrigation systems, because larger drops have very little evaporation.
Due to the long wait many farmers opt to plant trees at a reduced spacing to ensure a greater yield per hectare during the first ten years, and then the excessive trees are thinned out for optimal spacing. The discarded trees usually end up as firewood. But Shane Davies, a macadamia farmer in the Alkmaar area in Nelspruit has found a way to reduce this waste and ensure a faster return on investment for his newly established orchards.

Davies had a nine year old orchard due for thinning. Although it is common practice to simply chop down the extra trees, he wasn’t happy with the inefficiency of investing in trees that end up being productive for a fraction of their lifespan. He decided to experiment by carefully removing the mature trees and transplanting them into a new field. This would save him the expense of buying in new trees for his new orchard and would also keep the thinned out trees productive.

Above The replanted trees are painted white to protect the bark from sun damage. Most of the leaves are cut to encourage the tree to use its energy for root development.
COST BENEFITS

The cost benefit was further increased when Davies harvested a crop from the replanted trees far sooner than he would have had he planted new, two-year-old trees.

The trees were transplanted six years ago when they were nine years old. Within four years the new orchard already produced a yield of 4kg dry-nut-in-shell (DNIS) per tree. If Davies had planted two year old trees instead, he would have had to wait at least five years to get a crop and around seven years to achieve the 4kg DNIS crop he received from these trees. Today the yield is on par with the original trees of the same age on the farm.

Davies admits that the trees do lag behind the original orchard with the same aged trees in productivity but the benefit of replanting is still evident. “A normal four year old tree will give you about 5kg - 7kg DNIS, so you forfeit a bit on the yield on the replanted trees because they go into shock when replanted. But the outcome is still better because it reduces the waiting time for a crop by three years.”

The trees were initially planted at a five metre by five metre spacing. After nine years that space was increased to ten metres by five metres, resulting in 200 trees per hectare.

THE PROCESS

Every second tree in the orchard that needs to be removed is first marked with north and south markers. A basin is then created around the trees and they are thoroughly watered every day for two weeks. After that the tree is dug out using a mechanical tree spade and the taproot is cut off.

The tree is then carefully relocated to the new field. Here a deep hole is dug with water to remove the oxygen from the soil, so as not to overexpose the trees roots to oxygen. The tree is placed in the hole and then filled with sand. The relocated trees are watered twice a week for four to six weeks after which normal irrigation resumes.

Davies says that when the trees are replanted all foliage is removed to discourage the trees from producing a crop.

“The crop is dependent on the foliage so it is a gamble how much foliage to leave on the tree. You want the tree to focus its energy on establishing itself and creating a strong root system, before it starts being productive. For this reason I don’t boost the fertiliser either and only after six months do I start with the normal fertiliser cycle. After that I leave the leaves to grow out normally.”

Because the foliage is removed it is important to protect the bark from sun damage, since the trees were shielded from the sun previously. Shane paints the bark of the trees with regular white PVA paint. Added into the paint is the fungicide Aliette that protects the tree from fungi and root diseases.

Davies achieved a remarkable success rate with the relocated trees. On 2,5 hectares only twelve trees did not survive the transplant. “It has turned out to be a very successful and profitable experiment. Everything was trial and error. I don’t know what the maximum age is that one can replant a tree and we are still working out the correct ratio of foliage to leave on the trees when we replant. But I am very happy with the results and my crop in the new orchard has come in a lot quicker than if I had followed the traditional route,” Shane said.

Above In contrast to the replanted trees, a newly established orchard will take three years longer to produce a crop.
Macadamia mother-material ensuring high yield potential after 45 years of propagation experience

Sweet Dragon Fruit cultivars for an exciting new market

Avocado seedlings available for the 2018/2019 planting season
As thousands of hectares along South Africa’s eastern seaboard are converted from sugarcane fields to macadamia nut orchards, applications for water use licences are on the increase.

Farmers are having to apply for environmental authorisation and water use licences to guarantee that their water storage facilities for irrigation purposes comply with the National Environmental Management Act (Act 107 of 1998), and the National Water Act (Act 36 of 1998).

According to the South African Macadamia Growers’ Association, a hectare of mature macadamia trees, from about seven years and older, requires about 9 500m³ of water a year or between 40 and 120 litres of water for a tree a day and between 13 000 litres and 37 000 litres per hectare per day, depending on the cultivar and the time of the year.

Water demand increases in August and September when most of the cultivars flower and the macadamia nuts set.

The need for a Water Use Licence is linked to activities listed under Section 21 of the National Water Act, where a user, in this case a farmer, wants to take water from a river for storage or irrigation. And where the proposed development is expected to hinder and divert the flow by altering the bed, banks, course or characteristics of a watercourse.

The entire dam process is subject to the issuing of a Water Use Licence, and an Environmental authorisation, thus the specific requirements of two adjudicating authorities have to be met.

Steven Whitaker of the environmental services consulting company EnviroEdge says the number of applications for the requisite environmental authorisation and for water use licences in the macadamia industry has increased significantly since 2015.

“Any dam has to be approved after considering all biophysical, economic and social impacts, and to comply with the objectives of sustainable development. It is really important to understand that the EIA is a process and for it to be effective it must be allowed to run its course.”

- Steve Whitaker
“In particular we have seen applications increase on the KwaZulu-Natal north coast. At the moment we are working on four new applications. This is a fairly new agricultural shift here in KwaZulu-Natal and it is increasing. Most of the growers we are working with will use either drip irrigation or micro jets with modular moisture measurement applications once the orchards are developed,” Whitaker said.

He said the applications were mainly from sugarcane growers who were replacing their cane fields with macadamia nut orchards and the need for the Environmental Impact Assessments (EIA), for most of the farmers, was generally to increase the size of existing water storage facilities (dams) or create new dams for irrigation.

“The need for an Environmental Impact Assessment (EIA) for water storage facilities is the result of triggered listed activities under Environmental Impact Assessment Regulations 2014, (as amended 2017), under the National Environmental Management Act. Depending on the nature and scale of the development the water storage facility may require either a Basic Assessment or a full Environmental Impact Assessment,” he said.

LEGISLATION TRIGGERS

In the legislation Whitaker said, the main “triggered” listed activities included the development of dams, weirs or infrastructure and where the water surface area exceeded 100m² or where infrastructure or structures with a physical footprint of 100m² or more are in a watercourse, in front of a development setback, or, if no development setback exists, within 32m of a watercourse, measured from the edge of a watercourse.

Also if the infilling or depositing of any material of more than 10m³ into a watercourse, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10m³ are removed from a watercourse. Further the legislation states, “triggered” listed activities would include the expansion of infrastructure or structures where the physical footprint is expanded by 100m² or more, or where the dam or weir, including infrastructure and water surface area, is expanded by 100m² or more and where such expansion occurs within a watercourse, in front of a development setback, or if no development setback exists, within 32m of a watercourse, measured from the edge of a watercourse.

And finally, the development of a dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5m or higher, or where the high-water mark of the dam covers an area of 10ha or more.

“For a new dam for example, if the surface area of the water is greater than 100m², or if an existing dam wall needs to be heightened and the water surface area is increased by 100m², then a Basic Assessment is required. If a dam is proposed with a dam wall height of greater than 5m or with a surface area of greater than 10ha a full EIA is then necessary,” Whitaker said.

GETTING INVOLVED FROM THE GROUND UP

EnviroEdge is currently working with a full suite of specialist engineers and scientists for the necessary specialist studies, and Whitaker says his work has meant getting involved with the macadamia nut orchard conversions from the ground up.

“Our point of departure on these projects is to carry out desktop and field investigations, and then a specialist team will determine the required specifications of the dam with the aid of reservoir simulation. This assessment also gives us clarity on what type of EIA the dam will need. Once that is done, the existing or proposed storage dam can be classified as a level one, two or three by the Department of Water and Sanitation.”

If all runs smoothly Whitaker said the process should take no longer than 12 to 13 months including the mandatory commentary period required in both the Basic Assessment and EIA process.

This assessment he said identified anticipated impacts and how to apply mitigation measures.

A Basic Assessment, he said, would cost about R80 000. Also during the Basic Assessment or EIA process, the authorities may require specialist studies such as geotechnical studies, wetland assessment, terrestrial and aquatic ecological assessment.

“I always suggest to farmers not to focus on only one specific or preferred option because once the EIA process gets underway the experts might find that the site for the dam is not ideal. It is an integral part of the EIA process that feasible alternatives must be assessed. That means any reports must consider alternative options. Any dam has to be approved after considering all biophysical, economic and social impacts, and to comply with the objectives of sustainable development. It is really important to understand that the EIA is a process and for it to be effective it must be allowed to run its course,” he said.

If there were significant impacts associated with the development of the dam, Whitaker said these should firstly be avoided if possible. And if these impacts were unavoidable then mitigation plans needed to be developed and implemented.

“For example if there are fish species that will be impacted by the proposed dam wall, then the project application must respond to this issue and illustrate how it will be mitigated, through the inclusion of a fish ladder for migration purposes, or to alternatively look at another site, if it is not possible to mitigate effectively.”

The engineer or hydrologist, Whitaker said, would also assess whether or not the water in the upper catchment of the dam would be sufficient. If not, a supplementary water supply would need to be considered. Once the overall design is done the integrated water use licence process could commence.

“This usually runs in parallel with the EIA,” he said.
In the lead up to the harvesting season, Mayo Macs Technical Manager Andrew Sheard says through February and March farmers should be focused on orchard floor clean up and harvest equipment maintenance, maturity testing and stink bug control.
**ORCHARD HYGIENE SHOULD INCLUDE:**

- Making sure the orchard floor is cleared of old and immature nuts to make sure they are not mixed up with the current season’s early nut drop.

- Leaves should not be removed from under Beaumont trees earmarked for Ethapon spray.

- A rotary or a sicklebar mower should be used to mow grass under the canopy in bearing orchards as the presence of weeds will severely hamper harvesting.

- Registered herbicides should be used to burn back weeds under bearing trees.

Maintenance of harvest equipment means making sure all the dehusking and drying equipment is in working order and replacing any worn or damaged dehusking chains, while a set of spare chains should be on hand in case of break downs.

Sheard said all on-farm drying facilities should be cleaned and checked to ensure they were in good working condition and able to handle projected peak harvest volumes.

“Producers must be confident they have at least 30%-on-farm storage facilities for the total projected harvest and to provide adequate reaping containers, while drying bins must be able to dry the nuts to at least 10% moisture content,” he said.

On the maturity testing of the nuts, Sheard said producers should carry out proper kernel maturity tests before stripping early cultivars, particularly on Beaumonts which did not drop their nuts.

The brown colour under the husk is just one indicator of kernel maturity and a proper maturity test should be done using a sample of 50 to 100 randomly picked nuts per block of trees, he said.

“Dehusk the nuts and dry them in an oven set at 50°C or microwave the nuts in a 700 to 800 watt oven for about 16 minutes. Dry in three-minute increments and place a 300ml jug of water in the microwave until the kernel moisture content is more than 1.5%. Then, manually crack the nuts and place the kernels in a bowl of water. If more than 95% of the kernels float, the crop is mature and should be harvested within six weeks.”

Sheard said hybrid cultivars such as Beaumonts, Nel 2, A4 and A16 however, had a lower oil content than Integs and would as a result have a lower percentage floating kernel when mature. Also, the internal husk colour of the Nel 2 did not turn completely brown like other cultivars at maturity.

**FERTILISE AS A PERCENTAGE OF THE ANNUAL REQUIREMENT**

He said only nitrogen – about 5 to 10% of the annual requirement – should have been applied to the late cultivars in early February, while the application of potassium – about 10 to 15% of the annual requirement - could be applied at the same time to the late cultivars. NPK could also be applied as a blend to late cultivars early in the month but the annual nitrogen portion should not exceed 10%, so using a high K (potassium) to N (nitrogen) ratio blend was preferable.

**BURN BACK WEEDS**

Contact herbicides such as Basta/Nirvana/Bound, Gramoxone/Paraquat and Preeglone/Parody for example should be used to control weeds around the base of the young trees while these and other registered herbicides should also be used to burn down weeds under the bearing trees, Sheard said.

**SOIL MOISTURE**

In a normal season the requirement for water would start to decrease starting in February, however if drought conditions continued to persist in some areas, Sheard recommended growers monitor soil moisture levels remain in their normal range and maintain correct levels. This was to make sure that soil moisture levels remained within the “norms”.

**STAY AHEAD OF PESTS WITH SCOUTING**

Sheard said while scouting reports had shown low stink bug levels generally, he said two-spotted bug numbers may rise rapidly and late damage levels could be significant if not controlled timeously.

“Scout weekly and also monitor after an orchard spray because stink bugs can continue to damage nuts right up until harvest. It is not advisable to go longer than six weeks without spraying, however it is critically important that farmers heed the registered insecticide withholding periods,” he said.

Levels of False Codling Moth and the Macadamia Nut Borer were particularly bad this season. As a result Sheard said farmers should check their orchards regularly for unseasonal nut drop while continuously monitoring Yellow Delta traps weekly because the threat from borers decreases as the shells harden, any damage would increase the incidences of nut drop and kernel immaturity.

“We urge farmers to estimate borer damage in the orchard and at the sorting table as a measure to help with planning for the next growing season. We also advise farmers to continue scouting for stink bug and borer through the season as a precautionary measure to keep ahead of pest infestation in the orchards,” he said.
Our specialists consult on at least fifty Macadamia farms, covering more than 600 soil moisture probes in the Lowveld, S. Coast and N. Coast of KZN using their award winning and proprietary irrigation scheduling software and android and iOS app, IrriCheck Pulse™.

IrriCheck believes that, to provide the most accurate irrigation scheduling services to Macadamia farmers, there needs to be other technologies coupled to scheduling software to assist in understanding the holistic farm environment when it comes to soil moisture management.

In addition to scheduling software requiring professional set-up and continued maintenance by specialists in the field in accordance with crop phenology, crop age, root depth and soils, and the scheduling software at least measuring evapotranspiration under non-standard conditions, reference evapotranspiration from live, forecast, weather data and crop factors or the crop coefficient to provide 7-day live irrigation recommendations in mm, cubic meters or hours, other technologies need to interface directly with the irrigation scheduling software, such as:

**SATELLITE TECHNOLOGY**
Aimed specifically at moisture management and identifying other areas of potential moisture stress not covered by the probe. Satellite imagery overlays directly with the soil moisture probes in the IrriCheck Pulse™ platform, identifying areas of relative difference for further investigation or probe placement.

**DRONE IMAGERY**
Also overlaying directly with the soil moisture probes on the IrriCheck Pulse™ scheduling platform, drone imagery is used for higher value crops such as Macadamias where a better resolution is required.

**RELIABLE AUTOMATIC WEATHER STATIONS THAT FORECAST USING YOUR ON-FARM DATA**
IrriCheck supply and install weather stations that not only give you a ten-day weather forecast specific to your farm, spray conditions, frost warnings and disease modeling particular to the Macadamia industry (among other features), they also feed directly into the IrriCheck Pulse™ irrigation scheduling system for better and more accurate 7-day forecasted irrigation recommendations, utilizing farm-specific reference evapotranspiration rates.

**AUTOMATIC ELECTRONIC RAIN GAUGES (TELEMETRY UNIT DEPENDENT)**
Very competitively priced and available for clients looking for an immediate on-farm rainfall record automatically. The data is stored and available on the scheduling software platform and android and iOS app’s.

**AUTOMATIC IN-LINE FLOW METERS (TELEMETRY UNIT DEPENDENT)**
- Primarily for the micro and drip irrigation systems.
- Flow meters come in various sizes and assist in knowing exactly how many cubes flowed to a block/ micro/ dripper. This avoids any problems with blocked micros/ drippers at the probe or weeds/ other items blocking the path between the micro/ dripper to the probe, and therefore the probe not picking up on an irrigation.
- In-line flow meters are therefore also able to measure water used per season per block.

**If your scheduling system is not doing all this, contact us for a quote, we work with all types of soil moisture probes and telemetry units.**

For more information, please contact your nearest IrriCheck Specialist or contact the Office at 021 300 0425 or e-mail info@irrichck.co.za
WHAT MAKES THE FLOPPY SPRINKLER UNIQUE?

ENGINEERED FOR PERFORMANCE

WATER SAVING
The Floppy Sprinkler cuts the water into uniform droplets, with no mist formation. The South African Water Research Commission confirmed efficiencies of 89% from a 4 meter height.

ENERGY SAVING
Due to low operating pressure and water saving, substantial energy saving is possible.

LABOUR SAVING
The system can be automated and large areas can be managed easily. No need to walk the sprinklers to unblock or replace.

MAINTENANCE SAVING
The system has NO moving or wearing parts and therefore requires little maintenance.

FLOW CONTROL
The Floppy sprinkler has a built-in flow controller. This ensures super accurate irrigation even on slopes and steep gradients. Flow rate is within 4% band from 2 to 6 bar.

INCREASE IN YIELD
With this solid set system, irrigation can be scheduled more frequently, maximising yields with lower water used per ton.

WWW.FLOPPYSPRINKLER.COM
DON’T LET THE MIDDLE MAN BUILD AN EMPIRE ON THE BACK OF YOUR HARD WORK!

Become a shareholder in the value chain and avoid the trap of selling your nuts at the farm gate.

Mayo Macs delivers the very best to farmers in price, processor expertise, sustainability, and extension services.

Become a shareholder of Mayo Macs today and own an exciting future in Macadamias.

Contact Mayo Macs today!