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Welcome to the spring edition of SA Farmer.

WELCOME to the spring 2022 edition of the SA Farmer publication by Taylor Group Media.

A wide range of Riverland, Lower North and Mallee primary producers have shared their stories with our team of journalists, with the latest developments, challenges and outlooks showcased for this time of year.

This spring edition begins with a look at Riverland winemakers Angove's alternative route of organic wines, sustainability and profitability, followed by details for a blackspot program aiming to increase connectivity for South Australian grain growers.

We also take a look at

South Australia's llama market reigning supreme in the Barossa, a Loxton-based business growing and selling unique crops for the region, a Gawler South green oasis, an award-winning winemaker's approach to the 'slow food' movement and an avocado grower having a go at online fame.

As always, journalist Hugh Schuitemaker has made the rounds to put together industry updates from experts in almonds, canola farming, wine grapes and citrus.

Our regular ag news section continues to grow, and showcases what is happening at a state and federal level with various opportunities

for growers, plus the latest in technologies and harvest reports.

Featured news for this edition includes a new brewing project for SA grain growers, research into the effects of delaying grape ripening, harvesting jobs available across the state and new herbicide research.

The ability to grow this publication is made possible by our devoted readers, advertising supporters and primary producers willing to share their stories with us.

The team at Taylor Group Media hopes you enjoy this edition of SA Farmer and, until the next edition, keep updated online using the SA Farmer website: www.safarmer.com.au.

The SA Farmer team

Cover Photo: Kayla Den Hollander

Hutton Vale's Caitlin Angas shows off awardwinning chutney and wine among winter greens.

SA Farmer

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Publisher



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just vine



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WORDS & PHOTOGRAPHY BEN LENNON

IN a field where mass production is king, one Riverland winemaker has gone down an alternative route and has been reaping the rewards on multiple fronts.

Angove Family Winemakers' Riverland cellar door sits just off the Sturt Highway in Renmark South and is home to a large number of employees, one of whom is Renmark local Paul Kernich (pictured).

Mr Kernich is a senior winemaker with Angove and has overseen plenty of change in his time with the fifth-generation familyowned company, including a shift towards the production of organic wine in the name of both sustainability and profitability.

The shift means the company has zigged where others have zagged, opting against going down the mass-production, low-price route.

"We have been on a path to convert our vineyards to organic production for a long time now," he said.

"In organic production we don't use any synthetic pesticides, herbicides or fertilisers, and it assists in vineyard biodiversity and tends to leave the soil in better shape than when you start the process.

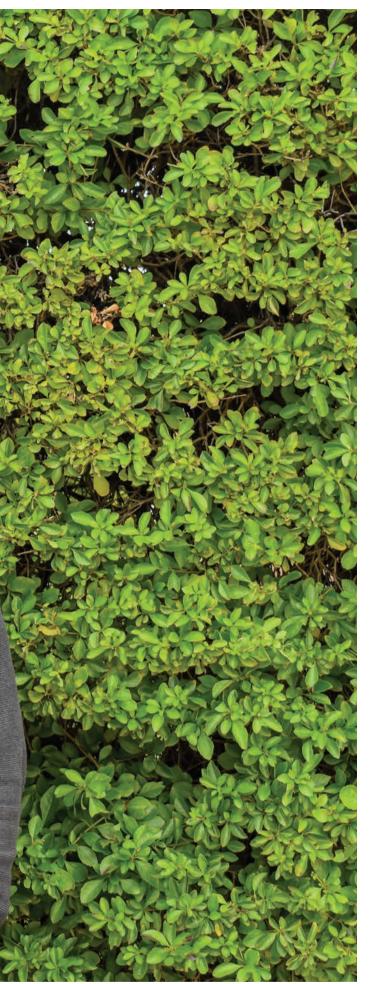
"The vines tend to be lower yielding, better

quality and also have better resilience in trickier growing years.

"Organic wine also commands a better price point than conventional wine and that helps sustain our business."

The decision to produce higher-priced organic wine has been profitable for Angove, but is not the only way the company has been able to offset its environmental impact.

Mr Kernich detailed a number of changes the company has made to how it works behind the scenes, from impressively engineered equipment to avoiding paper usage.





He and the company believe that producing goods in an environmentally-friendly manner coming at a higher price is a common misconception.

"When you are looking to change or update a process, if you keep sustainability in mind often a solution will arise that is as effective and more energy efficient," he said.

"For example, when we looked at cooling in the warehouse, we took advantage of the cool nights that we tend to have here in the Riverland.

"To cool that area, it was a case of having a sensor and a fan to operate when the temperature is cooler outside. It is cheaper to install and run than air conditioning, but does an excellent job.

"When we built our barrel shed to house our premium wines, we chose to put in a series of modern evaporative air conditioners to cool it rather than traditional refrigerative cooling and a humidifier. When we built our barrel shed to house our premium wines, we chose to put in a series of modern evaporative air conditioners to cool it rather than traditional refrigerative cooling

and a humidifier

CONTINUED ON PAGE 6

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"Generally in the Riverland we have low humidity, so good, modern evaporative systems are effective at cooling and the energy usage is much less than running compressors."

Away from the vines, the company has added whiskey to its repertoire, along with its already successful range of brandy.

But, for Mr Kernich, the next few months represent a chance to continue working on new things in the wine sphere, while also having a look at what the competition has to offer.

"The Riverland Wine show is coming

up in September, where all the local producers have their wines compared and critiqued by experienced wine show judges from around the country," he said.

"It is run by local volunteers, myself included, and it is great to see the wines our competitors have been making.

"I'm also looking forward to doing some show judging myself, at the Limestone Coast wine show in October.

"This year I have also been playing with a grape variety I haven't had much to do with in the past; an Italian variety called nebbiolo, and I am enjoying watching it evolve in-barrel, still on grape skins."

The Riverland Wine show is coming up in September, where all the local producers have their wines compared and critiqued by experienced wine show judges from around the country...



Angove's Naturalis Organic Wine was awarded Best Beverage Product of the Year at the Naturally Good Awards gala dinner last June in Sydney. Pictured accepting the award is Angove director of sales and marketing Tim Boydell, alongside Nikki Ford, CEO of Australian Organic. PHOTO: Facebook Trinity College

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Locals' opportunity for blackspot pilot project

WORDS JACK HUDSON

LOCAL grain growers have the opportunity to apply for a blackspot pilot program between Grain Producers SA (GPSA) and AgTech connectivity provider Zetifi.

The connectivity pilot project, funded through AgriFutures Australia's Producer Technology Uptake Program, is seeking three grain producers who farm in mobile and internet blackspots to trial Zetifi's long-range connectivity technology.

GPSA chief executive officer Brad Perry is calling on grain producers in areas of poor connectivity to express interest in taking part in the pilot program.

"The biggest barrier to the adoption of technology on-farm is the lack of connectivity in many cropping regions across South Australia," Mr Perry said.

"Without reliable connectivity it is challenging to undertake precision agriculture, remote monitoring, use autonomous machinery and advanced data analytics, to name a few.



It's great to have a lot of their technology piloted in South Australia. We're trying to find big areas that will have benefit.

"This will be a first-of-its-kind project in South Australia that will pilot last-mile connectivity for vehicles and machinery on farms."

Mr Perry said connectivity had grown into a substantial issue among grain growers across the



"We decided to do this because connectivity is a huge issue for the grain industry in South Australia," he said

"There's blackspots everywhere with connectivity and reception with internet.

"You need good, reliable connectivity to run your grain business in this day and age.

"It's important that GPSA provides opportunities for different solutions to address the connectivity issues."

Mr Perry added the opportunity to work alongside Zetifi was significant for GPSA.

"We are excited about the opportunity to team up with AgTech business Zetifi to install its cell and rover technology on three South Australian grain producers' properties to extend phone and internet coverage as a solution for blackspots and on-farm connectivity," he said.

"Zetifi has its technology in different parts of Australia and some globally, and they haven't done a lot of work here.

"It's great to have a lot of their technology piloted in South Australia.

"We're trying to find big areas that will have benefit.

"They are devices that can go on a home or sit on the back of a ute or tractor and extend the signal for those out on the farm."

Mr Perry confirmed GPSA only wanted a certain

amount of expressions of interest.

"We're only seeking three and we've had a lot more than three at the moment; it's been a good response," he said.

"We're really excited to get the project under way and getting the product out onto their properties."

Zetifi chief executive officer Dan Winson also said he's looking forward to working with GPSA and applying the businesses' connectivity solutions to South Australian grain farms.

"We're really grateful to Brad and the team at GPSA for the initiative they've shown in creating this opportunity for South Australian farmers," Mr Winson said.

"Our unique approach to on-farm connectivity was developed with regular input from grain growers around our base in Wagga Wagga, so we know that this setting is well suited to our products and we're excited to be able to showcase the benefits they provide as part of this project."

AgriFutures Australia innovation manager Ulicia Raufers said the third round of the Producer Technology Uptake Program had enabled a further 28 producer groups and networks to design bespoke projects to increase AgTech adoption on-farm and on-boat.

Expressions of interest to participate in the pilot program are being sought from SA grain producers and can be made by emailing: (office@grainproducers.com.au).

safarmer.com.au







Semmlers reign supreme in SA's llama market

WORDS & PHOTOGRAPHY BIANCA IOVINO

PAINTED Pines Llamas at Lyndoch has had a strong lineage in the Barossa Valley and agricultural industry for over a century, and now breeds an esteemed array of llamas.

The Semmler family established the site as a dairy farm over 100 years ago and was one of the first groups of German immigrants to settle in the Barossa Valley.

Now, great-granddaughter and co-owner Mel Semmler is the biggest breeder of llamas in the state, while helping her family uphold other business endeavours like livestock breeding and continuing to maintain the dairy.

Painted Pines, run by Ms Semmler and her family, raises both medium-wool and Suri llamas in a range of colours and markings, available to be hired and accompanied by her for events like parties and weddings. They are sometimes for sale to appropriate homes.

Ms Semmler conducts tours of her family's expansive farm and the plethora of animals that live there to showcase the day-to-day of farm life and give city folk a better understanding of agriculture.

She bred and trained alpacas for over two decades, but noted llamas were much easier to wrangle despite their similarities.

Now, Ms Semmler keeps a handful of alpacas with her llamas to show people the differences between the species.

"Normally, you can't get near an alpaca because they're antisocial like a cat, whereas llamas are more like a dog, they're loyal and make great pets," she said.

"You can train llamas to go camping and put all your camping gear on them, they can pull carts, little kids can ride them, and you can even train them to sit down in your station wagon."

Ms Semmer described llamas as having long banana-shaped ears, a straight back and an upright tail. But an alpaca has small, pointed ears, often a fringe of hair covering its eyes, a rounded back and a tail that tucks under.

Both species originate from Peru and Argentina in South America and live for up to 30 years, like a horse, but alpacas grow to about 70kg, while llamas can grow up to 6ft 5' and weigh in at 200kg.

Both also have the infamous ability to spit as a defence mechanism, with a llama being able to do so up to 2m, but Ms Semmler said alpacas spat more often due to their stand-offish nature.

"Alpacas will spit at you if you just look at them, it's their only form of defence because they don't bite

and they can't kick properly," she said.

"They will spit at each other over food and pregnant females will spit at males to ward them off.

"Food that is spat on will not be eaten by the others. They're very fussy."

Llamas and alpacas live among other common farm animals at Painted Pines such as goats, rams, sheep, cows and bulls.

In 1847, Johann and Anna Semmler arrived in the Barossa from Bremen, Germany, along with a substantial number of such immigrants who were the first settlers in the area.

They joined local congregations, and established the Lutheran settlement Hoffnungsthal at St Jakobi, Lyndoch and Rowland Flat in the mid-1850s.

The family gradually acquired more land, including the surrounding vineyards and 80 acres of hill behind the farm

Sheep roam the hill, keeping the grass down, and can wander into the vineyards to give birth to their lambs.

In the past few years, the Semmlers have ventured into the market of selling beef cattle, breeding Wagyu and Hereford cows that are sold at markets or to butchers for commercial consumption.







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National Australian Almond Conference is back

THE Australian Almond Conference – hosted by the Almond Board of Australia (ABA) – is officially back, after a lengthy hiatus due to Covid-19.

South Australian almond growers throughout the Riverland, Mallee, and Gawler area are encouraged to attend the conference, which normally takes place every second year.

However, the 2022 event – held at the Adelaide Convention Centre from October 10 to 12 – will be the first since 2018.

Attendees will have the opportunity to listen to industry experts, such as Californians David 'The Almond Doctor' Doll and Patrick Brown on how to do more with less as input costs go through the roof

The focus of the conference will be helping growers be as profitable as possible.

The latest research findings on a range of topics will be discussed, including:

- □ Hullrot
- □ Dieback
- ☐ Carpophilus beetle
- Carob moth
- ☐ On-farm drying
- □ Nutritions
- Water market strategies
- Pollination

Despite the challenges of a global pandemic, Australian almonds have evolved into a powerhouse industry that



has attracted significant investment from off-shore investors.

The ABA, in conjunction with Hort Innovation, has almost 30 research and development programs dedicated to addressing key issues on-farm, doing more with less, and promoting the benefits of consuming a handful of almonds every day.

The aim of the Conference in 2022

– titled 'Growing Together' – will be bringing together as many stakeholders as possible by delivering a conference program that educates, facilitates, collaborates and celebrates a wide range of issues from farm gate to plate.

A new interactive program that will provide growers with greater access to expert speakers than ever before is being prepared.

There will be a number of new innovations including an alternative Spouses Program that promises an alternative conference experience beyond the Adelaide Convention Centre.

The event will also celebrate those who have contributed significantly to the industry and come together to launch an industry-wide mental health support network that will be a first for horticulture in Australia.

Almond growers are encouraged to renew their ABA membership for the current financial year by visiting (www. australianalmonds.com.au/industry/annual-memberships).

Current members will be eligible for a discounted price for a conference ticket by visiting (www.australianalmonds.com. au/events/events-growing-together-2022-australian-almond-conference).



Conference hosts The Almond Doctor

THE 2022 Australian Almond Conference will feature a presentation from David 'The Almond Doctor' Doll (pictured), who is a renowned expert in all things almond production and research.

Mr Doll has built a comprehensive online resource for almond growers where they can share different almond and tree nut farming opinions and practices.

On his website over the past 11 years, articles have been posted regularly and included content about diseases, nutrition, irrigation, and insect management.

These have ranged from introduction and explanation of horticultural concepts to specific descriptions and management strategies of a problems.

Mr Doll will bring his expertise to Australian shores when he speaks about his extensive background in the industry at the conference.



Attendees will have the opportunity to listen to industry experts, such as Californians David 'The Almond Doctor' Doll and Patrick Brown on how to do more with less as input costs go through the roof.



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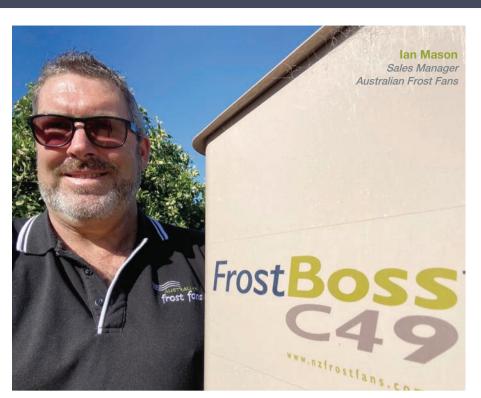


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AGNEWS

Search for next gen agriculture leaders



labour shortage, school leavers have helped keep the agriculture supply chain farmers need and to help innovate afloat through a gap year program.

The National Farmers Federation's (NFF) AgCAREERSTART program saw more than 300 people in the first year apply to be placed with farmers across the country in multiple industries including grain, livestock, horticulture and dairy.

The hunt is on again to find the next generation of agriculture leaders to apply for the 12-month **AgCAREERSTART program.**

People aged 18 to 25 looking to start a career in the agriculture industry are encouraged to apply to live in an exciting regional location, earn a nationally recognised qualification and

NFF CEO Tony Mahar said the program had seen school leavers learn new skills while assisting farmers to fill critical labour gaps.

"The impact of Australia's current labour shortage is already being felt by farmers across the country, with an estimated \$22m in crop losses having already been reported," Mr Mahar said.

"The AgCAREERSTART program is a

AS Australia struggles with a national new way of building a skilled workforce to complement the in-demand skills industry practices.

> The partnerships forged in round one of AgCAREERSTART have been a huge success for farmers and students alike, with students learning about farm data capture and mapping, and operating state-of-the-art machinery.

"Many of the participants are moving out of home for the first time and learning essential life skills such as cooking, communication and problemsolving skills, as well as undertaking training that will help in their future careers such as obtaining a first aid certificate, truck licence or forklift

Participants are employed under award wages on qualified farms, receive safety training and relocation assistance, and have the opportunity to join the farm after the completion of the

Applications for both farmer hosts and participants are now open and will close on October 18. Placements will commence in January 2023.

For more information, or to register interest visit (agcareerstart.com.au).



Rural Aid assistance for bee industry

SOUTH Australians are being encouraged to 'buy a bee' in the wake of the interstate varroa mite outbreaks.

The Buy a Bee campaign - developed by Rural Aid and supported by the Australian Honey Bee Industry Council (AHBIC) - aims to fundraise for beekeepers under the HiveAid umbrella.

Rural Aid CEO John Warlters said the varroa mite situation was both volatile and distressing for beekeepers across the

"The public is encouraged to show their support for Australia's littlest livestock by donating to Rural Aid's Buy a Bee initiative," Mr Warlters said.

"Rural Aid has been supporting beekeepers for years, through its HiveAid program, created during the Black Summer bushfires in partnership with AHBIC and Hive + Wellness, the nation's largest honey packer...

"The new Buy a Bee campaign... will assist these same beekeepers as they take on the varroa mite."

Rural Aid offers beekeepers and their families free counselling through its nation-wide team of qualified professionals.

"The DPI has identified mental health strain as the biggest issue currently facing these primary producers," Mr Warlters said.

"Rural Aid is proud to be able to offer beekeepers immediate assistance in this

AHBIC chairman Stephen Targett said without urgent support, some beekeepers would "struggle to survive financially".

"The contribution of honey bees to agriculture in Australia through pollination services is estimated at up to \$20 billion," Mr Targett said.

"We are calling on the public to back our beekeepers now, not just for their sake, but for the sake of Australia's entire agricultural and food production industries."

Donations can be made by visiting the Rural Aid website (ruralaid.org.au/

Beekeepers not already registered with Rural Aid are encouraged to do so by visiting (faa.ruralaid.org.au).

SA Farmer



New herbicide research may provide major boost for farmers

RESEARCHERS from Adelaide and La Trobe universities have discovered a way to potentially stop weeds dead in their tracks in a "potential game-changer" for agriculture.

Weeds have developed resistance to many existing herbicides, resulting in them being uncontrollable and costing Australian farmers more than \$5bn annually.

"We have identified herbicidal compounds that work by blocking the production of the amino acid lysine, which is essential for weed growth," said lead researcher, Dr Tatiana Soares da Costa, of the University of Adelaide's Waite Research Institute.

"This has the potential to be a gamechanger for the agriculture sector, given the lack of new herbicides that have entered the market in the past 30 years."

Dr Soares da Costa said the compounds target two steps in lysine production in weeds that could lead to the development of multi-target herbicides for the first time.

"A multi-target herbicide could make it more difficult for weeds to evolve resistance, helping to prolong the efficacy of existing herbicides and improving crop quality and yield," she said. "The development of new herbicides, especially multi-target herbicides, is a high priority to combat weeds that are resistant to herbicides.

"This research is particularly significant to Australia, where herbicide-resistant weeds have invaded more than 40 per cent of cropping land, resulting in a cost to farmers of more than \$5 billion per year.

"This work will directly impact farmers by giving them the tools they need to overcome weeds and improve the quality and yields of crops.

"The next steps for this work will involve large-scale field trials and toxicology screening to ensure they are effective and safe to use."

The Soares da Costa group is working towards new and safe herbicides that can slow down resistance development to be introduced to the market.

The research has been published in eLife Sciences (https://elifesciences. org/articles/78235), titled 'A duel target herbicidal inhibitor of lysine biosynthesis'.

Funding for this research was provided by the Australian Research Council through a Discovery Early Career Researcher Awards Fellowship to Dr Soares da Costa.

Straightening out kinky roots avoids drought stress



A NEW gene in barley and wheat that controls the angle of root growth in soil was recently discovered by researchers.

The discovery opens the door to new cereal varieties with deeper roots that are less susceptible to drought and nutrient stress.

"The angle at which barley roots grow down into the soil enables them to capture water and nutrients from different soil layers," said joint first author on the study Dr Haoyu (Mia) Lou, from the University of Adelaide's School of Agriculture, Food and Wine.

"Shallow roots enable plants to capture phosphate and surface water, while deeper, straighter roots can stabilise yield by accessing deeper water and nitrate; they can also bury carbon deeper in the soil."

Researchers at the University of Adelaide worked alongside scientists from the UK, Italy, Germany and the USA to identify the new gene called Enhanced Gravitropism 1 (EGT1) in barley.

"Remarkably, the roots behave as if they are overly sensitive to gravity they are unable to grow outwards from the plant, and instead grow straight down," Dr Haoyu said.

Australian farmers face a wide range

of risks, but the particular exposure to variability in climate has a flow-on effect to commodity prices.

Severe droughts are frequent and prolonged, particularly in the eastern and south-eastern parts of the country.

Coupled with the rising fertiliser costs and increased pressure to achieve sustainability across the country, a pressing need exists to develop new crop varieties able to capture nutrients, carbon and water better.

"These findings were made possible through exciting technologies such as X-ray CT, enabling root growth to be traced in soil," said co-author and deputy director of the Waite Research Institute, Associate Professor Matthew Tucker.

"They could immediately help cereal breeders to select varieties with straighter roots from their genetic stocks, or aid in the development and deployment of new EGT1 alleles in the near future."

Dr Lou undertook the research as part of a joint PhD program with the University of Nottingham, UK. The team's findings have been published in the journal Proceedings of the National Academy of Sciences (PNAS).

AGNEWS



Harvesting jobs on offer throughout SA

MORE than 1500 seasonal roles across SA and western Victoria are up for grabs within this year's annual harvest recruitment drive by a leading national agriculture company.

Viterra's recruitment drive offers les in its southern Australian storage and handling network, offering higherthan-average wages, on-the-job training and the opportunity to travel.

The roles are ideal for those looking for summer work outside of study and wanting to explore regional SA while earning money or gaining work experience.

Roles include:

☐ General grain handling

- Bunker operations
- Weighbridge operations
- ☐ Grain classification
- Supervisory roles

Viterra general manager operations Gavin Cavanagh said early forecasts for the upcoming harvest show South Australian growers are set for an above-average season.

"Growers right across the state have had a great start to the season, crops are well established and looking fantastic," Mr Cavanagh said.

"If conditions continue to be favourable, the state is headed for a significant crop harvest of around one to two million tonnes above average.

"This is great news for local growers and we can help workers find living and makes our annual harvest recruitment drive even more important, accommodation in some areas. as we ensure we're ready to provide our efficient service to growers when they want to deliver."

Viterra general manager human resources Alyson Gilbey said jobs are available from October 2022 through to January 2023 at Viterra's 53 sites across regional South Australia, and two sites in western Victoria.

"We pay above award rates and have a variety of roles on offer, from general grain handling to classification - and all necessary training is provided," Ms Gilbey said.

"No previous experience is required

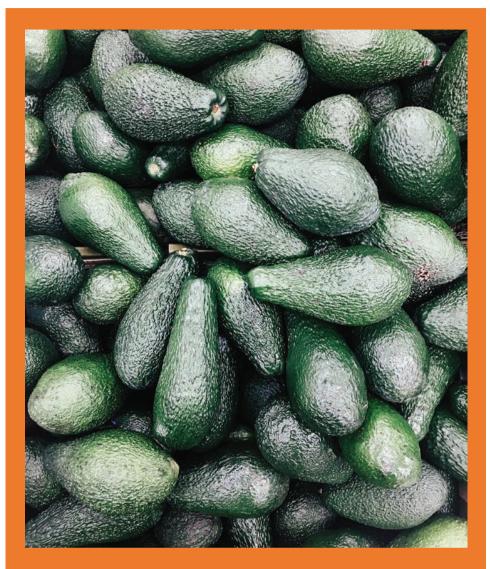
arrangements and assist with

"It's a really fun and safe working environment which attracts students, semi-retirees, job seekers and people who are travelling but also looking to make some extra money along the

Season after season, Viterra welcomes back a large number of harvest workers, with close to 500 returning in 2021.

Applications are open now and close on Sunday, November 20, 2022. Visit (viterra.com.au/Careers/Harvestjobs) for more details or to apply.

SA Farmer



Nation grapples with an avo-lanche

A NEW report states Australians will need to consume and export more avocados as growers around the country navigate a period of soaring production growth now and into the future.

According to the report – from specialist agribusiness bank, Rabobank – the per capita (person) supply of avocados is estimated to be up by 26 per cent on the last year, equating to 4.8kg and 22 avocados for every Australian.

Rabobank says a significant maturing of avocado trees in the past season has resulted in a bumper crop and a national oversupply - seeing retail prices fall to a record low of \$1 each in June 2021 and

While low prices were welcomed by consumers, grower margins have faced extra pressures with increased input costs and labour shortages, according to RaboResearch associate analyst Pia

Ms Piggott said while all avocadogrowing regions are expecting production growth, it will not be "linear

"Significant weather events and drought are also likely to affect the country's avocado production, while the recent varroa mite incursion in Australia may pose a threat to pollination and therefore production, and there is likely to be some industry consolidation along the Australian avocado industry."

the way as well," she said.

To regain balance in the avocado market, Ms Piggott said both "increased domestic demand and larger export volumes" were required.

"Avocados have a strong health halo and are price competitive amid the broader cost-of-living pressures, and this has supported Australian domestic demand," she said.

"The Singapore and Hong Kong markets have been stand-out performers, with Australia growing to account for 46 per cent and 12 per cent market share of their avocado imports,

'Malaysia remains an integral export market and has rebounded from Covid-related impacts, with Australian exports making up 46 per cent of the total imported avocados into Malaysia. up, including to the Middle East and

"While exporting provides the greatest opportunity for Australia's avocado industry to attract a good price and improve revenue, ensuring high export quality is paramount to maintaining the reputation and premium of the fruit and continued investment in improving export access remains a key priority for

SA grain growers in new brewing project



Grain Producers SA CEO Brad Perry, Kangaroo Flat grain grower Josh Krieg, and Trust Provenance CEO Andrew Grant at Mr Krieg's farm. PHOTO: supplied

SOUTH Australian grain growers are set to participate in an "exciting collaboration" which will see barley tracked and traced from paddock to beverage.

The collaboration between Grain Producers SA, Coopers Brewery and agtech company Trust Provenance is funded through the state government's AgTech Growth Fund.

The project will see growers work with software to capture data along barley's growing journey, with the data then linked into Coopers' software, enabling a full paddock-to-beverage traceability platform.

Grain Producers SA CEO Brad Perry said it was a unique opportunity for South Australian malting barley growers to take part in an innovative pilot project.

"Many of our grain producers already supply high-quality malting barley to Coopers Brewery and, in this project, they will be following barley through the many stages to the end product – a high quality beer," Mr Perry said.

"As part of the traceability program, engagement will occur with a number of growers directly and with grain trading company ADM, to cover all critical tracking events and understand the practical and commercial requirements of all stakeholders.

"The growing global trend for real-time

and transparent proof of claim is finding its way into procurement programs for food manufacturers and retailers.

"Making sure South Australian grain producers are future-proofed against evolving supply chain demands is an important part of this program."

Data will be viewable through a unique QR code for each batch of barley, according to Trust Provenance CEO Andrew Grant.

"This allows for real-time monitoring, management and feedback and allows grain producers and Coopers to provide a new level of trust on quality and sustainability and align with consumers' demand for greater transparency on the beverages they are consuming," Mr Grant

Minister for Primary Industries and Regional Development Clare Scriven said South Australian farmers have a "longstanding and proud history of being some of the most innovative in the world".

"This funding will boost the opportunities to advance their agtech, not just on-farm but throughout the agriculture supply chain," Ms Scriven said.

"These projects will help our primary producers overcome challenges and barriers they have identified and I'm looking forward to seeing first-hand how these projects are delivered over the coming months."

AG NEWS

Delays in grape ripening results in more flavour

RESEARCHERS at the University of Adelaide have discovered the best methods of delaying grape ripening, leading to better quality and more flavoursome wine.

The research was published in Horticulture Research, titled 'A systematic review and meta-analysis of vineyard techniques used to delay ripening' and combined the efforts of researchers from University of Adelaide with researchers from Italy and California, USA.

Lead author Pietro Previtali, a PhD graduate from the Department of Wine Science and Waite Research Institute, and the Australian Research Council Training Centre for Innovative Wine Production, said the research focused on three common techniques used to delay grapes ripening: the use of antitranspirants, late pruning and late source limitation.

"Antitranspirants are compounds applied to the leaves of plants to reduce transpiration," Mr Previtali said.

"We found that applying antitranspirants when the grapes started to change colour caused larger ripening delays, and the ripening delay was larger when there were early and late-season applications.

"Late pruning is when pruning is postponed until after the apical buds have

"We found there was a larger delay in ripening when the vines were pruned later in the season, however the technique is less effective on high-yielding vines.

"Late source limitation, which removes a portion of the young leaf area that accumulates sugar during ripening, is likely to be more suitable in red grape varieties with higher sugar levels, while white grape varieties may be harvested

INCREASED LEVELS OF CARBON DIOXIDE IN THE ATMOSPHERE, RISING **GLOBAL TEMPERATURES AND DECLINING RAINFALLS, CAN LEAD TO GRAPES RIPENING FASTER THAN NORMAL...**

too early for this treatment to be effective.

"We also observed larger ripening delays were achieved on high-yielding vines where sugar accumulates slower."

PhD supervisor, Associate Professor Chris Ford, said higher sugar concentrations in grapes can be caused by a number of factors.

"Increased levels of carbon dioxide in the atmosphere, rising global temperatures and declining rainfalls, can lead to grapes ripening faster than normal," Prof Ford said.

"This results in higher levels of alcohol, throwing off the balance of the wine and diminishing the quality of the product, while growers may need to postpone harvest altogether.

"This research can hopefully help growers make decisions that will generate higher yields and quality wine."

The results of 43 studies were examined by researchers, using statistical modelling techniques typically seen in medical and psychological research.

Grapevine soil carbon increases under cover crops



University of Adelaide researcher Joseph Marks with a split core sample of soil, used to analyse carbon levels of cover crops planted below grapevines. РНОТО: supplied

COVER crops planted directly under grapevines can help lessen any potential an increase in dissolved organic carbon effects of climate variability and improve land sustainability, according to researchers at the University of Adelaide.

Research showed the level of soil organic carbon (SOC) was nearly 23 per cent higher in areas that had cover crops below vines when compared to a standard method of herbicide spraying on the soil over a five-year growth

Cover crops are planted to provide soil carbon in vineyard soils." with cover rather than for the purpose of being harvested.

Benefits of cover crops include slower erosion, improved soil health, enhanced water availability, smothered weeds, pest and disease control, and an increase in biodiversity.

Lead author and University of Adelaide PhD student Joseph Marks said the benefits of planting cover crops between the rows of vineyards was well known, however less research had been conducted on the effects of under-vine

than double in cover crop soils, owing to and that there is evidence for more resistant carbon in cover crop soils," Mr Marks said.

"These results suggest that cover crop management under-vine is a potential solution to increase SOC stocks within vineyard systems.

"Taken together, the results of this study indicate that a shift from bare earth to cover crops in the under-vine region has the potential to contain

The study was undertaken on two vineyard sites established in 2014, with soil from four different treatments examined - including two cover crop combinations, a straw mulch and a herbicide-managed control.

Soils were sampled under-vine to depths of 30cm, and were analysed for SOC concentrations and bulk density to determine the level of SOC in the soil.

The findings of the research – which was supported by Wine Australia through its scholarship program were published in Science of the Total

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WORDS & PHOTOGRAPHY ELYSE ARMANINI

THE block of land nestled on Loxton's outskirts may be unassuming, but exciting things are happening for the husband-and-wife team at Black Sheep Produce, home to three unique crops.

Following a record harvest of jujubes and capers earlier this year, Dave and Heidi Setchell are again looking at the upcoming harvest to be bigger and better, with hopes their date palms flower this spring.

The Loxton farm currently has one-third of a hectare of capers – working out to around 200 plants – and three hectares of jujubes, plus one and a half hectares of date palms.

While the pair have been in the produce game for nearly 20 years, they developed their Black Sheep business over the past couple of years after moving crops to the Riverland from the Mallee.

"We had a farm in the Mallee, and we were playing around with all these crops but not in a serious way," Dave said.

"It's only when we decided to downsize to this block – closer to home – and transplant everything here that we said, 'Yep, this is what we're doing; we're growing these three things and we're going to call ourselves Black Sheep Produce'."

The unique choice of crops came from the simple need to grow what the salty groundwater at their original Mallee farm would allow.

"We were also pretty motivated by wanting to grow things that were suited to the local environment and weren't high-input," Dave said.

"We were originally wanting to get into growing natives, like wattleseed and quondongs, but we did a lot of research into it and there hadn't been a lot of marketing. Everyone who was growing native produce at the time were producing crops but then finding they had no one to sell it to.

CONTINUED ON PAGE 22 & 23

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It's been a weird season with the dates... normally we would get a flush of flowering in autumn, and we would pollinate those flowers for harvest in summer.

"We planted the dates first (in the Mallee) but they take a long time to come into production. So we planted the capers – but they're a lot of manual work and very expensive to pick because of how time-consuming it is – and then went to jujubes.

"Jujubes are the thing we're going with at the moment because although they're quite labour intensive, they come into production quite quickly. You get a good price for the fruit and you're not on your hands and knees like you are with the capers."

The Loxton farm currently has about 2000 jujube, caper and date plantings, however due to many of the crops being young, or transplanted from the Mallee, the business is yet to reach full production.

"We're hoping that we'll eventually get up to around the 10 tonne per hectare, and we're about mid-way now," Heidi said.

"Most of the plantings are fairly immature, so we're hoping to hit full production by 2025.

"Because we're keeping our trees a bit more compact, we're erring on the conservative side with

the yield projections, but they just keep amazing us year after year with their production.

"We got absolutely hammered last October by the hailstorm that hit here and we were thinking we'd have quite a reduced crop – but it didn't work out that way. They still pumped out a lot of fruit for individual trees.

"The greatest impact was the damage of the branches that created a weakness – so once they became fruit bearing, we had a few limbs snap off the tree.

"Once it hits full production it will be very interesting to see what sort of crop we can yield."

In another unique practice, Dave and Heidi hand-pollinate the date palm flowers and, following less than ideal weather conditions earlier this year, began collecting pollen from the male flowers this winter.

"It's been a weird season with the dates... normally we would get a flush of flowering in autumn, and we would pollinate those flowers for harvest in summer," Dave explained.

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SA Farmer







Fresh jujubes. PHOTO: supplied

Black Sheep Produce capers cured (left) and fresh (right).
PHOTO: supplied

"Because summer was fairly cool and so was autumn, everything is flowering now, but you can't pollinate when the weather is too cool because you don't get the fruit set.

"Some varieties can be sensitive to temperature, and we have about seven or eight varieties of date palm here."

While the Black Sheep Produce business currently sells dried jujubes in various states, plus caper berries and buds, Dave and Heidi have a keen outlook on potential future products for the business.

"We're certainly not short on ideas," Heidi laughed.

"We've been playing around with a jujube drink – a healthy, non-alcoholic option – and we're thinking of caper relishes and packaging the leaves.

"We've never gone into the caper leaves, but we're looking at getting some of those packaged and that will just round off the capers... in that you can use three aspects of the plant."

Due to having low-input crops and a reduced scale production of fruit, Black Sheep Produce has been unaffected by the recent hike in fertiliser costs.

"We try and use natural products like Neutrog and worm castings," Heidi said.

"They're probably more expensive products but because we're doing it over a smaller scale it's not killer to our bottom line, compared to someone with 40 hectares of vines."

The next harvest for Black Sheep Produce will begin in November, with the caper plants expected to put out new growth as the weather warms up during spring.

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INDUSTRY EXPERT UPDATE

Journalist Hugh Schuitemaker spoke with key Riverland, Lower North and Mallee agricultural industry figures to gain an insight into their respective seasons.



Tim JacksonAlmond Board of Australia CEO

What stage of the almond season are we at?

We are about to enter the pollination period.

This will be one of the most challenging seasons for growers given the border controls around beehive movements due to the discovery of varroa mite in northern NSW on June 22.

We're seeing the almond industry reaching new milestones for production, what has been key to this continual growth?

The ongoing health benefits, versatility and non-perishable characteristics of the product is appealing to growers and consumers alike.

The global take up of plant-based diets has elevated the use of almonds given their wide-range of applications from beverages to snacks to ingredients.

Are there any export challenges still being caused by Covid-19?

Sea freight congestion has slowed the sale of almonds globally and weakened grower returns as a result.

The cost of freight has increased by 400 to 500 per cent in the past 18 months.

Is the threat of varroa mite to bees causing any challenges for Riverland almond production?

Varroa mite has resulted in the price of beehives for pollination firming.

If the mite cannot be eradicated this will have an ongoing impact on the availability and cost of hives for growers.

As an industry, we are likely to be down at least 70,000 hives for pollination this season, so getting perfect weather – warm clear days – will be essential to help offset this shortage in some orchards.

Do you expect another overall increase in production in the next harvest?

The industry is forecast to grow to 15 per cent on this year's crop but it is too early to tell if it will live up to potential given the challenges we are facing with pollination.

What are the most important factors for tree health at this stage?

The effectiveness of post-harvest fertigation will be a critical component in canopy growth. All oil sprays to manage mite activity should have been applied by now.

In the lead-up to flowering, one of the most important applications of the year for growers will be targeting diseases like blossom blight.

The looming pollination and nutset phases of season are also the highest-risk periods for frost.

"As an industry, we are likely to be down at least 70,000 hives for pollination this season...



Mallala canola farmer, Adelaide Plains councillor

How has the rainfall been over the last few months?

We had a really good start to the year, then July was dry, but at one stage we had seven inches in seven weeks.

So we've got a good sub-soil soaking and the crops have plenty of moisture beneath them. Providing we have a good September we'll be pretty good, so there's a lot of potential.

The rainfall is pretty much on track with last year at this stage.

I had a look a little while ago and we were 10mm behind last year. But you don't have to go much further north and it falls off pretty quick.

How is the quality of crops looking, and are prices still favourable?

The crops are looking really good, possibly the best we've ever had, and the prices are looking good.

With what's going on in the world at the moment, I think the prices will hold. Unless they can get a large tonnage of wheat out of Ukraine, I don't see wheat prices coming down, because everyone needs some.

Canola prices are at an all-time high, so it's all looking pretty good.

Are input costs still a challenge?

We're paying huge prices for inputs like fertiliser and fuel, and it's really hard to get spare parts, and tractor and truck tyres.

We're thinking a long way ahead. When buying machinery we're thinking a year ahead at least, because you need to have something ordered for a year before you get it.

Whatever we might need within the next 12 months, we're putting it on the buy list now.

Did you have success with dry sowing this season?

We sowed a bit over half our crop dry and then it rained, so we finished off seeding with a bit of wet ground, but the crops all came up really well.

We're using some pretty new air-seeding technology, so the crop establishment was magnificent. They're really making a difference.

The IT technology is still improving as well, and you need to be pretty technology-savvy to use the machinery we buy now.

We've got a couple of new varieties of canola this year and they are just magnificent. They are herbicide-tolerant TT varieties that are doing really well.

It sounds like there's a lot of exciting new technology in the industry?

The technologies we're using now to keep our crop residue on top of the ground (are) keeping the soil 9C cooler. That's compensating for any global environmental changes.

Our soils are now... protected by a blanket of mulch, which is a step forward.

Since we've done that our yields have gone up by more than a tonne to the hectare, and when you dig down in there it's crawling around with earthworms and the soil is very active.

It really is a game-changing technology.

How can farmers best stay prepared for some of the supply challenges we see?

We're keeping enough fuel on the farm now to do a whole seeding, or a whole harvest, so if there's a hiccup in the supply of fuel – which could easily happen – we'll still be able to keep going for a while.

What will be key to Australian industries remaining viable through these global challenges?

Here we are in a country with huge coal, gas and uranium reserves, and we're short of electricity. We're not getting the economic benefit of these reserves, it's all going to major companies.

Electricity prices are going to double in the next eight years, and when that happens a lot of industries are going to shut down because the costs are going to be off the planet.

I'm worried how we'll have any industry that consumes power, because we just won't be competitive. China is building more coal-fired power stations, and Germany are reopening the ones they closed, because they know they cannot survive off renewables.



Adrian Hoffmann

Wine Grape Council of SA Region Two chair

How is the wine quality from the 2022 vintage looking?

The wines from the 2022 vintage are looking quite strong for us. The cooler-than-average summer meant a delay in ripening and extra time on the vine, hence why the wines have developed a lot of flavour.

Where we were, we got the fully ripe, rich tannins the whole way through. It was quite a strong vintage – from a volume and quality point of view – to follow up on 2021.

But in saying that, there were other growers that suffered through hail, a bit of frost, and the cooler season as well

Have the cooler summer temperatures recently benefited fruit quality?

It is beneficial, but it does create problems as well. We're looking for that richer, riper style, so we have to let the fruit hang a bit. We only finished vintage in May this year, so it draws the vintage out a bit for us, and there's the patience needed to get the fruit ripe. Going into the current season now it's all about wood selection, especially in blocks that have been frosted or hit by hail. We're leaving wood for the coming vintage, and pruning.

Does that later vintage affect vine health at all?

The vines definitely don't have that break after they've been harvested and they store carbohydrates, so some of the carbohydrate storage would be quite depleted in some

We've combated that by spreading a bit of extra compost, and nutrients, to help the vines through.

Normally they get a good four to sixweek break before they drop leaves and go into dormancy, but a lot only had two or three weeks with no fruit on the vine. There will definitely be less carbohydrate storage this year.

How is the demand for red varieties looking ahead of 2023?

Everyone knows shiraz and cabernet are the varieties probably in oversupply, but there's strengthening demand for grenache, mataro, and for white varieties in the Barossa as well.

The Chinese market hasn't come back on, and they were really dominant in that red sector, especially shiraz and cabernet

When people talk about oversupply, it's really only in those couple of varieties. When you go through the Adelaide Hills, and Eden Valley, there's a real strengthening in riesling and whites. Growers should take the opportunity to rework those vines, and focus resources on some of the other varieties.

Should growers focus on other varieties in 2023?

We definitely saw a softening in prices last year. The hailstorm and frost events brought balance back to the Barossa and you didn't see those big fluctuations in prices. But looking forward at how La Nina and the Indian Ocean Dipole is all working, we're looking at a wetter-than-average spring again this year, and potentially a cooler summer as well. So we're potentially looking at very similar conditions to what we've had the last two years, which concerns me a little bit because there's the potential to create pressure and strain on supply. If people can pick up a tonne of Barossa shiraz, they aren't going to get it from other regions.

My encouragement to growers is to grow within your means this year, even if you grow a bit less, and to concentrate on the other varieties in your vineyard. We saw price increases in grenache last year, so anything we lost on the shiraz price we picked up there.

Are we seeing growing demand in other overseas markets for Australian wine?

Most of the other markets are strengthening and getting better serviced by the Australian wine industry, so it was really only the Chinese market that dropped off.

A lot of other wine companies that are established in other markets are going from strength to strength, and increasing brand recognition and sales. You really only have to look at the bulk wine pricing to get a fairly good indication of what's happening in the industry.

Mark Doecke Citrus SA chair

What varieties of citrus are currently being harvested in the Riverland?

Mid-season varieties like Washington oranges and amigo mandarins are virtually finished.

Late navels and afourer mandarins are starting now.

Have weather conditions benefited the quality of fruit this year?

Because spring 2021 was so cold and the 2021-22 summer was very mild, the skin quality on some varieties has been weak.

These mild conditions have produced some very tasty varieties and sunburn is minimum.

Have there been any increases in volume of fruit harvested compared to 2021?

Volumes produced this year are up slightly but this is mainly due to new plantings coming into production.

Has 2022 seen any relief in the previous labour shortages caused by Covid-19?

There seems to be more labour available this year.

The main issue with labour is the compliance demanded by Fairwork, with the time taken to manage your workforce significantly higher than in previous years.

Piece work is unfortunately frowned upon by Fairwork and this complicates employing labour.

Have Riverland growers had any challenges dealing with fruit fly this year?

Fruit fly has cost growers significantly. Compliance with the code of conduct and the associated paperwork accompanying loads of fruit is a cost.

Also the cost of cold-treating produce to export destinations is high.

Have stability in water allocations and cheaper temporary water prices helped growers during this time?

Water is a minor issue in 2022, with prices to lease water low and supply high.

What should growers be doing at this time to ensure healthy trees and fruit?

This time of the year is a good time to prune trees and also maintain irrigation infrastructure.





WORDS & PHOTOGRAPHY

BRENDAN SIMPKINS

IN 2015 the Haines family embarked on a project to transform their small block in Gawler South into a thriving garden.

At first the land was a blank canvas just waiting for some paint to be thrown on.

With just a few pot plants and a straw-bale bed in the back garden, it was humble beginnings.

But now the 60-square-metre block has been transformed into a delightfully chaotic ecosystem, providing the family with the essentials.

Malcolm is the brains behind the operation, and is





always tinkering away with new techniques and trying new things.

With an environmental management degree under Malcolm's belt, the garden has been laid out in such a way that the family can be more self-sufficient and energy efficient.

"There was nothing here, it was an empty block and the western sun was just banging in here," he said.

"We started with the core row of deciduous trees that runs through the middle, so they let light in during winter and block the light (during summer). We let them get really big and built around those.

"The path came from where people mostly walked, so I just worked out where the most efficient place was by footprints...

"The path used to be reversed but I put this in later and that actually captures the breeze from down south in the summer.

"We get a little southerly and that blows through here and it cools the area it runs through."

Malcolm said when the family embarked on this journey it had a core structure in mind, but everything else was experimentation.

He said it had set a rule in place: if a plant was moved twice and it still didn't thrive, it would be passed on to someone else.

The name of the garden, Ligaya, means 'happiness' in Tagalong, the native language of Philippines where Jelina and Marlon hail from.

At last count there were more than 200 different types of plants with everything from apples, mandarins and plums to the more exotic like guava, jujubes, hops and dragon fruit.

About 60 per cent of what the Haines family need is grown in their own backyard.

There are also a number of exotic herbs and tropical and sub-tropical plants from the Philippines, which Jalina uses for both cooking and natural medicine.

Out in the backyard is the family's aquaponics system, which has been rebuilt and simplified over time.

Chickens also roam around in the front garden in a 'four-cylinder' deep litter system – deemed fourcylinder because of the four birds housed on the property.

All the organic material that comes into the house is given back to the chickens, as well as worms, through the floor lining of the chicken run.

Over time the system, through fertilization and turnover of the lining, becomes a rich ecosystem that can be used for mulch and compost in the garden.

Malcolm said the chickens are "the engine" of Ligaya.

This year the Haines family is doing things a little different, cutting the trees down a lot further than usual.

Malcolm said this was being done to get bigger harvests, and because they know what vines work best now.

But the family never expected the garden to become as big as it has. It is now a place to inspire others, with family members imparting their trials, tribulations and knowledge onto others.

In recent years the movement towards backyard growing has picked up steam, particularly influenced by the global Covid-19 pandemic.

Ligaya has close ties to Joe's Connected Gardens in Elizabeth Grove and operates on much of the same principles, albeit on a smaller scale.

Malcolm said anyone can achieve what the family has at Gawler South.

"Start with your basic herbs like mint, thyme, oregano, that sort of stuff," he said.

"And start with what everyone else is growing because than you can go and talk to people, talk to your neighbours and see what they are growing.

"Take it slow, start small and start with a square metre if you can and prepare the soil really well, invest in your soil."

The key, though, was to "grow what you like".

He said there were "enormous benefits" including improving mental health, understanding nature and contributing to a cooler climate.



Start with your herbs, your basic herbs like mint, thyme, oregano, that sort of stuff...



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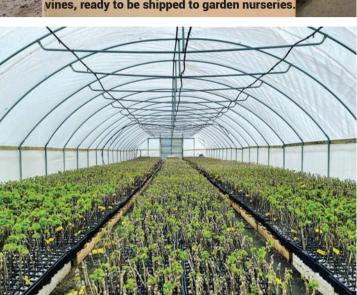






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Next best

WORDS & PHOTOGRAPHY ELLOUISE CRAWFORD

THE remnants of an ancient sandhill have proved the perfect place to put down roots to a thriving table grape nursery for one Freeling family.

Viticulturist Wayne Farquhar purchased land southeast of the Freeling township 22 years ago, originally with the intent of only growing grapes for wine

But the discovery of sandy soil at the top of the block, combined with his extensive background in horticulture, presented an opportunity too good to pass up.

"We started to propagate our own grape vines in the sand and we actually started down the front of the property, and as we expanded, I realised this was perfect soil to make a business," Mr Farquhar said.

"So we then formed Elite Nursery, supplying wine grape vines to the industry."

In 2006, during a period of wine grape oversupply and low grape prices, Mr Farquhar looked to table grapes as an alternative.

He first purchased an established Barossa-based business that supplied retail garden nurseries with table grape vines across the country.

Today he continues to supply over 100 retail garden centres Australia-wide with dozens of different public domain varieties.

"It's ideal for us to plant table grapes into the sand because sand is fairly uniform, so we are able to give them nutrition and water, and get a fairly consistent and even growth," he said.

"It also enables us to lift them out of the ground with minimal amount of effort, which is important."



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Separately, Mr Farquhar is the sole Australian distribution point for the California Table Grape Commission, meaning he also supplies vine rootstock to the big commercial table grape producers, which in turn stock the supermarkets.

These vines cannot be propagated by anyone else under the plant breeder's rights (PBR) scheme, which protects plant breeders by giving them a commercial monopoly for a period of time.

"There are lots of different varieties available in the marketplace and we have five we supply from the California Table Grape Commission," he said.

"If you go into Woolies and Coles and buy fruit, the chances are you are buying grapes that have come from vines that we propagated."

The process of getting a new, unique table grape variety from the United States to Aussie consumers is no easy or quick task

Mr Farquhar currently has another variety he is still propagating, while another vine is on its way through Australian quarantine.

"It's a very long process to get the sticks into the country – about two years in Australian guarantine," he said.

"They come in, they get treated and they

plant them up, they carry out molecular testing on them and then after a couple of years they get released and I get one pot.

"It takes me quite a few years to make enough babies from the one pot until I can commercially release it to the growers."

The process of lifting, packaging and distributing both the PBR vines and those headed to retail garden centres is carried out through May to October.

Mr Farquhar hires seasonal staff to help, but the business is also a family affair.

Wife Lisa does the bookwork, and when not on the footy field or studying, 16-yearold daughter Amelia is also lending a hand with the manual work.

Son Connor, 19, will eventually take over the complete running of the business.

"Connor works side by side with me, he is out here driving the tractor lifting, so he is learning on the job," Mr Farquhar said.

"I'll still keep going until such time as I fall down I guess, but I can start to backpedal once he takes control."

Connor also has a hand in the running of the family wine label, Dell'uva Wines, which produces premium European varieties.

Following the close of their Greenock cellar door, plans are now under way to develop a cellar door experience and sale point on their own Freeling property.





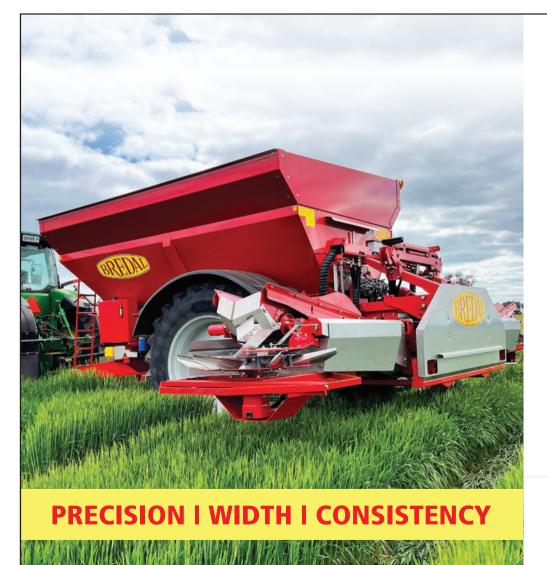
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WORDS DEIRDRE GRAHAM

IN 1997, Pinnaroo farmers Heath and Amanda Nickolls registered their first calves.

Now, 25 years later, Bull Oak Well Angus calves about 240 stud calves each year, while selling 60 bulls at its annual February sale and another 30 to 40 privately throughout the year.

Mr Nickolls said running a successful stud cattle business was never part of a plan.

"We probably fell over it by accident," Mr Nickolls said

"We bought our first cows from Roseleigh Angus at Pinnaroo, and then we slowly added more cows from other dispersals and other herds from around Australia.

"We bought registered cows, then they had registered calves, then someone bought a bull. So, then we started to artificially inseminate (AI) them and tried to breed bulls from then on."

This February, at its annual sale, Bull Oak Well Angus again cleared 60 bulls, with a top price of \$36,000 and an average of around \$12,000, making it a recordbreaking sale for the stud.

"The top priced bull, R11, was sired by an American bull, Baldridge Beast Mode, and was out of one of our top cows," Mr Nickolls said.

"He attracted a lot of attention prior to the sale as he was a 'calving ease bull' that had great growth and carcase EBVs as well as outstanding structure and eye

"He was sold to a long-term client at Tintinara."

The Nickolls' success has been made possible thanks to a long-term interest in registered livestock, plus a lot of hard work.

"I have always been interested in stock with pedigree," Mr Nickolls said.

"Whether it is sheep, cattle, chooks or whatever, it's just always been an interest.

"(We love) the breeding side of it...

"We use bulls from all around Australia and all around the world.

"Being able to breed a good animal that goes on, seeing clients buying them and then seeing them breed good calves that weigh well and are profitable for our clients – I guess that is probably a thing that we really enjoy to see."

When looking at bulls the first characteristic Mr Nickolls checks is fertility.

"We start with the fundamentals – fertility, structure, docility – and then we move on to body type; so, good constitution and good muscle pattern," he said.

"We have been trying to add marbling into our herd too, trying to select bulls that are not extreme for marbling but above average."

Modern technology has also become part and parcel of the business.

"We will probably AI 70 per cent of our herd, and we also run an embryo transfer (ET) program where we fertilise embryos out of our top cows and implant them in our lower quality cows," Mr Nickolls said.

"ET is good but you still have to have a whole herd accountability, your whole herd has to be good still. (So) I think ET is good, but not on a large scale.

"We might breed 10 to 20 calves a year by ET, and they might all be out of a specific cow.

"In saying that we have a co-operator herd in the Adelaide Hills that we implant embryos in up there, then we take back the progeny. So that is a good way of getting your numbers up and not having to run them here."

Mr Nickolls said ET was about identifying the bestperforming cows, then multiplying them as much as possible.

"We have a cow called Melody H50 that we have been flushing and last year she would have had 15 calves,

and we got seven heifers," he said.

"So we will have seven more of her daughters into the herd calving next year, which is really exciting I reckon."

In 2021 the Nickolls were approached by Rick Llewellyn, from the CSIRO, to take part in a virtual fencing trial.

The trial included having collars attached to 40 heifers and placing them in a paddock that had one side of physical fencing and three sides of virtual fencing.

The trial went well enough for it to return in 2022.

"It worked again, and worked even better this year," Mr Nickolls said.

"It's pretty exciting. It's a fantastic way to graze your paddocks evenly and... keep stock off areas like sand rises.

"I think it is... the way of the future."

Like many livestock breeders across Australia at the moment Mr Nickolls is concerned about the possible outbreak of foot and mouth disease in the country, now that it is widespread in Indonesia.

"It is at the front of my mind," he said.

"We have already started to get information together to try and work out our own biosecurity plan, and try to limit traffic on and off our farm going forward if it does hit Australia.

"It is the biggest threat to the livestock industry we have seen for quite a while.

"It will destroy cattle, but it will also (mean) the price of cattle will take a huge knock, and it will be felt through Australia.

"It won't be just cattle and sheep producers that feel it, it will be everyone (down the supply chain)."

Meanwhile Mr Nickolls, wife Amanda, and sons Cooper, Harry and Archie, are looking forward to February 2023 for the business's annual bull sale at Willalooka, where they will again offer 60 bulls for sale.

Hutton Vale Farm slows food down

WORDS & PHOTOGRAPHY KAYLA DEN HOLLANDER

ANGASTON'S Hutton Vale Farm is a Barossa icon, known for its award-winning wine and luxury accommodation.

But operations manager Caitlin Angas said the farm's approach to 'growing local' and feeding locals was part of something bigger – the slow food movement.

Behind its accolades, Hutton Vale's team members are primary producers who pride themselves on feeding guests and providing local restaurants with produce from their land to reduce food mileage.

Hutton Vale is a family operation spanning seven generations, and was established in 1843, with its approach to mixed farming a key role in its success.

In those days, the primary producers would keep ostriches for leather and feathers, as well as tobacco plants.

Today, you will still find established

fruit trees well over 120 years old.

"It comes back to being selfsufficient, because they didn't have the supermarkets (in those days)," Ms Angas said.

Nowadays, the farm is still brimming with seasonal produce, which when preserved is the key ingredient to its award-winning chutneys.

"As soon as there's a surplus of anything that we grow, we preserve it to enjoy throughout the year," Ms Angas said.

"The garden is loaded, and we do love that, and to have the kids out there eating more snow peas than they know what to do with, that's a pretty simple pleasure"

Paddocks of sheep are nestled in rolling hills, and are a permanent fixture of the land for the farm's wool and lamb production.

The farm sells its prime lamb cuts to local Barossa restaurants and they are often in high demand.

"We're pretty lucky as a primary producer to have a waiting list," said Ms Angas.

Ms Angas said she even had requests for meat to be shipped to the east coast of Australia.

"I reluctantly say no, because there's farmers over there that could have that opportunity, and also we're hitting food miles – and I don't want to do that," she said

Other livestock is maintained on site, depending on the demand.

"We've got a couple of pigs on the go at the moment because we want to have bacon we can give to our guests when they're here — it's stress-free, it's had a good life, and we can enjoy the quality of it." Ms Angas said.





Hutton Vale "rarely" says no to new endeayours.

The team even produced ducks at the request of a local chef, despite an 18-month wait.

"There really is no greater joy than being able to produce your own food and provide for family and friends, so that's something we want to keep doing," Ms Angas said.

"That full circle is important to us, and if we can produce it ourselves... why not? Keep those food miles low and the quality goes up."









The full circle is a concept that is integral to the slow food movement, something that Hutton Vale has embraced for generations.

But Ms Angas said the concept goes further than just having food to eat.

The movement is an opportunity to educate locals, guests, and even future generations.

"With kids that are primary school age, I see how disconnected they are from the world, and not realising where their food is coming from," Ms Angas said. "That doesn't weigh up for me. I want them to understand where it's from and what it's taken to produce something so they have respect for the producers.

"(That can be done) by educating people and having the understanding that it is quality over quantity and that the enjoyment and satisfaction is well worth the shift of mindset.

"The slow food movement I really want people to start embracing. It is hard, because we are creatures of comfort and convenience, but hopefully the rewards are worth chasing". Even amid the tribulations of the Covid pandemic, Ms Angas has taken the crisis as an educational opportunity.

"I think Covid has been a really good reset for people to understand the importance of being able to have the food you want when you want... and just understanding the importance of nutrition" she said.

"The ability to cook something from scratch adds another element of connection to the people you are sharing that with, and that's something that can't be bought."

With kids that are primary school age, I see how disconnected they are from the world, and not realising where their food is coming from...



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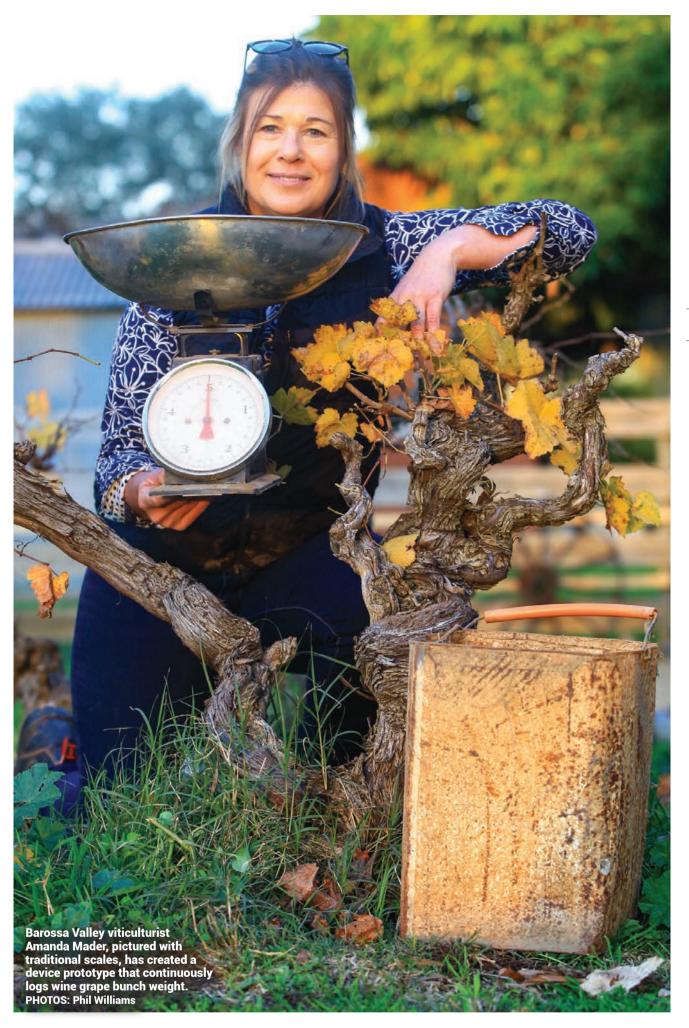


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Estimating wine grape yield made easy

WORDS VANESSA ROSE

FOR wine grape growers estimating yield is one thing but whether that end ups accurate is another.

Perhaps, until now.

Barossa Valley viticulturist Amanda Mader said current methods for accurately tracking grape yield for global demand and wine production logistics had an error margin of up to 30 per cent.

However, wine companies would like to see this margin reduced to 5 per cent.

It's a big task, and one that could become easier to achieve thanks to her novel solution.

Ms Mader, along with electronics expert Craig Harris, from CPH Electronics, has created a beta prototype of a device that continuously measures the bunch weight of wine grapes in real time.

"At the moment, it doesn't look pretty," she said.

"It's a silver box with an antenna. Imagine fish scales with a hook."

But it's the brains of the device, not its beauty that matter.

Simply explained, the device, which is connected to the internet, measures bunch weight between veraison (the onset of ripening) and harvest by using load cell technology with continuous data logging capabilities located within the vine canopy.

Meanwhile, a thermoelectric device inserted into the bunch obtains internal temperatures hourly while an external logger outside the bunch also tracks at these intervals.

Irrigation application and rainfall events are noted to determine the possible effects on bunch weight.











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There's potential for the information derived from this technology to assist winemakers and viticulturists to make important decisions in the optimal selection of harvest date.

"For now, it's one of a kind that's out there at the moment," Ms Mader said.

She said the setup was a massive improvement on the manual methods historically used to monitor bunch weight, as the time and labour involved limited the sample size that could be practically obtained in commercial vineyards, and the industry was still getting it wrong.

And her understanding isn't just theoretical.

Ms Mader has a viticulture consultancy, Vine Scout, under the banner of Gumpara Wines, a family-owned business in the Barossa Valley.

Located in the small township of Light Pass, the land has been in the Mader family since 1856.

Six generations later, her husband Mark Mader produced the first wine under the Gumpara label in the year 2000.

"We have challenges in the wine industry," Ms Mader said.

"The most important one is we don't understand how bunch weight responds to heat waves, however, in the era of climate change, it's imperative to refine our irrigation practice and water use efficiency.

"There's potential for the information derived from this technology to assist winemakers and viticulturists to make important decisions in the optimal selection of harvest date."

The second issue Ms Mader flagged was that

"we're not very good at estimating crop yield".

"It's a worldwide issue where we're always trying to improve our yield estimate accuracy reliability for global demand and supply and also for winery logistics.

"If we can significantly improve your yield estimate of what we say we're going to bring into the winery, to what actually gets delivered, within 5 per cent, it will be a massive achievement.

"I think this device has the potential to do that as we're receiving information every hour on how bunch weight responds to a heat wave, cool spells, rainfall and irrigation application.

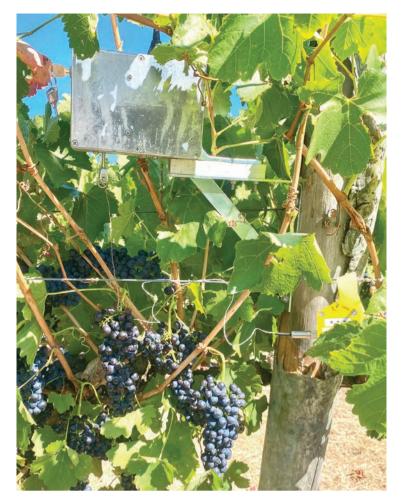
"It's so dynamic – the bunch weight always changes."

The device still has another year of field trials to go, but there's already plenty to toast to.

Ms Mader's innovative agricultural technology was one of nine to share in more than \$700,000 worth of grants available through the State Government's AgTech Growth funding in June.

Her grant will go towards producing and installing three load cells in a few vineyard demonstration sites to enable the continuous logging of bunch weight.

The data will be used to analyse the relationship between environmental factors, such as heat waves, cool spells, rainfall and irrigation application, to the pattern of berry weight gain or shrinkage during the period



between grape ripening and harvest.

Receiving the grant comes just a few months after Ms Mader was named the 2022 Barossa Viticulturist of the Year by wine fraternity Barons of Barossa.

Next on her agenda are collaborative trials on the bunch weight management device, securing new stakeholders and then taking it to market.

"What we are hoping for after the next growing season is to refine this technology and build this into a commercial reality." ABOVE:
A trial of
viticulturist
Amanda
Mader's
device that
continuously
logs the bunch
weight of wine
grapes.
PHOTOS:
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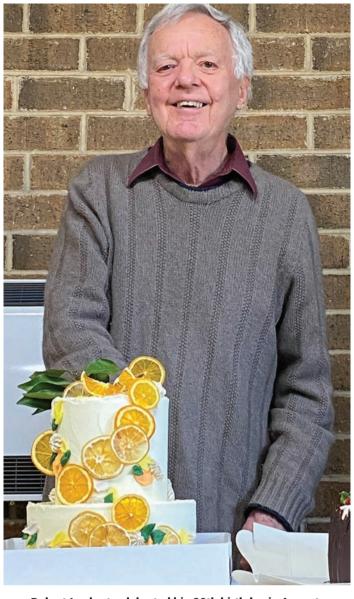
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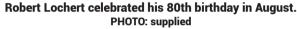


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Lochert Bros managing director and owner Robert Lochert (left) and general manager Peter Kuchel have witnessed the peaks and troughs of the citrus industry. PHOTO: Christine Webster

Loyalty rewarded for Riverland West citrus packer

WORDS & PHOTOGRAPHY CHRISTINE WEBSTER

CITRUS industry hall of fame inductee Robert Lochert attributes the recognition he has received to the hard working and loyal staff at his Riverland West company, Lochert Bros, based in Ramco.

Mr Lochert was installed into Citrus Australia's Hall of Fame in April this year during an industry forum at Maroochydore, on the Sunshine Coast in Queensland.

The 80-year-old managing director and owner of Lochert Bros was humbled to receive the accolade and said the award belonged to his team.

"We have been in business, packing oranges, since 1963 and over the years

we have had some long-term and loyal employees," Mr Lochert said.

"To have a successful company you need to have good employees."

The citrus packer and transport business officially became a company in 1963, with Mr Lochert and his brother John running the business.

This followed their father Emil handing over the family business to his three sons in 1961, when John turned 21, Robert was 19, and their youngest brother Russell was still at school.

"He said to us, 'That is all I have to give

to you, if you make a go of it, good luck, if you fail there is nothing I can do about it'," Mr Lochert said.

"He never interfered, although he was a bit interested at times in what was going on."

Mr Lochert's father also requested his sons buy the Virgo Road property from him for £4000 and give the money to their three sisters, which they did.

Emil Lochert's first venture in horticulture and transport was in the 1930s when he grew tomatoes and cucumbers in glasshouses at the present site Mr Lochert said his father would take his produce in his Ford Model T to the Waikerie railway station and send it to clients in towns along the railway line to Tailem Bend.

"Greengrocers were buying them from him," he said.

Mr Lochert said they then asked Emil if he could also start supplying oranges from the area.

He said during a railway strike in the late 1940s his father had to hire some carriers to transport citrus from the district to other parts of the state.





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We have been in business, packing oranges, since 1963 and over the years we have had some long-term and loyal employees

In 1950, Emil purchased his first truck, an eight-tonne S Model Commer.

Mr Lochert said when Lochert Bros first started, it employed five people. It now has 95 staff.

This includes employees at its express freight division, Sprint Freight and Logistics, which operates out of Adelaide and distributes overnight all over South Australia and into Victoria.

Lochert Bros has weathered the difficult times experienced by the citrus industry and continues to strive to ensure growers receive the best returns possible for their fruit.

The family established Crusta Fruit Juices in 1971, with Murray View Irrigation as a 50 per cent shareholder.

In 1993, Lochert Bros became the sole owner of the juice-processing enterprise, after purchasing the shares owned by their business partner in the venture.

In 2001, Crusta was the second largest fresh fruit juice brand in Australia.

In 2004, Locherts decided to sell their juice processing company to Coca-Cola Amatil. It was a decision Mr Lochert

"After they took it over, it just went backwards, eventually they closed it down," he said.

Lochert Bros general manager Peter Kuchel said right from that first year Coca-Cola Amatil did not purchase the estimated volume of fruit expected of it.

"We had a three-year arrangement to make sure that they had enough fruit, but they couldn't take it all," he said.

"Each year the demand dropped, so we had to find somewhere else for our growers' fruit."

Mr Kuchel said Lochert Bros expanded its packing operations to ensure the

region's oranges still had a market.

The company bought back its juice factory in 2018, but was unable to buy back the Crusta brand name or Crusta Fruit Juices Company.

It now supplies valencia juice to Renmark-based beverage company Charlie's Drinks.

This year, Riverland growers are facing their lowest prices for citrus in five years. Mr Lochert said the small size of navel oranges this season was causing these low returns.

Mr Kuchel said growers were receiving \$300 to \$500 a tonne for their fruit compared to \$500 to \$900 in 2018.

He said transport costs were also causing the drop in prices for citrus.

"The costs of shipping has gone up astronomically," Mr Kuchel said.

"Raw materials are going up and freight is a horrendous expense, especially with the fuel levy due to go up again across Australia."

Mr Kuchel said the Covid-19 lockdowns were a profitable time for the company and its growers, as more consumers bought oranges from supermarkets in Australia, Singapore, and Malaysia.

But he said the easing of restrictions meant more people were choosing to buy their fruit from other outlets, such as farmers' markets.

Mr Lochert said the Australian citrus industry was also suffering from a downturn in exports to China. He said this was due to Covid-19 lockdowns and a souring of the relationship between Australia and China.

But he said Lochert Bros still had strong ties with Singapore, Malaysia, and Japan where Riverland citrus remains in high demand.



RENMARK

May to August 5, 2022: 71.2mm Rainfall to August 2021: 81mm May to August Average: 142.3mm

LOXTON

May to August 5, 2022: 71mm Rainfall to August 2021: 95.5mm May to August Average: 165.6mm

WAIKERIE

May to August 5, 2022: 33.6mm Rainfall to August 2021: 101.6mm May to August Average: 151.7mm

LAMEROO

May to August 5, 2022: 118.8mm Rainfall to August 2021: 161mm May to August Average: 205.2mm

GAWLER

May to August 5, 2022: 164.4mm Rainfall to August 2021: 247.6mm May to August Average: 258mm

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Current storage: 95%
This time last month: 95%
This time last year: 71%

HUME DAM

Current storage: 94%
This time last month: 94%
This time last year: 85%

LAKE VICTORIA

Current storage: 53%
This time last month: 54%
This time last year: 84%

MENINDEE LAKES

Current storage: 112%
This time last month: 110%
This time last year: 69%

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Much more than your average broker, Ms Purvis has lived and worked on farms, making her a trusted expert advisor for agribusiness finance.

"I grew up on a farm and my husband is a career farm manager, so we have lived on farms for most of my life" she said.

My work over the last 25 years has required operational, managerial, and strategic knowledge of farming. I have a good knowledge of all three."

Indeed, Ms Purvis has many successful years of experience in broking, financial

counselling and bookkeeping for farming businesses.

She is also a problem-solver, focused on overcoming the challenges that farm businesses all-too-often experience.

Is your hurdle being too short on time to research financial issues, such as interest rates, loan terms, covenants and lenders?

Perhaps, you don't know enough about the finance products available to make a well-informed decision?

Maybe, you've been unable to obtain finance for a land purchase or project?

Or, do you need someone in your financial corner who can provide an ongoing service in a way that fully meets your needs?

With Ms Purvis on your side, you can obtain the help and advice you need.

And, her commitment to taking the time to get to know you and your individual circumstances will provide confidence that you're heading in the right direction.

"I have a discovery session working out the problems that they want me to try to solve,"



I grew up on a farm and my husband is a career farm manager, so we have lived on farms for most of my life..

Ms Purvis said.

"From there I put forward a proposal about what I believe should be done."

It's a process that's proved effective for clients including Vince Critchley, of South Australia.

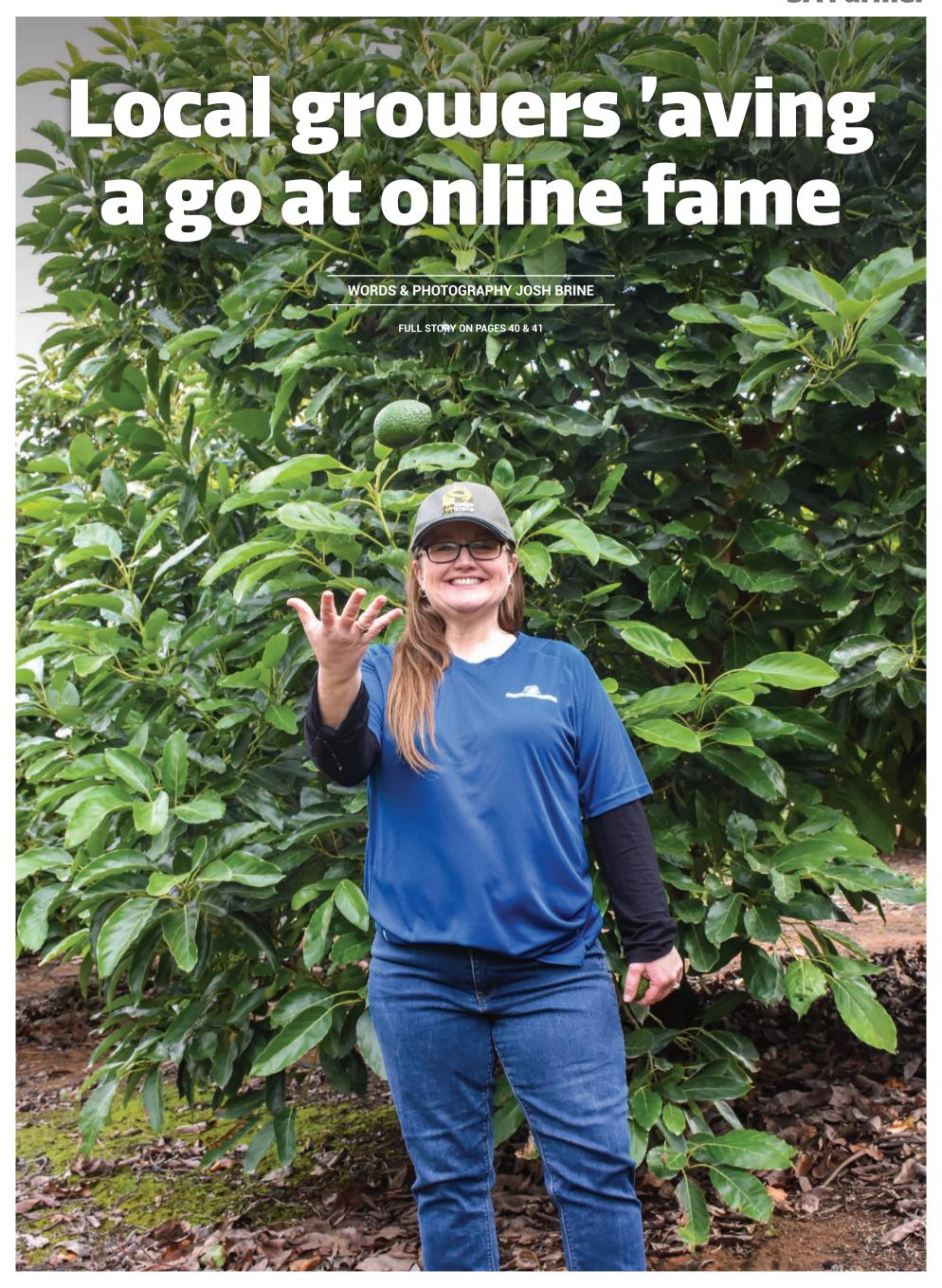
"Farm finance is so involved in today's world and Deb simplified a process that looked impossible," he said.

"Deb presents excellent value for money, and I would never have negotiated an arrangement like we have now without her.

Although most Purvis Agri Finance clients are based in South Australia, Ms Purvis said "anything is possible".



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VIRAL marketing is normally the realm of large PR firms with specialist staff and significant resources at their disposal.

But for one-person social media team Sarah Tucker-Boehm, it's become an essential part of growing the brand recognition for her parents-in-law's business Parkes Lane Produce.

Ms Tucker-Boehm has racked up millions of views across Instagram and TikTok in just over two years, after starting to post about the business at the beginning of the Covid-19 pandemic.

Initially posting as part of Australian Avocados 'Smash an avo at home' campaign in April 2020, Ms Tucker-Boehm has found posting has boosted the Parkes Lane Produce name.

"I started doing it purely to get more people to eat avocados and to get our name out there," she said.

"When people see our blue boxes, if they know this crazy girl on Instagram or on TikTok and recognise Parkes Lane Produce and it inspires them to buy one or two, that's fantastic and I've done my job right.

"We've got a lot more brand recognition. I have people who text me and say they've found our avocados at the shops or the Adelaide Central Market.

"It's helped us get in contact with other markets – in Victoria and Sydney it's helped us establish those markets. It's organically created interest in our avocados."

Ms Tucker-Boehm said social media helped the business connect with a different audience and educate followers on where their food comes from

"When I'm posting videos on Instagram or on TikTok it's about educating people on how food is grown and what goes into the process of it," she said.

"If you look in your fridge I guarantee pretty much everything in there a farmer has grown or sourced or started the process of.

"Even beer – yeast has to be grown as a crop, and so educating people on how things are grown is a huge part of why I do what I do on Instagram and TikTok as well."

Parkes Lane Produce's following has also allowed them to branch out from avocados and citrus into more niche produce, which they've found success selling to interstate markets. "We have planted finger limes, which are a really interesting native fruit and we can't wait to have a proper commercial crop," Ms Tucker-Boehm said.

"We had quite a few this year but not quite commercial quantities.

"We also grow spaghetti squash and pumpkins...

"I was given a spaghetti squash as a gift from a friend for my birthday a few years ago and it was such an amazing vegetable that we kept the seeds from that one and planted a small crop of our own.

"I posted about it on social media and then I got contacted by the Melbourne markets who said they particularly love spaghetti squash.

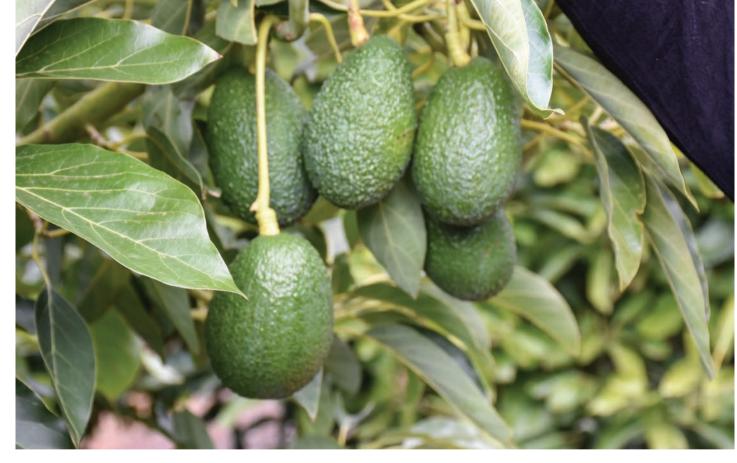
"Ours are ready before those in WA, which is one of the bigger growers.

"They asked if we were interested in growing it commercially, and so we did.

"The following year we got seeds and planted up a couple of rows and it just grew from there.

"It's not a massive crop for us, but it's something that's ready at a different time to avocados and having interest interstate has been fantastic.











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"Adelaide is slowly warming up to it, so hopefully we can get some spaghetti squash in Adelaide next year which would be great."

Ms Tucker-Boehm has been part of the business, owned by her in-laws Mark and Dawn Boehm, for eight years with her husband, Aaron.

The Boehms have grown avocados for more than three decades.

"Our season for avocados starts at a different time to other regions," Ms Tucker-Boehm said.

"Queensland just finishes theirs when ours starts, and it's before Western Australia comes into the market.

"Queensland and Western Australia probably have the biggest numbers (of avocados). We fit into that little pocket, so we can help supply Australia with avocados when there is that shortage in the market.

"It's definitely a great place to grow for that reason."

Ms Tucker-Boehm said Parkes Lane's crop was looking strong due to ideal weather conditions.

"We didn't have the long weeks above 36C like we have in the past and we also haven't had quite as many frosts," she said.

"Although people have been saying how cold this winter has been, for us we haven't had those really chilly mornings as well as less warmer days...

"We had a bumper crop last year – every growing region in Australia had a bumper crop last year.

"That meant there was quite a massive supply in the market and that's why avocados were so affordable.

"This year it is obviously down on last year, but there are still quite big crops going around as far as I know."







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Varroa mite: It only takes one

WORDS & PHOTOGRAPHY ALEXANDRA BULL

VARROA mite is a pest that many people are growing to learn all about, including Paringa beekeeper Robbie Johnstone, who is concerned about the potential affects that a varroa mite outbreak would have on the Riverland bee industry.

Varroa mite was first detected in Australia in late June at the port of Newcastle, with strong measures imposed quickly to stop the spread of the mite to other states, including South Australia.

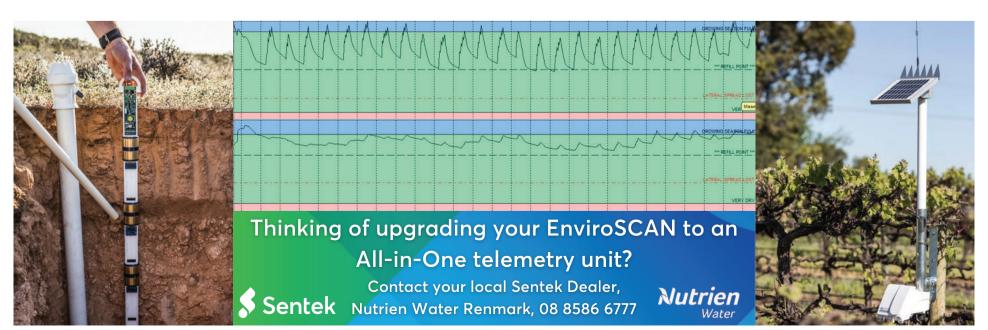
Mr Johnstone, who has backyard hives on his property, including hives that pollinate almond crops, explained that a female varroa mite hitchhikes a ride on a female bee and lands in a hive, beginning the process of infection.

"When the female varroa lands in there she hops off the bee, and she goes into a cell that has a grub in it, waits for it to be capped, then lays an egg," he said. "The first egg she lays is a male and every 30 hours thereafter she lays an egg."

Mr Johnstone said the problem with varroa mite is it only takes one mite to infect an entire hive.

"You only have to have one varroa in a hive and it will take them a long time to actually get out of the hive but in the meantime they are spreading,"

CONTINUED ON PAGES 44 & 46







"It is not uncommon for a female varroa mite to hitchhike a ride to another cell or hive, and she can get four to six cycles in one go.

"They are insidious and they are deadly."

Mr Johnstone explained he uses a sugar shake to check for varroa mite, which is typically used by beekeepers around Australia.

The sugar shake method involves getting a handful of bees in a jar filled with powdered sugar, letting it sit for about four minutes, and allows the sugar to warm.

This causes the mites to release from the bees, as the fine granules from the icing sugar sticks to their feet and they can no longer grip to the bees.

Then, the jar is turned upside down and slowly rotated over a container of water. The sugar will dissolve as it falls into the water, revealing if the hive is infested with varroa mite or not.

While the sugar shake method is effective, it is time consuming, with Mr Johnstone saying that it is not viable to do the sugar shake method on all hives, as it would simply take too long.

CONTINUED ON PAGE 46











Mr Johnstone believes if varroa miteinfected hives were allowed into the Riverland, it would be a similar slippery slope to what happened when small hive beetle was first in Australia.

"What is annoying me, is they did it before," he said.

"We had small hive beetle, not here, but they needed to pollinate our trees, so they brought them here and now we have them.

"While mites don't propagate well here in the Riverland, they are smart and they will evolve, and anything like that is going to have an effect on the hive."

Mr Johnstone believes South Australia will be able to struggle through the almond pollination season with just local bees, but is concerned about the NSW



bees that will be brought to the Sunraysia region for pollination.

"That is going to be right on the border, and this risk-management stuff just doesn't work," he said.

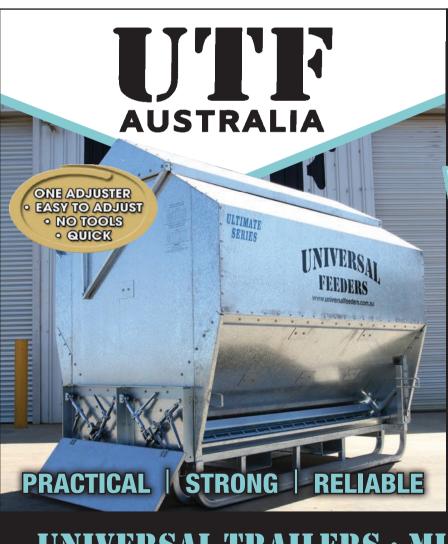
"It is just a nice way of saying 'if we are going to bring them here, you will be lucky if you don't get them'.

"It is very simple to get them (varroa). They just hitchhike a ride to a hive and that's that. So, if they let in NSW bees, of course we are going to get them, and how are they going to guarantee we won't?

"They are a drain on resources of the hive, and even the bees that survive, they live less.

"So, all in all, we don't want them."

That is going to be right on the border, and this risk management stuff just doesn't work...





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Strong 2021-22 farm financial performance

GOOD rainfall and high commodity prices contributed to the strong farm financial performance in 2021-22 according to a recent report.

ABARES executive director Dr Jared Greenville said cropping farms reported higher-than-average cash incomes over the past financial year.

"It's been a boom year. At

the national level, farm cash income for cropping farms is estimated to have increased by around 28 per cent to average \$619,000 per farm in 2021-22," Dr Greenville said.

"We can put this down to higher receipts from wheat, barley, oilseeds, and grain

"That said, prices are higher for farm inputs such as fuel

and fertiliser, and this has affected returns and will do so even more into 2022-23.

"It's been a solid year for livestock producers as well. At the national level, average farm cash income for livestock farms is estimated to have increased by around 10 per cent in 2021-22 to average \$202,000 per farm.

"A combination of high

commodity prices, especially for beef cattle, and good seasonal conditions have delivered strong financial returns for livestock producers.

"Ongoing productivity gains in Australian agriculture have helped drive the strong farm performance result in 2020-21.

"Over the long term, average annual productivity growth in

per cent, and 1.3 per cent in the dairy industry.

"Looking beyond the averages, we see that broadacre sector performance is being driven by larger farms with the largest 10 per cent of broadacre farms producing around half of total output, while the smallest 50 per cent of farms produce around 10 the broadacre industry was 1.0 per cent of total output."



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