FEEDBACK

MLA – FOSTERING PROSPERITY

AUTUMN 2023

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MEAT & LIVESTOCK AUSTRALIA

FEEDBACK

MLA fosters the long-term prosperity of the Australian red meat and livestock industry by delivering world-class research, development and marketing outcomes.

Cover (page 12): *WA ag-tech innovators Belinda and Deon Lay with their children Anastazia, Shannyn, Alexander, Rachelle and Darcy. Image: DHP Photography.*

Have your say!

We'd love to hear from you.

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A note from the MD

Welcome to the autumn edition of *Feedback* magazine.

MLA kicked off the year with the launch of our anticipated annual summer lamb ad – and what a cracker this latest one has proven to be.

Aussie lamb challenged the term 'un-Australian' and reminded the world that it's all of our differences, along with our delicious lamb, which unites us as a nation.

It only took three days for the ad to reach one million views on YouTube, and by the time *Feedback* went to print there were more than 4.8 million views, making it the most watched summer lamb ad on YouTube ever. If you have not seen it, I encourage you to watch and share with your networks. You can learn more about the ad and where to view it on page 3.

Take a closer look at some of MLA's other marketing activities from page 41, to see how our international and domestic marketing teams are keeping red meat on consumers' shopping lists around the world, from summer barbecues in the US, to camping in Japan, to cruise ships off the coast of Australia.

MLA also maintains a focus on red meat at a national level – including at the recent Parliamentary Friends of Red Meat events in Canberra (page 3) and the Senate Inquiry into the cost of living earlier this year. I had the opportunity to talk to the Senate Inquiry about how MLA invests in programs which give consumers more options such as the beef mid-week meals campaign and using different cuts of meat to create healthy nutritious meals.

Industry outlook

MLA recently released our annual industry projections, which present a positive year ahead for sheep and beef as national flock and herd numbers accelerate.

Overall, Australia's sheep industry is in an exciting position of continued growth and development, with local production and the flock forecast set to rise, while global demand for high quality sheepmeat in established and emerging markets continues. The industry's ability to continue to deliver high quality protein and be a world-leading producer will define 2023 as a positive and optimistic year.

There are also positive outcomes forecast along the entire beef supply chain as the exceptional operating conditions on-farm continue. While 2023 will be a year of transition for the cattle industry, the overall outlook for Australia's beef industry both domestically and internationally is one of

optimism and positivity, as it continues to deliver high quality beef in larger volumes.

Turn to pages 3–4 for more insights from MLA's 2023 sheepmeat and beef industry projections.

While the rainfall and favourable seasonal conditions last year will ensure solid supply of lambs and young cattle over the next two years, regardless of seasonal outcomes, many of our members are still recovering productivity following excessive rain in late 2022. Turn to page 6 for insights into pasture management tips through autumn, to get saturated pastures back on track for the important southern spring grazing period.

For northern producers who are facing feedbase challenges of a different type from pasture dieback, new insights into managing dieback have emerged in MLA-funded research – learn more on page 26.

We have also compiled some handy insights into pasture options in WA, including vetch and novel legumes, which you can read more about on pages 24 and 34.

For northern beef producers who want to be on the front foot coming into this year's bull sales, check out page 8 for a look at how the two new genetic tools MLA has released can help you achieve better breeding objectives.

Strategies such as these – to improve pasture and genetics – are among the emissions-reducing tools producers can use to build resilient businesses. Follow a NSW producers' carbon journey on page 18.

I delved deeper into how our industry is improving the environment and providing highly nutritious food to the world in a recent article – read *The biting truth: red meat's sustainability success story* at **mla.com.au/op-ed** ■

Jason Strong MLA Managing Director
Have a question for me? **jstrong@mla.com.au**

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Attend

Sign-up for a MeatUp or BeefUp forum near you:

- mla.com.au/meatup
- mla.com.au/beefup

Watch

Sheep and cattle industry projections:

- mla.com.au/projections

Use

The Australian Feedbase Monitor tool:

- mla.com.au/afm

eNVD in your pocket

After extensive testing by producers and supply chain members, Integrity Systems Company (ISC) has finalised its newest update to the electronic National Vendor Declaration (eNVD) system – the eNVD livestock consignments app.

The eNVD app is purpose-built to overcome connectivity challenges, providing a complete mobile solution for the NVD.

The user-friendly app is designed to help industry transition to digital consignments.

It enables the transfer of information along the entire supply chain from a producer's mobile device to a receiver's device, with or without mobile coverage.

It can also be used offline – producers can generate a unique QR code to be scanned by their transporter and receiver.

The app is available to download for free through the Apple Store and Google Play Store.

ISC has a suite of eNVD app 'how-to' resources available for all supply chain sectors.

Find out more at: **integritysystems.com.au/envd-app**

Red meat on the menu at Parliament House

The Parliamentary Friends of Australian Red Meat joined forces with the Red Meat Advisory Council (RMAC) recently to celebrate everything beef, lamb and goat – marked by a three-hour long line of Parliament House staff keen to get their hands on a smoked brisket roll.

A lunchtime offering in the Speakers Courtyard led to more than 450 smoked brisket burgers dished up to staffers, front desk workers, grounds people and parliamentarians.

This was followed by a special celebratory dinner hosted by Speaker of the House Milton Dick MP together with Parliamentary Friends of Red Meat Co-Chairs Senator Susan McDonald and Senator Raff Ciccone, and RMAC. About 150 champions of the industry dined on red meat canapés cooked by MLA's Corporate Chef Sam Burke and Australian Parliament House Head Chef David Learmonth.

RMAC's Independent Chair John McKillop said the event, which focused on sustainability, was not only a celebration of red meat, but of the people who make up Australia's beef, sheep and goat industries.

mla.com.au/sustainability-hub

» Speaker of the House of Representatives Milton Dick MP with MLA Corporate Chef Sam Burke and Australian Parliament House Head Chef David Learmonth. Image: Andrew Taylor.

Free feedbase tool for MLA members

Planning for profitable pasture has become easier for producers with the Australian Feedbase Monitor (AFM). Following the launch of the AFM by MLA and Cibo Labs in November, more than 1,500 accounts have already been created by producers around Australia. The AFM undertakes a satellite-based assessment of feed availability – or standing dry matter – to help producers identify their 30-day rolling average for their property and make objective assessments of pasture growth, biomass and ground cover. The tool is free for MLA members who have linked their Livestock Production Assurance (LPA) accounts to their myMLA dashboard.

mla.com.au/afm

Join a MeatUp or BeefUp forum near you

MLA's 2023 MeatUp and BeefUp forums are underway for 2023, giving beef, sheep and goat producers the opportunity to learn something new, stay up-to-date with the latest on-farm research and technologies and meet others working in the red meat industry.

MeatUp forums are held predominantly throughout southern Australia – the remaining events for 2023 are at:

- Albany, WA
- Cunnamulla, Queensland
- Tamworth, NSW
- Cowra, NSW.

BeefUp forums are held throughout Queensland, NT and WA – the remaining events for 2023 are at:

- Broome, WA
- Kununurra, WA
- Taroom, Queensland
- Hughenden, Queensland
- Alice Springs, NT
- Barkly, NT.

Visit the MeatUp and BeefUp webpages for event dates and programs: **mla.com.au/meatup** **mla.com.au/beefup**

New carbon management tools

Two new carbon management modules are now available on MLA's free eLearning platform, The toolbox.

Packed with practical advice, the training modules focus on the key concepts of carbon accounting and the actions producers can take on-farm to support their emissions reduction and carbon sequestration journey.

Following on from the release of the *Carbon 101* module (which de-mystifies the language of carbon and provides information about carbon farming) in October, the two new modules – *Measure your own emissions* and *Carbon sense* – provide guidance on the carbon accounting process and steps producers can take to reduce emissions.

Both eLearning modules, which take less than an hour to complete, provide producers with an opportunity to learn through case studies, images, videos, quizzes and practical data application (either their own or default data). They also help producers understand how their learnings can be applied to their current and future planning.

The two new modules were developed and funded in partnership with beef processor, Greenham, with technical support from agribusiness consultants, Pinion Advisory.

The toolbox: **elearning.mla.com.au**
Carbon neutral by 2030 hub: **mla.com.au/cn30**

Lamb sears tasteless 'un-Australian' behaviour

Un-Australia: Australian Lamb film:
Scan the QR code to watch on YouTube.

MLA's annual summer Australian Lamb ad challenged the term 'un-Australian' and reminded the world how our differences, along with our delicious lamb, are a uniting force.

It resonated with Australians, earning the title of the most watched summer lamb ad on YouTube ever with more than 4.8 million views since launch of the campaign.

Research conducted by Australian Lamb found that almost half (45%) of Aussies have been called out for an 'un-Australian' act, while more than half (52%) have used the term to describe someone or something.

The rise in living costs over the past 12 months have dominated the list of the most 'un-Australian' things to have happened in 2022. Paying $34 for a watermelon caused the most uproar (55%), above rising rent/property prices (36%) and rising interest rates (32%).

Now though, it seems that these call outs have gone too far. More than half (53%) of Australians believed the term 'un-Australian' was so overused in 2022 that it was hard to know what is or isn't Australian anymore.

The latest advert from Australian Lamb imagines an alternate reality where people are called out for being 'un-Australian' before being banished to Un-Australia – an infinite cultural exile filled with Aussies who've committed offences from switching off the test cricket, to eating a meat pie with a knife and fork, to not knowing the second verse to *Khe Sanh*.

When Lambassador Sam Kekovich appears in a cloud of smoke, alongside a sizzling barbecue and perfectly searing lamb, it's clear all the 'un-Australian' accusations have gone too far.

"Lamb is famous for bringing Aussies together, so what better way to cut through this division and help us come together over these collective differences than with a good lamb barbecue," Graeme Yardy, MLA Domestic Market Manager, said. ■

Facebook **@AustralianLamb** YouTube **@AustralianLamb** Try delicious lamb recipes at **australianlamb.com.au**

National herd and flock increase on cards for 2023

MLA has released its latest industry projections, which forecast Australia's sheep flock to reach the largest size in more than 15 years, while the national cattle herd is heading towards a level not seen since 2014.

- National sheep flock will **grow to 78.75m head** – the highest level since 2007
- **Record lamb production and exports** are forecast for 2023
- Opportunity for **Australia to increase its market share** as the world's largest exporter of sheepmeat

- National cattle herd will **grow to its highest level since 2014** at 28.8m head
- **Prices are forecast to operate at longer term averages** in 2023
- Issues surrounding **labour remain the key determinant** of cattle slaughter performance in 2023

Sheep projections

The Australian sheepmeat industry is set for another bumper year in 2023 as the national sheep flock grows to its highest level since 2007 at 78.75m head.

Driving this increase are optimal breeding conditions nationwide, a genetically superior flock, improved lambing percentages and medium-term industry confidence at the farm gate level.

Growth is forecast across all states, with larger improvements in flock numbers expected from SA, WA, Queensland and Tasmania. The key sheep producing states of NSW and Victoria are also forecast to lift numbers, although not as significantly as other states.

In 2024 the national flock's growth is projected to moderate and plateau, reaching 79.5m head, a rise of 1%, or 750,000 head year-on-year. In 2025, the national flock is estimated to fall to 2023 levels, although it will remain above the 10-year average.

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Slaughter

According to MLA's Senior Market Information Analyst Ripley Atkinson, the growth of the national flock in 2023 will lead to increased slaughter numbers and production.

"Lamb slaughter is forecast to reach 22.6m in 2023 as a result of large numbers of breeding ewes and strong marking rates. This is a rise of 595,000 head or 2.7% year-on-year."

This reflects a continuing trend of small stock processors increasing their throughput in line with higher supply.

"Looking further ahead to 2024, we forecast it to be a record year for lamb slaughter, reaching 23.2m head. This would be a rise of 3%, or 560,000 year-on-year and higher by 1.1m head or 5% on the 10-year average."

Carcase weights are also forecast to increase in 2023. This is primarily due to structural genetic investment and productive improvement in the national flock over the past two years.

In 2023, lamb carcase weights are forecast to remain high at 25.1kg. This would be 11%, or 2.5kg/head, above the 10-year average.

This is despite weather forecasts suggesting drier conditions across southern Australia will occur in the second half of 2023.

Export

As the second largest sheepmeat exporter in the world, New Zealand plays an important role in the global lamb and mutton market.

However, a decline in the New Zealand sheep flock size – as wool and lamb production become less profitable compared to dairy production, and land availability decreases – presents an opportunity for the Australian sheepmeat industry.

"In recent years, successive Australian governments have made considerable strides in gaining European market access, with talks ongoing for an Australia (AU)-European Union (EU) Free Trade Agreement (FTA) and the AU-UK FTA signed in December 2021," Ripley said.

"As New Zealand sheepmeat exports have increasingly shifted away from Europe, and towards China, improved opportunities for Australian sheepmeat in European markets may continue."

Cattle projections

The Australian beef industry and cattle herd are also well positioned to capitalise on changing global supply dynamics in 2023.

This year will be a year of transition and maturity for Australia's cattle herd, with any increases in numbers now beyond rebuild status. All key production metrics are forecast to improve this year.

Continued rainfall and favourable seasonal conditions last year will ensure solid supply of both young and slaughter weight cattle over the next two years, regardless of seasonal outcomes.

Southern Australia will continue to drive increases in cattle numbers, particularly NSW, with supply improvements also expected from southern WA, SA and Victoria to different extents.

In the north, favourable seasonal conditions for large parts of Queensland drove the beginning of the state's herd rebuild and an improvement in female numbers. Northern Australia's rebuild is expected to gain significant pace this year.

Herd growth

Overall, the cattle herd in 2023 will grow to its highest level since 2014, reaching 28.8m head, an increase of 1.1m or 4.5% year-on-year.

"The record retention of females for 15 consecutive months, coupled with above-average marking rates, has delivered larger calf drops. This bodes well for supply to increase substantially in 2023 for both young and slaughter-weight cattle," Ripley said.

"Both of these metrics suggest that the lowest or most significant retention of stock on record occurred for the year. This underpins the positive growth in numbers forecast for the next three years."

By 2025, the national herd is expected to reach its highest level since the 1970s at 29.6m head, before a steady decline. This continued growth is due to strong female reproductive performance, genetic improvements across the herd and sound on-farm management.

Labour challenge

Input prices and cost of production will be major factors affecting the ability of the sector to remain productive and efficient.

In addition, the availability of skilled and unskilled workers to manage the increased supply of cattle in 2023 will be the major issue affecting the red meat industry. The processing sector's ability to process cattle will determine production levels and therefore exports in 2023.

MLA's Market Information team have recognised this with a two-scenario forecast for 2023.

"If labour concerns are not addressed within the processing sector, slaughter is forecast to reach 6m head," Ripley said.

"Based on actual supply of cattle this year, the forecasts indicate an uptick in numbers to 6.625m head." ■

TO DO

Read MLA's 2023 *Sheep Industry Projections* and 2023 *Cattle Industry Projections* at: **mla.com.au/projections**

Watch the MLA Market Information team present the forecasts for the Australian sheep flock and cattle herd in 2023.

Ripley Atkinson **ratkinson@mla.com.au**

ON FARM

RESEARCH IN ACTION

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Tap into more $/ha and lift winter grazing with new and improved pasture legumes.

Four ways to keep pastures productive

With many southern producers experiencing the impact of saturated pastures from recent rainfall, autumn is the time to assess pasture renovation or rejuvenation needs.

Here, feedbase management advisor Cam Nicholson outlines the steps to keep your feedbase firing up for spring.

Cam recommends using MLA's Pasture Paramedic tool to analyse the condition of the feedbase after initial saturation before the autumn break, and again in the late autumn to early winter period.

"What producers find during these two assessments are going to determine the actions needed to revive their pastures," he said.

Cam said there are four important steps to take to get pastures back into production after flooding:

1. Test soil fertility in early autumn and replenish soil nutrient levels that have dropped.
2. Spell impacted paddocks to allow at least three leaves to regrow on the desirable grasses, even if this means supplementary feeding.
3. Wait until any weeds found during second assessment are under control before resowing.
4. Use MLA's pasture products to aid in managing general regrowth.

First assessment – early autumn

Cam said producers' observations after feedbase saturation can be highly variable.

"Some will find their pasture has survived well, while others will have lost theirs completely," he said.

"Being able to make that first rapid assessment will allow producers to think about short-term feed supply strategies, especially if not a lot of their pasture has survived.

"For those who see relatively good pasture survival, the initial assessment will be about determining the soil manipulation or grazing management needed to allow pasture to regrow."

When it comes to testing soil fertility, most producers who have experienced water logging will have lost a lot of natural nitrogen.

Southern producers who haven't been impacted by heavy rainfall may also find soil testing is beneficial to promote pasture productivity into winter.

Second assessment – early winter

When it comes to the second pasture assessment phase, Cam's tip is to use the image resources associated with the Pasture Paramedic tool to identify common pastures, clovers and weeds.

"Producers should keep in mind that their pastures might not return as quickly as they have in the past. If they lost a lot of those good perennial grasses, the more weeds they are likely to see," he said.

In addition to the Pasture Paramedic tool, Cam recommends checking out MLA's hubs as well as MLA-funded fact sheets, developed by Southern Farming Systems to support feedbase revival and management:

- Healthy productive soils: **mla.com.au/healthy-soils**
- Weed control hub: **mla.com.au/weeds**
- Persistent pastures hub: **mla.com.au/persistent-pastures**
- Sub-clover fact sheets: **mla.com.au/feedbase-hub** ■

Cam Nicholson using MLA's Pasture Paramedic decision-making tool.

SEASONAL ACTION PLAN

- The Pasture Paramedic tool requires training - find a deliverer at **mla.com.au/pasture-paramedic**
- Get on top of weeds at **mla.com.au/weeds**
- Scan this QR code to read a quick guide on how to take a soil test.
- Access more soil testing training and resources at **elearning.mla.com.au/courses/soil-testing**

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Andrew Morelli
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Feedbase management toolbox essentials

- **Feedbase planning and budgeting tool**
- **Feedbase monitor tool**
- **Pasture improvement calculator**
- **Phosphorus tool**
- **Pasture Trial Network**

Visit **mla.com.au/tools-calculators** to access these resources.

Carbon calculator at your fingertips

MLA has launched an online, web-based greenhouse gas (GHG) calculator based on the Sheep and Beef Greenhouse Accounting Framework (SB-GAF) tool for Australian sheep and beef producers.

The digitised version of the SB-GAF tool is based off the freely available excel version of the tool available on the Primary Industries Climate Challenges Centre (PICCC) website to ensure consistency across the sector.

According to MLA's Managing Director Jason Strong, completing a carbon account is an important first step for producers to increase their carbon awareness and determine what their net GHG emissions position is, so they can identify strategies to reduce these emissions and improve carbon storage on-farm.

"Calculating baseline carbon emissions and sequestered carbon is an essential first step for producers who are considering opportunities arising from low or zero carbon red meat, such as carbon-neutral branded products, or who simply want to improve their productivity and profitability," Jason said.

"A carbon account can be used in on-farm decision making and sets a benchmark to show progress over time.

"Just as financial accounting aids financial decision making and reporting, carbon accounting aids decision making and reporting around how carbon is – or is not – utilised on-farm.

"The calculator also enables an emissions intensity figure to be calculated, and improves on-farm data collection and storage capabilities."

Calculating and reporting on-farm emissions and emissions intensity for red meat products are likely to be requirements for on-going and emerging market access in the future. The improved usability of this tool will support red meat producers in the process.

Benefits to your business

The calculator will provide a baseline carbon account with total GHG emissions for the property and the emissions intensity of product produced.

The SB-GAF calculator will enhance on-farm data collection and storage capabilities, and ensure relevant information is on hand when market opportunities arise that require historical data.

A carbon account is an important tool for business planning as it allows producers to understand their current position and identify areas for improvement.

A carbon account includes two key elements:

1. **GHG emissions** – including enteric methane from ruminant production and carbon dioxide from fossil fuels, as well as direct and indirect emissions of nitrous oxide from fertiliser application and excreta and methane from manure.
2. **The carbon related to vegetation and soils on-farm.**

Reducing GHG can DELIVER a range of benefits, including increased productivity and long-term sustainability, improved consumer and community support, and secure market access.

Carbon accounts also provide accessibility to new and emerging markets for products demonstrating environmental stewardship credentials, as well as access to capital and ensuring the adaptation and resilience of red meat production in the face of changing climatic conditions. ■

TO DO

- Check out the new online GHG calculator at **mla.com.au/tools-calculators**
- Learn more about the SB-GAF tool at **piccc.org.au/resources/Tools**
- Access more sustainability tools and resources at **mla.com.au/sustainability-hub**
- Scan this QR code to learn more about carbon accounting.

mla.com.au/tools-calculators **mla.com.au/cn30** Katelyn Lubcke **klubcke@mla.com.au**

Two tools to turbo-charge genetic gain

Weaners moving onto grower country cells on Andrew Mactaggart's property in Duaringa, central Queensland (see story opposite).

Northern beef producers have two new tools to drive fertility in their herds.

MLA-funded Genomic Breeding Values (GBVs) and herd profiling are designed to boost fertility in high-value commercial production systems.

They allow producers to identify high-performing replacement females, for greater transparency in management decisions to fast-track productivity gains.

Benchmarking

Benchmarking is an important tool to identify opportunities to lift herd performance, but until recently, the ability to benchmark the genetic potential of commercial herds was limited.

An MLA project in partnership with the University of Queensland (UQ) has closed the gap between possible genetic gains and the gains producers are currently achieving in northern beef production systems.

The project, which has just finished, used a large reference population to map a range of traits related to fertility.

Clara Bradford, MLA's Project manager – Livestock Genetics, said unlike previous models which focused on recording genetically diverse seedstock animals, the UQ project recorded phenotypes and genotypes of commercial herds.

The 54 collaborator herds involved in the project contributed 26,000 commercial females, which were recorded for age at puberty, return to oestrus (P4M) and other production traits, as well as new traits such as tick resistance.

"The aim was to provide a tool that could utilise the technology of genomics for commercial production systems, where they don't have the level of recording or accuracy that a seedstock herd would," Clara said.

Two products emerged from the project: GBVs and herd profile.

1 Genomic Breeding Values (GBVs)

"A GBV is a trait based off a genomic prediction developed from a large commercial reference population," Clara said.

"It allows producers to select commercial females that are better for fertility and growth, or teams of bulls from crossbred or composite breeds that are part of the reference."

While the products allow producers to test bulls, they don't replace estimated breeding values (EBVs).

The GBVs can help producers select their highest performing heifers in a more objective way.

"If you had to pick 20 heifers from 100, the GBVs allow you to select them on their genetic potential for key fertility traits, instead of on pedigree, the way they look, or how much they weigh," Clara said.

"It's less subjective, more objective."

The Mactaggarts select polled bulls on Genomic Breeding Values (GBVs), temperament and soundness.

2 Herd profile

If a producer has never done any form of genomic testing or used breeding values before, the herd profile tool will benchmark where their herd sits.

"If you have a breed that has EBVs, you can do a herd profile that will tell you where your commercial females fit. You can then purchase bulls with EBVs complementary to those females," Clara said.

Producers who are aiming to drive production can find bulls that sit in the top 1% of the breed, and use those animals to put their herd on a fast trajectory of increasing genetic progress.

"If you have a terminal herd, you'll make some very quick gains. In a self-replacing scenario, one bull will have an impact on your herd for 10 years.

"Being more informed in the way you make that decision will positively impact the productivity of your herd for generations." ■

These tools are currently going through the commercialisation phase – contact Elsie Dodd for more information: **e.dodd@uq.edu.au**

SEASONAL ACTION PLAN

- If you have spring-born calves, now is the time to assess which of these could be replacement females.
- Bring them into the yard, test them, draft according to which you are going to keep, and which will be sold or put through a feedlot program.
- Do a herd profile to benchmark your herd in preparation for upcoming bull sales.

Revolutionising northern genetics

Meet two of the northern beef producers who participated in the MLA/University of Queensland project to develop new genetic tools (see story opposite).

The ability to identify genetic markers for fertility in northern beef herds has been a game-changer for composite breeders such as Andrew Mactaggart.

Andrew Mactaggart

Andrew Mactaggart and his family run a multi-generational beef enterprise north-east of Duaringa, in central Queensland.

They have 2,500 open-composite breeders, with 40–60% *Bos indicus* content and a balance of British and European genetics, capturing the benefits of hybrid vigour.

Andrew provided the UQ reference group herd with two cohorts of yearling heifers in 2017 and 2018.

"We didn't have specific goals going into the project, but we could see that if the research team could identify a genetic marker for fertility in northern beef herds, it was going to be good for the industry," Andrew said.

The heifers were scanned at approximately 300kg to determine the presence of a *corpus luteum*, indicating oestrus cycling, then scanned for pregnancy and foetal age after joining. They were then scanned 12 months later for a rebreed pregnancy.

The scans determined approximate age of puberty and ability to rebreed while lactating (known as P4M – pregnant four months after calving). While it took a few years before data collected delivered the indicators, the results have allowed Andrew to benchmark his herd.

"A single benchmark can be dangerous, but a series can show you the trend of where you're headed," Andrew said. "The value is in knowing how far towards your goal you are, and if what you're doing is moving you in the right direction."

As all the bulls he uses are contract bred or home bred, Andrew also selects bulls using GBVs, in addition to existing systems.

"GBVs have given us more robust data to work with, particularly for hard to measure fertility traits," he said.

"This is a significant tool for commercial production. It really lifts the ability to measure objectively, in a cost-effective manner, for producers who are not registered breeders or part of a breed society."

Andrew Mactaggart
acrm@bigpond.com

Droughtmaster breeder Michael Flynn said the new Genomic Breeding Values tools will allow seedstock breeders to accelerate genetic gains.

Michael Flynn

Michael Flynn has a Droughtmaster bull breeding operation south of Augathella, Queensland.

Each year the Flynns join 3,000 females and produce 500 bulls.

Michael is also a cattle vet, focusing on fertility and profit for clients.

For almost 50 years, he's been selecting for fertility traits using traditional breeding methods.

"It's a really slow process," Michael said.

"You can't get enough data, and by the time we know a sire is throwing heifers that are performing for us, he's long gone. These new tools allow us to select bulls as calves that have those traits ingrained."

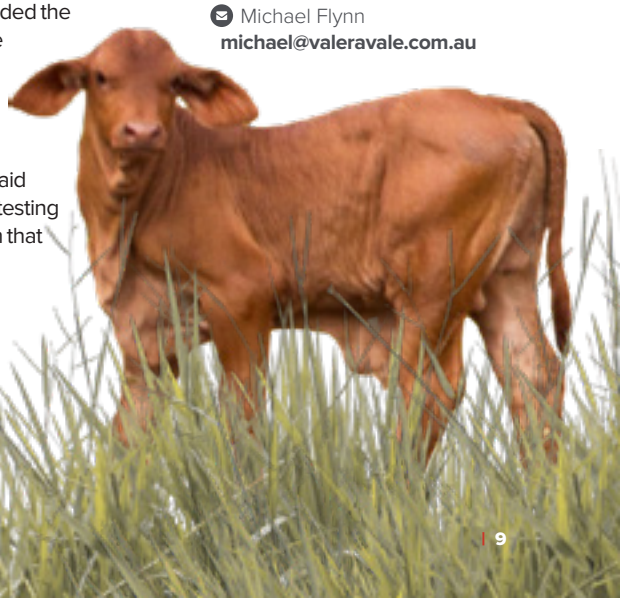
Michael provided the UQ reference group herd with two cohorts of maiden heifers, and said the genomic testing showed them that in terms of fertility, they still have some genetically inferior animals that are not being identified by traditional performance records.

"It's disappointing on one hand, but it's also exciting, because it shows us the potential for these tools to accelerate the program," Michael said.

"For too long the beef cattle industry has been selecting their bulls on inadequate information, us included. We're going to be able to make enormous genetic gains by picking bulls on their genetics, not on their looks or showring success.

"These tools will revolutionise the beef industry."

Michael Flynn
michael@valeravale.com.au



MLA genetics hub **genetics.mla.com.au**
BREEDPLAN **breedplan.une.edu.au**
Clara Bradford **cbradford@mla.com.au**

Jim Gaylard, property manager of 'Trawalla', Rose Grange Pastoral Company, Little River, near Geelong.

Fertiliser secures feedbase

In just eight years, the stocking rate at Rose Grange Pastoral Company's 'Trawalla' property has more than doubled.

Manager Jim Gaylard credits this growth in production to the enterprise's approach to applying and managing fertiliser.

"The initial years of management under Rose Grange ownership were a shock to the system at Trawalla," he said.

"Inputs increased and the property just came to life. In the past eight years we have simply been building on that production potential and you can see it by the sustained growth in dry sheep equivalents (DSE)."

Mapping trends

Trawalla has focused on mapping soil fertility trends over time, dividing the property across both the cropping and livestock enterprises into four management sections, with each management section soil tested every four years and treated accordingly.

"The cost of production for spreading fertiliser works out to be about $58/ha/year (for the period of 2014–2021)," Jim said.

"It's hard to put a dollar value on return on investment from fertiliser use, but you can put it this way, when I came to Trawalla the stocking rate was 12 DSE/ha, it's now 26 DSE/ha. That's fertiliser.

"Obviously, there are other factors like better suited sown pasture species and things like that, but you could put a lot of that down to simply soil fertility."

Jim has observed how often the first thing producers sacrifice in a tough year is soil fertility.

However, under Rose Grange owner Jock Richmond, it's a different story.

"Jock, myself, all of his managers and everybody that works for him, would be totally on the other leg and say, well, that's the first thing we're going to put out; we're going to maintain that fertility and we'll sacrifice putting a fence up or something else," Jim said.

"There'll be other things that you could sacrifice before fertiliser and I think, by doing that and maintaining the soil fertility, it gives us a big advantage."

Don't compromise fertility

For Jock, even the high input prices producers faced in 2022 didn't erode this commitment to soil fertility.

"I could have reconsidered fertiliser applications given current prices, but I know our cost of production and our returns, and it was still worth it," Jock said.

"You just can't cut out one of your biggest production drivers."

Nitrogen is vital

In addition to phosphorus, potassium and sulfur, nitrogen (N) has a prominent role in the fertiliser program at Trawalla.

The philosophy is that maintenance applications of urea, used on high-performing perennial pastures, will increase the rate of return of fertiliser.

In autumn, N is used in the form of 100kg DAP per hectare for new sowings, with some strategic use of urea on other paddocks.

SNAPSHOT

ROSE GRANGE PASTORAL COMPANY,
'Trawalla', Beaufort, VIC

AREA
4,454ha

ENTERPRISE
Red meat production, cropping and summer fodder

LIVESTOCK
600 Angus cows (July calving), 11,000 first-cross ewes (July lambing)

PASTURES
Perennial ryegrass, phalaris, sub-clover base

SOIL
Basalt base ranging from clay, clay-loam soils, becoming lighter on the hilly country. Hard claypan in the subsoil.

RAINFALL
625mm

In late winter, N is used on selected paddocks to boost growth in highly productive perennial pastures, and in some of the annual pastures that will be cut for hay and silage.

"Our urea application on better pastures is a post-lambing application, spread at about the time we're lamb marking, at a rate of 100kg/ha," Jim said.

"Post-lambing, mobs are boxed to increase grazing intensity. This also allows us to rest paddocks that have been fertilised and focus grazing pressure on the country that's going to go into crop.

"This way we maximise utilisation of feed on those lesser performing paddocks, knowing that we're going to spray them out in early spring. It also lets the better country respond to the fertiliser and grow some bulk."

The approach is that paddocks are rested until feed on offer reaches 1,500kg DM/ha, at which point stock return to graze.

> **"You just can't cut out one of your biggest production drivers."**

Southern Farming Systems **sfs.org.au** Jim Gaylard **jimgaylard@gmail.com** Lisa Miller **lmiller@sfs.org.au**

"If the spring is on our side, and it looks like we've over-committed in areas, there's no reason why another 100kg/ha of urea can't go out," Jim said.

"This is purely opportunistic on prioritised pastures.

"For instance, if we spread urea over 1,500ha, we wouldn't go over that whole area a second time, but we might do 500ha again.

"It would be a smaller pocket of country that we know we could get going, such as a younger, newly established pasture with vigour."

When it comes to selecting paddocks for opportunistic nitrogen application, Jim said it has to give "bang for your buck".

"There's not much point spreading fertiliser and then the season cuts out; you have to get a return."

Learning from experience

"We're all about fertiliser but not about wasting it. I think that Rose Grange's approach has been influenced by the dairy operation in Colac (another of the Rose Grange properties); it's been an eye opener with how much and how frequently they spread urea on their pastures," Jim said.

Although responses have not been quantified with yield cuts, the visual response to nitrogen is clearly positive.

"We had a phalaris paddock that was split with a laneway – one side got urea and the other didn't. I estimate we would have grown an extra 1,200–1,800kg DM/ha on the side that had urea spread." ■

LESSONS LEARNT

- Fertiliser is one of the biggest drivers of production and is a critical input which cannot be sacrificed, even when fertiliser prices rise.

SEASONAL ACTION PLAN

- Find more soil resources at **mla.com.au/healthy-soils**
- Find seasonally relevant management tips and tools at **mla.com.au/seasonal-hubs**
- Read more case studies and access practical resources at MLA's feedbase hub **mla.com.au/feedbase-hub**

Eye in the sky for goats

Trials are underway to explore the use of drones to locate and muster goats efficiently and cost-effectively on large-scale operations, and as a broader on-farm management tool.

Queensland producer Luke Chaplain of 'Malakoff Station', Cloncurry, is the founder of SkyKelpie, a research and development company undertaking trials with the aim of upscaling the technology to make a commercial product for finding and moving livestock.

The trials are supported by MLA's Supply Chain Technology Innovation Program and Queensland Department of Agriculture and Fisheries.

Luke said while some producers are already mustering livestock using drones – also known as unmanned aerial vehicles (UAVs) – there's potential to explore commercial models that emulate traditional helicopter mustering in a more cost-effective and efficient way.

Through the trials, Luke is also looking to address future regulation changes to make UAVs more user-friendly for large-scale livestock operations.

"The use of drones in Australia is regulated by the Civil Aviation Safety Authority (CASA). It's very complex to be able to fly a drone out of the visual line-of-sight, which is a barrier to the technology's adoption on large-scale properties," Luke said.

Goat mustering trials

The trials included mustering goats with producers Natalie Curley and Aimie Licht, on 'Avington Station', near Blackall in central-west Queensland.

"We used a DJI M30T drone and applied the simple mustering principles of pressure and release in different ways to move the herd and it worked really well," Luke said.

"We think there's going to be a range of other benefits associated with using the drone, particularly in terms of on-farm safety.

"Where Natalie and Aimie are located, a lot of gyrocopters are used by livestock producers, which can be even more dangerous than helicopters.

"During one of the trials, the lead goats ran out into timber, and it would have been dangerous with a motorbike trying to flush them out, but we managed to steer them out with the drone."

Natalie and Aimie were impressed with the drone's ability to muster the goats efficiently.

"The drone really helped flush out the goats from the brush and trees," Aimie said.

"It allowed us to control the mob better, with less people and less stress."

The drone also aided mismothering by gently moving stock and allowing nannies to pick up their kids.

During one of the trials, a speaker was attached to the drone to test its effectiveness.

"While the noise of the rotor blades and the presence of the drone is usually more than enough to move livestock, when you get into different situations, it's an extra tool that could be used if needed," Luke said.

"It's a third-party speaker that's compatible with the DJI, and you can upload any sounds you want. I have uploaded helicopter noise, my voice and a dog barking."

Queensland livestock producer Luke Chaplain is the founder of SkyKelpie. Image: SkyKelpie.

More than mustering

MLA Supply Chain Technology Innovation Program Manager, Darryl Heidke, said the trials highlight the specific use cases and value propositions of drones for red meat producers and how this technology may change the way livestock is mustered in the future.

"The added advantage of this aerial platform is that the drone could be used as a mobile data platform for gathering important data on water, livestock and pasture management while mustering, to improve decisions on-farm," Darryl said.

Luke will visit UAV manufacturers globally this year as part of his 2022 Nuffield Australia Scholarship. ■

Watch videos of the drones in action at 'Avington Station', Blackall – scan this QR code Darryl Heidke **dheidke@mla.com.au**

» Belinda and Deon Lay with their children Anastazia, Shannyn, Alexander, Rachelle and Darcy. Image: DHP Photography.

Ag-tech heats up at Coolindown

Gaining control over their own data has improved productivity and efficiencies for Belinda Lay and her family at 'Coolindown Farms', near Esperance, WA.

The Lays have developed their own farm data store (rather than relying on third parties to store data) where they can access, combine and collate historical and current data sets to uncover new data insights and test management theories.

Belinda, who received the 2019 WA AgriFutures Rural Women's Award for her trials of sheep location and temperature collars, has long embraced on-farm ag-tech and is involved in research into Internet of Things (IoT) technology.

IoT encompasses the billions of interconnected objects whose technology, such as sensors, allows them to share data with other devices and systems across the internet.

The Lays have progressively automated processes that are cost-effective to do so, and their involvement in MLA's co-funded research project, which looked at using devices and data to generate return on investments (ROIs) in a mixed farming enterprise, has showcased a wide range of benefits.

The results from the project will also be used to test an ROI calculator being developed by MLA.

Return on investment

Belinda said a valuable part of being involved in the MLA project was the ability to assess the financial benefits and ROIs in the context of time savings, wages, overhead costs and increased production.

"It also helped us develop stronger thought processes around ag-tech adoption and automation," she said.

"We found we needed to look beyond manufacturers' prescribed applications for a range of devices to reach our ROIs."

Belinda's advice to other producers is to not just view ROI as a monetary return, as investing in ag-tech can also improve management, animal welfare, traceability and biosecurity, which in turn drives profits and savings.

Here's a look at how the MLA/Coolindown project demonstrated the value of device interoperability and how embracing ag-tech can generate healthier returns on investments and more efficient management decisions.

SNAPSHOT

THE LAY FAMILY,
'Coolindown Farms',
Esperance, WA

AREA
3,200ha

ENTERPRISE
Sheep and grain

LIVESTOCK
3,200 Merino ewes

PASTURES
Crop grazing, annual improved mixed species pastures

SOIL
Sand over gravel, deep sand

RAINFALL
500mm

» Drones save Belinda time when sheep collars notify her of any issues which need checking. Image: DHP Photography.

Belinda's top tech tips

Make sure you can combine a device's data with other data sets: We compared animal movements with rainfall, crop yield and soil moisture, to gain insight into different areas. This correlation is only possible if your data is interoperable.

Ask the curly questions: Ask about data ownership, how you gain access and what happens with your data. Make sure you get an answer.

Installation costs: Factor these in – don't forget fences to protect devices from livestock.

Stay positive: There aren't problems, there are only solutions, and finding them is part of the fun. Ag-tech is still in its infancy; what you want may not exist yet in the way you want it.

Don't underestimate the value of your ideas: You're a producer and ultimately the end user – don't give your ideas away.

Ag-tech on the ground

During the year-long MLA project at Coolindown, multiple ag-tech devices were assessed on their ability to boost production or deliver savings.

Here are four ways ag-tech data provided insights to guide on-farm management at Coolindown – despite real-world challenges such as sheep snacking on some of the technology.

1 Managing water

Coolindown's established use of weather stations and water tank sensors – which were already delivering results – made it the ideal site to build on these to test soil moisture probes and water flow meters as part of the MLA project.

During the project, additional Waterwatch level sensors were fitted to tanks and connected to the property's existing Waterwatch phone app, as well as the AxisStream platform.

Analysis showed a remarkable 70% reduction in inputs, including human resources, fuel, wear and tear on vehicles and land, and delivering a return on investment (ROI) in just one year.

The sensors reduced annual water monitoring costs by $9,664 and returned 88 hours of work which could be reallocated to other farm activities.

"That ROI didn't require us to look past the manufacturer's instructions – water tank sensors just make so much sense to invest in," Belinda said.

"To get those input reductions to 100% though is harder, as the last 30% would require significant investment.

"If we wanted to make the system fully automated, our analysis showed the ROI is not there yet. As part of this assessment, we developed an automation implementation process."

Seven water flow meters were attached to each water source (windmills and one solar pump) and at the base of a tank to monitor the water flowing to troughs.

Belinda hit some unexpected hurdles with water flow meters when sheep chewed through the cable connecting the meter to the data transmission device.

"We also found our dam water wasn't suited to the water flow filters.

"An algal bloom inside the tanks clogged them up, which nearly led to a stock water issue as the water couldn't flow to the troughs. Luckily, we found it in time."

Her tip for other producers is to check out water filters and understand the water on-farm to choose the best option.

Water sensors have a financial return within one year.

2 Understanding animal behaviour

Digitanimal GPS tracker collars which track temperature and GPS location, were fitted to 74 twinning Merino ewes and connected through a Sigfox connectivity network. Electronic identification device (eID) tag numbers were matched to collar IDs using a Tru-Test wand.

Collar data was sent at 20-minute intervals (accessible via smart phone), and cameras powered by solar panels and batteries were placed on trailers in the paddock. This provided observations about grazing patterns and behaviour, and met animal ethics monitoring requirements.

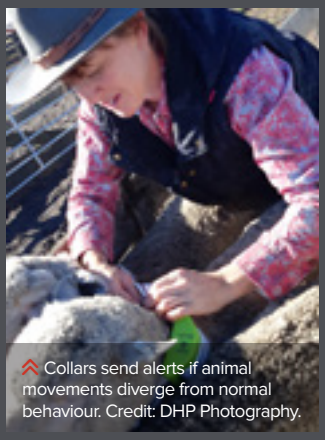
Other information was sourced from biomass imagery, yield maps and heat maps to confirm feed utilisation patterns and animal distribution and density during lambing.

When Belinda combined these insights with elevation and soil test data, she realised sheep were grazing heavily in elevated areas comprised of deep sands.

Plant tissue tests showed lower nitrogen levels at these points – an example of how technology revealed the ability of sheep to determine nitrogen levels in forage, potentially unearthing a way to map nitrogen.

The data also indicated ewes moved to higher elevation during lambing.

"I'm curious to understand this behaviour more and to know whether it may be related to ewes being better able to detect predators, especially as the higher areas are more exposed to the weather," Belinda said.



Collars send alerts if animal movements diverge from normal behaviour. Credit: DHP Photography.

GPS tracking sheep had a financial ROI of approximately six years, making them non-viable as a per animal deployment, however they did present the opportunity to support targeted ewe management (see following section).

ROIs were also calculated using MLA's ag-tech ROI tool which gave similar results to other methods used, validating the usefulness of tools like this to assist producers in understanding the true value of ag-tech.

As Digitanimal collars have a higher data reading frequency rate than others on the market, adequate quality of data could still be obtained by using devices on as little as 10% of the flock.

Belinda said a better ROI can be obtained with the reduced 10% density rate, while still getting decent paddock utilisation data.

"I can now spread the devices across more mobs, gaining more insights across our operations," Belinda said.

Producers should consider the frequency of device readings, which can impact quality of data, when assessing the ROI case for their chosen devices.

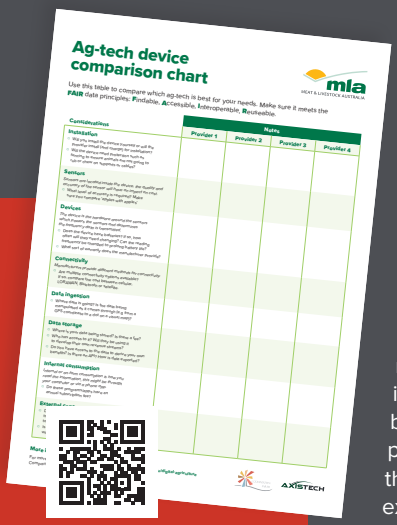
Continued next page

Where to start

Interested in investing in ag-tech?

Belinda has developed a device comparison chart to weigh up the options.

Scan QR code to download.



Data ownership puts producers in the driver's seat

Data ownership is an important part of the ag-tech conversation.

Lack of data ownership and storage was an obstacle The Lays overcame in 2020 when they partnered with AxisTech to establish their own farm data store.

This means all data from IoT, eID and other sources are stored on-farm, so the Lays can better access, compare, collate and analyse it. This enables more insights than when the data was stored offsite by third parties and not overlayed with other data sets.

"I have an issue with third parties collecting and owning my farm data. The only person who needs to see all my data is me. I can now interrogate my own data," Belinda said.

This data store is an option which puts producers firmly in charge of their own data, paving the way for mutually beneficial collaboration between their chosen value chain partners.

Looking ahead, Belinda said increased capability building across the entire value chain is an important next step in using data more effectively. In her case, it's about partnering with the right advisors.

Data ownership has led to greater insights and analysis at Coolindown. Credit: DHP Photography.

"I am fairly good with an Excel spreadsheet, but some of this analysis is beyond me. I can see the need for data analysts to support producers moving forward. These skills could be acquired via independent consultants, much like we do when working with agronomists." ■

Continued from previous page

3 Targeting ewe management

Following shearing, 525 ewe hoggets were body condition scored (BCS) and divided into three even groups prior to joining:

- high BCS
- low BCS
- a mix of high and low BCS as per traditional management.

Information was compiled from a range of sources, including eID tags, collars and sampling rations, to collate data on pregnancy scanning, BCS, distance walked and the nutritional aspects of feed.

"The data comes from multiple places. That's the beauty of this project, we were able to bring it together to gain insights," Belinda said.

Insights included:

- The traditional mixed BCS score group walked further than either of the other two groups.
- Interestingly, the low BCS score group conceived as many foetuses as the traditional mixed group.
- As anticipated, the high BCS group returned the highest conception rate.
- The average daily gain of the mixed BCS group dropped over time compared to the high and low BCS groups, due to the greater distances they were walking.

Overall, Belinda found these results indicated better overall flock performance is achieved when ewes are managed based on BCS.

"We will now change how ewe hoggets are managed and will separate hoggets by condition score above and below three – it's been a great production outcome and it also enables us to target our feeding in a more efficient way," Belinda said.

Changing how hoggets are managed so nutrition can be targeted improves conception.

4 Enhancing traceability

The Lays' decision to collect and store as much data as possible against eIDs, including which paddock lambs are born in right through to vaccinations administered (including dosage rates and batch numbers) supports traceability at Coolindown, and paves the way for future management improvements.

With eIDs set to become mandatory for sheep producers in 2025, the project also looked at transferring data from producers to the broader supply chain.

Belinda engaged with her local processor to see if lifetime data collected on-farm could be transferred over – she found this would require changes to the processor's software, staff training and skills development.

Rather than a challenge, Belinda sees increased individual animal data collection as a great opportunity, from genetic data through to animal husbandry practices.

LESSONS LEARNT

- Give yourself the freedom to explore your interests – it will lead to innovation.
- Look beyond the manufacturer's instructions.
- Digitise manual labour to free up your time to focus on the things that will bring in income.
- Efficiency is key to staying productive – the result will keep food affordable in this country.
- Value your time. It doesn't always make sense to have upper management in the sheep yards.

SEASONAL ACTION PLAN

- Develop naming conventions for paddocks and use the same name across all applications. Inconsistencies with capitalisation, spaces etc impact the ability to correlate data.
- Establish good paddock boundaries – this will help automation down the track.
- Calibrate your harvester. This will help you when making zones for precision agriculture applications.
- Implement electronic identification (eID) to objectively measure and compare livestock.

- Coolindown Farms: **coolindown.com.au**
- Esperance Zone Innovation Group: **ezi.org.au**
- MLA's digital agriculture sub-program: **mla.com.au/digital-agriculture**

Belinda Lay **coolindown@bigpond.com**
John McGuren **jmcguren@mla.com.au**

» The Whytes' ponds were created in February 2022. This drone footage was taken after a rainfall, nearly four months post-construction. It shows the ability of the 30-plus ponds pictured here to slow the flow of water. Image: Brett Naseby.

Water ponding rehydrates rangelands

As part of the Rangelands Living Skin project, a group of NSW producers are running trials of low-cost, scalable practices that offer possible solutions to increase farm income and landscape function.

Gus and Kelly Whyte are trialling water ponding as one strategy to repair and rehydrate their rangelands station near Wentworth.

Water ponding is a mechanical intervention, appropriate on fairly gentle slopes, to slow the flow of water across the landscape and encourage water infiltration into the soil. This approach is used to reclaim scalded country and rehydrate rangeland landscapes.

The Whytes were keen to rehydrate a large scaled area on their property.

They accessed a Local Land Services (LLS) grant for $10,000 to undertake the water ponding project.

The Whytes contributed $5,000 and LLS provided the surveyor, and directed and oversaw the contractor who constructed banks.

"Water ponding needs a fair bit of planning to make sure the banks are going in the right spot," Gus said.

"Producers should do water ponding projects in conjunction with and under the instruction of someone who knows what they are doing."

The whole water ponding project covers 300ha. In February 2022, the Whytes and LLS selected two sites within this area to monitor.

Between February and June, a grader was used to construct more than 60 U-shaped earth banks, measuring 500mm high at their peak and 2m across at the bottom. Construction paused in April–May due to large rain events as constructing water ponds is much easier and long-lasting when done with dry soil.

The Whytes and collaborating scientists will monitor the water ponding works for three years, to map changes in soil, pasture, production and biodiversity. It will be compared with a control site (not ponded) and reference site (a paddock in good condition as it receives good water flow already).

The expectation is for the ponding trial areas to regenerate and, in time, look more like the reference site.

Influencing landscape

So far, Gus has observed that the ponds have retained a lot of water.

A year after construction began, the ponds are already influencing the landscape.

"There's certainly an increased growth of saltbushes and other perennials in places where there were previously no plants," Gus said.

The Whytes are also looking forward to the scientific studies with project partners to understand other types of soil and landscape change – such as soil carbon, water infiltration and microbiology – to better understand and explain the value of landscape and soil stewardship practices.

Senior Land Services Officer Paul Theakston said the Western LLS Rangeland Rehabilitation Program is also keen to see how this water ponding will reinstate natural surface water flows.

"Gus and Kelly's project area originally would have acted like a 'sponge' with shallow ponds (called gilgais) absorbing water into the soil and excess water being slowly released as low-energy flows," Paul said.

"Projects such as water ponding, water-spreading banks and diversion banks reinstate these natural water flows and landscape function."

» Gus and Kelly Whyte.

SNAPSHOT

ANGUS, KELLY AND MITCHELL WHYTE, Wentworth, NSW

AREA
31,000ha across two properties (owned and leased)

ENTERPRISE
Sheep (mainly Merinos, some Dohnes, some joined to White Suffolk), Angus-cross cattle, and planning a goat enterprise

LIVESTOCK
Joining 5,500 ewes this year, trading about 20% while a good bulk of pasture exists

PASTURES
Native pastures and extensive rangeland grazing

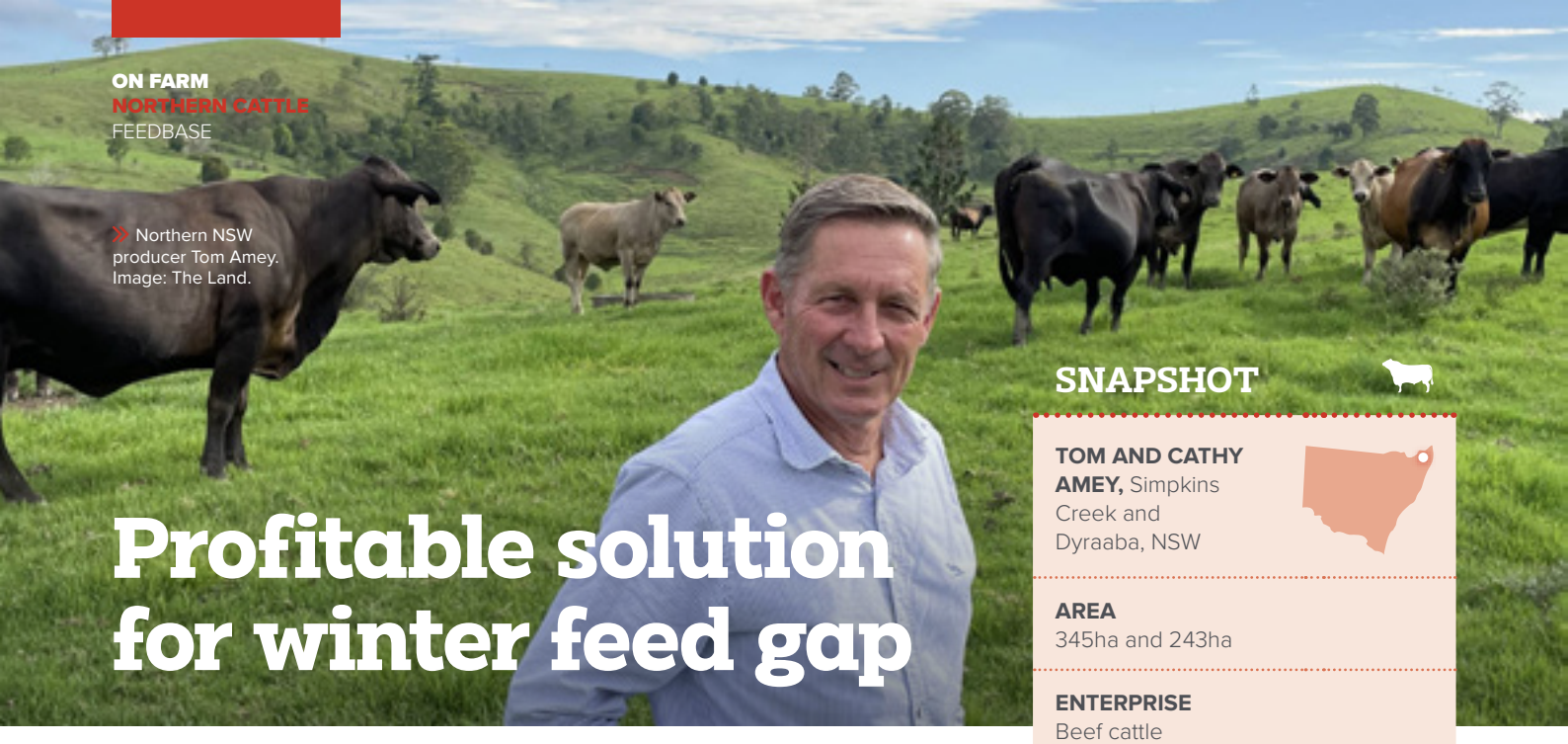
SOIL
Variable – self-mulching clays on floodplains to sandy ridges, some sandy loams

RAINFALL
250mm

He hopes to see erosion and claypan rehabilitation projects on many properties in the rangelands.

Initial results from these trials will be published later this year. ■

Visit the Rangelands Living Skin project website to read more, sign up for the project newsletter, or contact the team: **soilsforlife.org.au/rangelands-living-skin** Scan this QR code to learn more about this MLA-supported project:
Angus Whyte **wyndham3@bigpond.com** Mitchell Plumbe **mplumbe@mla.com.au**



» Northern NSW producer Tom Amey. Image: The Land.

Profitable solution for winter feed gap

An MLA Producer Demonstration Site (PDS) project demonstrated the impact of filling the winter feed gap in northern NSW with annual forage such as ryegrass or oats – a strategy which led to an increase in profit of up to $656/ha.

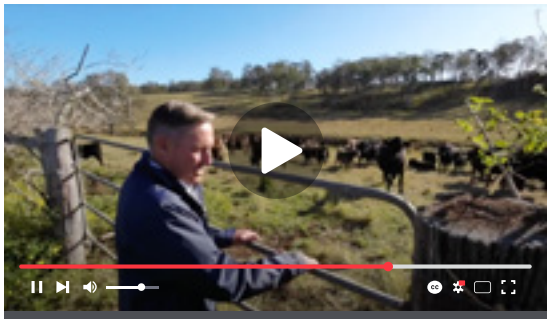
Beef production in the NSW Northern Rivers region, and more widely country east of the tablelands extending from Gympie to Newcastle, is based on tropical grass pasture species.

There's a deficit in pasture growth and/or quality in this region during late autumn, winter and early spring.

This feed gap results in multiple productivity issues in beef breeding herds which include a decrease in:

- the year-round stocking rate
- the condition score at calving and a delayed and decreased re-joining rate
- conception rates
- milk production and calf growth rate
- pasture quality and ground cover.

The PDS project facilitator and beef producer Tom Amey, along with his son Callum, had one of the core sites on part of their Dyraaba property, near Casino.



Casino – Virtual Farm Tour: **Scan this QR code towatch a video with Tom Amey and the other core producers involved in the PDS discussing productivity drivers related to the whole farm system.**

"I've been direct drilling ryegrass into my setaria pastures for several years," Tom said.

"I knew I was gaining some benefits, but I didn't analyse the system to quantify the benefits.

"I was pleasantly surprised when the three-year results were analysed – the results from the other three core sites were also very pleasing."

Boost carrying capacity

The outstanding impact was the increase in the annual carrying capacity.

The 40ha site of tropical grass had 16ha direct drilled with ryegrass and oats and carried an average of 38 breeding cows throughout the three years. This was double the carrying capacity of other parts of the property without winter forage.

"This allowed me to concentrate some of the breeding cows on a smaller area and use the freed-up land to grow out my heifers," Tom said.

An increase condition score of more than one at calving compared to the non-winter forage group flowed on to give benefits such as:

- earlier return to service
- higher conception rate
- allowed the cows to produce more milk and increase the weaning rate of their calves.

The quality of feed produced from the setaria pasture also increased due to mulching in late summer in preparation for drilling the ryegrass – and later accessing the residual nitrogen at the end of spring.

SNAPSHOT

TOM AND CATHY AMEY, Simpkins Creek and Dyraaba, NSW

AREA
345ha and 243ha

ENTERPRISE
Beef cattle

LIVESTOCK
730 head

PASTURES
Setaria, creeping blue grass, paspalum, kikuyu and Rhodes grass; some glycine and siratro, winter forage at Dryaaba

SOIL
Black medium clay and silty clay soils on creek flats, clay loan basaltic soil and sandy loam soil on ridges

RAINFALL
650–1,500mm

Sustainability benefits

In some paddocks the soil organic matter has increased to 11% (12cm sampling depth) over 20 years due to the increased pasture biomass and increased plant material on the soil surface.

The surface organic matter gives many benefits such as:

- soil moisture retention
- decrease erosion
- decreased weed invasion
- reduced trampling.

"I've used the carbon calculator developed by the University of Melbourne and the project results have encouraged me to further increase the productivity of my properties," Tom said.

His Dyraaba property is 179t of Net Farm Emissions ahead while the Simpkins Creek property is 338t Net Farm Emissions behind.

"I only need to reduce the total emissions by 159t to be carbon neutral. I have a plan

> **"It's great to get productivity benefits and sustainability benefits such as increased soil organic matter."**

for this over the next two years and I have been paying a lot of attention to the biodiversity on both properties," Tom said.

"I can increase my profitability and increase the quality of habitat for all the creatures."

Drought lifesaver

Tom found during the drought year of 2019, the 40ha trial area carried 37 breeding cows with no supplementation.

"They did lose about 80kg live weight from calving to weaning however, they were still very strong and fertile. The conception dates and rates moved forward to give an earlier calving the following year.

"Other groups of breeding cows without access to winter forage consumed up to $300 worth of pellets/head (12MJ ME and 14% crude protein).

"It's great to get productivity benefits and sustainability benefits such as increased soil organic matter. However, my beef enterprise is a business and in the drought year of 2019, the difference in profit from the winter forage group and the others was $42/ha.

"Carrying the cows through the drought year allowed me to capitalise on the better weather conditions and cattle prices in the following years, so in 2020 and 2021, the benefit was $547/ha and $656/ha respectively." ■

LESSONS LEARNT

- Bridging the feed gap with annual forage increased our annual carrying capacity.
- Improved surface organic matter has many benefits, including soil moisture retention, decreased erosion and weed invasion, and reduced trampling.
- The quality of feed produced from the setaria pasture increased due to mulching in late summer in preparation for drilling the ryegrass.

TO DO

Scan this QR code to learn more about the PDS.

- Access tools and calculators – including for carbon accounting and feedbase management – at **mla.com.au/tools-calculators**
- Subscribe to the PDS Updates newsletter and access other PDS resources at **mla.com.au/pds**
- Attend a MeatUp (southern) or BeefUp (northern) forum near you: **mla.com.au/meatup** or **mla.com.au/beefup**

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« Argyle's CEO Lachlan Graham.

Insights from a carbon journey

Navigating the road to carbon farming can be challenging. Here, one Australian red meat business opens the gate to share their approach, to equip other producers to establish profitable carbon strategies.

Argyle Carbon is a division of Argyle Foods Group – a vertically integrated red meat and livestock business with operations across Australia and in Hong Kong.

Argyle Carbon was set up with the goal to make an impactful environmental change, hand-in-hand with maintaining farm productivity and increasing profitability.

The company's production arm, Argyle Pastoral, which covers grazing properties in NSW and Queensland, has registered three projects to support their on-farm decarbonisation strategy.

Argyle received support under MLA's Co-Innovation program, which is designed to assist industry build capability in solving priorities outlined in MLA's *Strategic Plan 2025*.

Business drivers

The first step in Argyle's carbon journey was to understand what activities were eligible to generate credits from, which would also support their broader business strategy.

For Argyle Carbon's Production and Commercial Manager, Naomi Leahy, heading down the carbon road was a logical fit.

"Farming and environmental stewardship go hand-in-hand," she said.

"With the Australian Government building up markets to reward this stewardship, producers have a real opportunity to pilot innovations to improve the resilience of our land while generating secondary income streams.

"Clarity of the key business drivers is important for anyone looking to undertake a carbon project.

"For us, it's key that our carbon sequestration and emission avoidance activities complement our broader business strategy and help grow our business."

Registering methodologies

Argyle Foods Group has registered two projects under the carbon sequestration methods (reforestation and soil carbon sequestration) and an emission avoidance methodology (beef herd management).

Activities under these methodologies – which are being implemented to improve soil and animal health – include:

Carbon sequestration:

- planting native trees
- longer pasture rotations during cropping
- enhancing the management of inputs to maximise soil health

Emissions avoidance:

- reducing the time taken to turn off cattle (which reduces emissions).

SNAPSHOT

ARGYLE FOODS GROUP (parent company), **ARGYLE CARBON**, Harden and Goulburn, NSW

AREA
1,708ha

ENTERPRISE
Vertically integrated supply chain

LIVESTOCK
Beef, sheep, mixed farming

PASTURES
Native grasses and lucerne, chicory, clover, fescue perennial pastures

SOIL
Grey clay loams, red loams

RAINFALL
605mm

» The landscape at Argyle's NSW property, 'Hillview'.

While the benefits of registering the projects was warranted, Argyle's CEO Lachlan Graham said it wasn't a straightforward process. He encouraged producers to seek support to make the process easier.

"When we started our carbon journey in 2019, the companies that exist today weren't around, so we needed to do it ourselves. Thankfully, there's now an emerging sector of capabilities which can support producers.

"Given what we have learnt ourselves, as well as building up a highly skilled team, Argyle Carbon is also now available to support other producers on their journey.

"Part of our service is consulting to other farming businesses on the opportunities around carbon projects, carbon markets and general improved farming sustainability. We're doing this ourselves, so our team is able to support producers from a unique point of experience."

Research links

Argyle Carbon's aim to increase the area of land under sustainable land management practices will optimise farm returns in the process.

To grow knowledge in this area, the company works with researchers across the country on industry projects.

One such partnership was with Matthew Harrison at the University of Tasmania, who helped guide Argyle Carbon on ways to improve their soil carbon.

"We knew we wanted to increase our beef production, and so transitioning our mixed farming property to move more crop into pasture supported this," Lachlan said.

Argyle will introduce new areas of pasture and new pasture species, improve control of inputs such as fertiliser and implement stricter rotational grazing management, to increase the soil carbon across the property.

Long-term view

With soil carbon projects requiring a minimum 25-year commitment on the landowners' behalf, Lachlan said the company was mindful of the flipside of management changes.

Argyle took a broader view to the farm operations in order to determine how its commitment to the carbon projects could be financially and environmentally positive in the long term.

"We have to be committed to this change if we want to make a genuine impact on our property," Lachlan said.

"This commitment may mean we forego optimising financial returns annually when grain commodity prices are strong, so we need to take a longer-term view of both the costs and benefits."

Data collection

Now that Argyle Carbon's projects are registered, the next steps are to set baseline measurements and implement practice changes.

Registering projects under carbon methodologies requires historical, present and a commitment to future data, in order to accurately account for the carbon sequestration or emission avoidance.

The more data the better, but translating historical records, even paper form, into something which can be used in projects is key.

Lachlan said changes across the Argyle business in recent years – such as embracing technology and rigorous data collection – helped smooth this transition and supported the businesses to successfully register and implement carbon projects.

"Greater data collection and analysis, using digital agriculture, maintaining and improving our genetics, ensuring we maximise our joining and weaning rates – all of this helps our farm productivity, and contributes to decreasing our carbon output," he said.

"Across the Argyle projects we've worked to continually evolve our data recording and pastoral management capabilities – and this has led to improved livestock management and the ability to capture new opportunities across our business more broadly."

Carbon credits

Argyle has been exploring the potential opportunities around generating an alternative revenue stream across the business through the monetisation of Australian Carbon Credit Units (ACCUs).

"We've spoken with international voluntary carbon fund managers as well as domestic banks and carbon funds who are willing to pre-pay for predicted ACCUs we will generate through our projects," Lachlan said.

"We're yet to make a decision and continue to work our way through the many options available to us as Australian landowners.

"Selling credits is a key decision for landowners, and it's important to have access to information outlining the options.

"For the time being, Argyle is exploring the options, but will make a decision once the ACCUs are generated. This is one of the reasons why Argyle has followed the path of the Clean Energy Regulator, so ACCUs generated are eligible for both the regulated and voluntary market." ■

LESSONS LEARNT

- Starting is the hardest part. Find someone who has time to guide you through the options, pros and cons, and how to optimise your carbon opportunity alongside your farming operation. Argyle worked with lead researchers to develop projects through the Emissions Reduction Fund (ERF)..
- The changes implemented within a farming business for a carbon project should complement the overall production system and long-term business goals. Establish how these changes will impact productivity and profitability, to ensure the practice change is sustainable.
- Weigh up the costs associated with a carbon project (to implement changes, undertake baselining with third parties and audit the project) before you determine your carbon pathway.
- Improving soil carbon is a win-win, as it helps to improve pasture management and farm productivity.

"Clarity of the key business drivers is important for anyone looking to undertake a carbon project."

Cattle grazing at 'Argyle', where emissions avoidance activities focus on reducing the time take to turn off livestock.

TO DO

Find out more at:

- **mla.com.au/cn30**
- **mla.com.au/sustainability-hub**
- Complete the Carbon 101 eLearning module: **elearning.mla.com.au**
- Start creating your own carbon account: **piccc.org.au/resources/Tools**

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Soil, stock and carbon trifecta

An MLA Donor Company-funded project is giving producers a closer look under the surface of their paddocks, to hone strategies which increase the trifecta of livestock productivity, soil moisture retention and soil carbon.

Milton Curkpatrick and Hamish Webb, co-directors of Precision Pastures, are on their third year of a five-year integrated research and development project centred around 10 Producer Demonstration Sites (PDS) in the New England region of NSW.

They are testing the interrelationship between pasture biomass production, soil moisture and soil organic carbon levels, and recording baseline data for factors which feed into the relationship between these.

Measurements include:

- plant available water
- water holding capacity
- soil organic carbon
- seasonal pasture mass (kilograms of dry matter/ha)
- live weight gain.

The heart of the project is to test if carbon levels, soil moisture and livestock production have an intrinsic relationship, where if one measurement improves, the others improve with it – or one worsens, so does the others.

Early data shows this is the case.

"We've always believed livestock can have a positive impact on the carbon cycle and carbon sequestration in the soil and, as a result, available soil moisture levels improve as a consequence – this project is close to proving this concept," Hamish said.

"MLA has played a big role in the research and development of the soil carbon method* of calculating baseline emissions through livestock metabolism, soil additives, residues and irrigation energy, and it's proven itself to be highly credible.

"It's a win-win for red meat producers – better soil, more livestock and higher carbon credits."

Flow-on impact

So far, the project has shown a 1% increase in soil carbon down to 30cm could:

Figure 1. Paddock comparative SOC% results on 1 ha grid, 0-15cm: 2021–2022. Carbon % ● <6, ● 6–10, ● >10.

- create 150,000 litres of increased moisture retention per hectare
- help increase biomass production by up to 30%
- sequester 165 tonnes of CO2 from the atmosphere per hectare
- convert to 165 Australian Carbon Credit Units (ACCUs), worth approximately $5,000/ha in today's market.

However, these carbon improvements are heavily impacted by soil health – including pH (non-neutral), toxicity and nutrient deficiency.

"One producer from Ebor recorded an annual average soil organic carbon (SOC) increase of 0.31% across their demonstration site and a 2% SOC increase in more than one of the sample sites , including an already high result of 16% to even greater 18%. Milton said. "

This location (site 6) sits within a localised soil type zone (that includes sites 7, 10), which has fewer soil health issues and has therefore returned noticeably higher levels of SOC."

Figure 1 illustrates the location of the high SOC% site and the other two sites with high test results within the 18ha paddock.

"While these results are very impressive and provide an example of the extent of the potential for raising soil organic carbon levels by solving soil health issues, some SOC levels were also lower highlighting the variability of soil carbon levels especially at shallow depths (0-15cm)."

"These results are just a small sample of the five-year project and we look forward to sharing the next round of sampling in September this year," Milton said.

Take action

Milton said producers who want to know more about what's happening under the surface can install probes to collect soil moisture levels. This can shed light on their soil's current state, to identify how it can be improved through carbon-focused management.

"We want producers to know the needs of their enterprise, and with this in mind, they can look at this data that has been proven over the 10 sites we have tested on and make their decisions from there," Milton said.

The project aims to develop tools and calculators for producers to make production decisions, particularly in terms of relating water use efficiency to pasture biomass levels and in turn soil carbon sequestration predictions. ■

Table 1. Ebor Producer's Paddock Trial Results – Soil Organic Carbon (0-15cm)

Result (Site)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Avg.
2021 SOC %	9.7	7.6	5.9	5.6	7.4	15.7	14.1	6.6	6.9	17.3	6.9	7.3	5.3	6.7	5.3	5.4	8.36
2022 SOC %	10.7	5.7	6.3	7.3	5.4	18.3	14.9	6.6	6.2	16.3	7.2	7.1	6.6	5.6	8.0	6.8	8.67
Change in SOC %	**1.0**	**-1.9**	**0.4**	**1.7**	**-2.1**	**2.6**	**0.8**	**0.0**	**-0.7**	**-1.0**	**0.3**	**-0.2**	**1.3**	**-1.2**	**2.7**	**1.4**	**0.31**

*The Clean Energy Regulator's soil carbon initiative methodology – to learn more, visit **cleanenergyregulator.gov.au** and search 'soil carbon project'.

TO DO

Access handy seasonal resources at:

- **mla.com.au/feedbase-hub**
- Check out pasture improvement and carbon calculators: **mla.com.au/tools-calculators**
- Scan this QR code to read *Sustainable grazing – a producer resource*
- Scan this QR code to read *Carbon accounting technical manual*

Precision Pastures offers a tailor-made Carbon Starter Report for producers interested in estimating their soil carbon, visit **precisionpastures.com.au** Milton Curkpatrick **milton@precisionpastures.com.au** Hamish Webb **hamish@precisionpastures.com.au**

Integrated approach drives productivity

Gary and Rhonda Olrich's holistic approach in their New England beef business made them the perfect fit to participate in a project which dug deeper into how grazing practices impact livestock health and productivity, and how soil moisture and carbon can come along for the ride.

The MLA Donor Company project, in partnership with Precision Pastures (see story opposite), has fuelled the couple's drive to find solutions to their production challenges.

"You've got to improve your knowledge – grazing practices, sustainability, holistic management, everything," Gary said.

"Getting that education from professionals and like-minded people and then implementing it is the most important part of the job."

Improved pasture management

For Gary and Rhonda, the change to grazing practices on their Woolbrook property, 'Glenview', was driven by their goal to improve animal health, as well as a desire to maintain productivity and carbon levels.

Their shift to rotational grazing, hand-in-hand with more effective drenching, combatted the property's barber's pole worm burden, and provided better nutrition for sheep and cattle.

It also underpinned the Olrichs' realisation of the foundational impact these changes have on soil health, pasture productivity and carbon sequestering, alongside their focus on animal health.

Gary and Rhonda primarily target the feedlot market with steers, which are bred at Glenview and backgrounded on their other properties. They target an average turn-off weight of around 400kg, with a focus on feedlots that promote and support sustainable products.

"We've made a strategic shift with moving from set stocking to rotational grazing, so now we're subdividing and monitoring our paddocks before and after grazing.

"We could benefit from more stock in our rotation to get right down to the soil, but our rotations aren't regular – they're done every few days with respect to the impact on our soils," Gary said.

"We want to monitor our stock and make sure we aren't sacrificing production value, while still maintaining soil health and sequestering carbon."

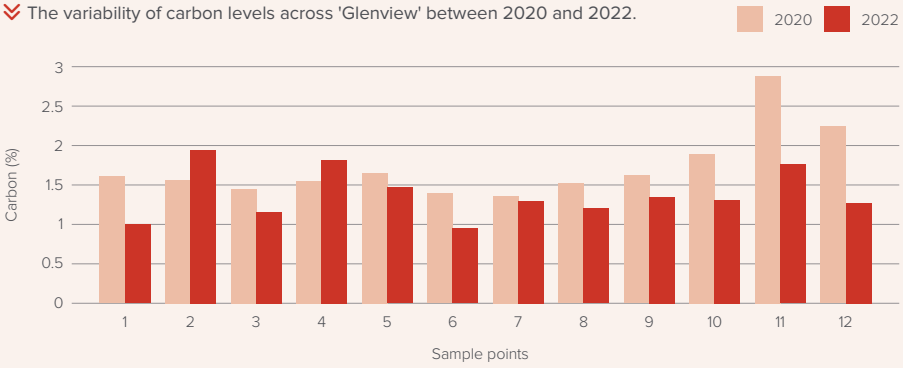
Variables affecting carbon

Although Gary and Rhonda's improved livestock management has helped in their carbon sequestering, they've experienced an overall drop in carbon since 2020 (see graph below).

The graph shows the variability of carbon levels across Glenview – ranging from 0.95% to 1.94% – as well as a 0.3% drop of overall carbon levels from 2020 to 2022.

However, the project revealed this decrease was due to high rainfall and oversaturation of soil, and Gary and Rhonda's effective grazing practices have, overall, produced a relatively consistent maintenance of carbon levels.

The variability of carbon levels across 'Glenview' between 2020 and 2022.



GARY AND RHONDA OLRICH, 'Glenview', Woolbrook, NSW

AREA
930ha

ENTERPRISE
Breeding sheep and cattle

LIVESTOCK
250 Angus cattle and 1,000 Merinos

PASTURES
Native

SOIL
Granite, basalt

RAINFALL
780mm

On-farm values for sustainability and enterprise

Gary and Rhonda's balanced approach to their carbon and grazing project has seen their focus on livestock production hold steady while maintaining their carbon and sustainability goals.

For example, they align with quality assurance programs which specifically help promote and produce sustainable products.

Looking ahead, their plans to increase cattle production, use artificial insemination to access genetic gain, and improve fencing and infrastructure, are underpinned by their focus on productivity in tandem with sustainability.

Despite the initial outlay to set up soil monitoring and baseline assessments, Gary said their focus on sustainability will add up for their business.

"We believe consumers will be prepared to pay more for products that help the planet, and that's the path we should be promoting. People have more knowledge about how our work effects the world and how their purchases go into that, so if we are working towards that, in the future, we see it as a really profitable venture," Gary said. ■

Gary and Rhonda Olrich **garyolrich@bigpond.com** Andrew Morelli **amorelli@mla.com.au** Alana McEwan **amcewan@mla.com.au**

A key driver for Chris is knowing how many pregnant females they have on the station at one time. Comparing pregnancy rates to branding percentage determines their calf loss figures.

Data drives big beef business in the top end

Chris Morrow, manager of 'Nerrima Station' in the West Kimberley region of WA, is one of the producers involved in the Northern Breeding Business (NB2) network.

With 15,000 head of cattle under his management, Chris is drawing on insights from his involvement in NB2 to harness data to boost production to overcome specific challenges.

"One of the biggest challenges we face here in the north is creating a beef product that can be sold into multiple avenues and not just live export," he said.

"My previous experience and NB2 allows me to build my knowledge to produce a product which provides a range of marketability."

Genetics are part of the marketability of Nerrima's red Brahman/red Brangus breeder herd.

"The red Brangus influence has given us an increase in fertility, producing an animal for the live export market, but we can also feedlot our steers and process them through an abattoir for the domestic market."

Data drives business

Chris has used an intensive data collection system for the past seven years, based on the Stockbook program.

The herd data he collects includes:

- weaner weight
- animal health history
- pregnancy status
- average daily gain
- dates when cattle are seen.

"We run a data collection system crush side. This process starts at weaning so we can track and collect data on the animal across its life on the station," Chris said.

"Average daily gain is handy to look at the performance of the animal over the years and forecast their weight at time of sale.

"With our females, collecting data on pregnancy status is important so we can work out our quality breeders. This also minimises out-of-season calves and allows us to look after the body condition of the cows."

Breeder management

Chris manages a controlled mating program to get as many productive breeders as possible into their optimal October–December calving group.

"We separate the breeders into paddocks and about 80% of our breeders fall into October–December calving," Chris said.

As well as producing a consistent line of weaners for sale, this strategy has increased the average selling weight for steers from 290kg to 335kg.

"Four years ago, we started with 1,600 out-of-season calves and now we're down to an average of 100/year," he said.

A key driver for Chris is knowing how many pregnant females they have on the station at one time. Comparing pregnancy rates to branding percentage determines their calf loss figures.

"We keep an eye on our calf loss figures to make sure there isn't any disease in the herd which needs to be fixed," Chris said.

"To reduce calf loss, we have a heifer vaccination program to set them up for their life of breeding."

People come first

With seven stock camp members, it's critical staff input this data correctly.

"I make sure staff are on board with our station goals and explain how the operation is going to work," Chris said.

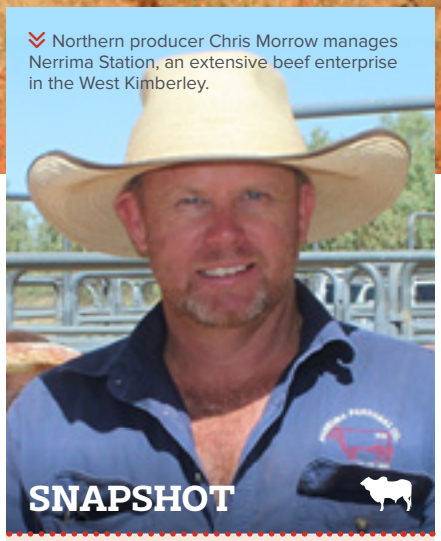
"Once there is buy-in, the team takes ownership to make sure the data collection is right."

Labour efficiency gains

The data collection program is driving multiple on-property benefits.

"We've gone from two rounds of mustering per year to one round because the data tells us the information we need," Chris said.

"This not only saves operational costs but improves animal welfare as we aren't handling the cattle in the heat and there is less mismothering and calf loss." ■



Northern producer Chris Morrow manages Nerrima Station, an extensive beef enterprise in the West Kimberley.

SNAPSHOT

CHRIS MORROW
'Nerrima Station',
Derby, WA

AREA
203,142ha

ENTERPRISE
Beef production

LIVESTOCK
15,000 head of red Brahman and red Brangus cows

PASTURES
Northern savannas

SOIL
Sand/loam/clay

RAINFALL
500mm

Northern Breeding Business (NB2) is a network of beef business groups across northern Australia. NB2 provides property owners and managers with the opportunity to set directions for their business, based on evidence from their data, while working alongside other producers to exchange ideas.

Northern Breeding Business (NB2): **mla.com.au/nb2** See next page for northern vaccination tips or visit **mla.com.au/vaccinating**
Chris Morrow **chris@emanuelbrothers.com** **nb2@mla.com.au**

Top tips to improve vaccination

Vaccinations are a critical component of cattle husbandry and, when administered correctly, can prevent common endemic livestock diseases leading to improved animal welfare and productivity.

MLA's new vaccination resources for northern beef producers support decisions around:

- the best time to vaccinate
- how to administer vaccines for the best results
- which vaccines are right for their herd.

Should I vaccinate?

Vaccination can be used to help manage the risk of disease in livestock, alongside other measures such as biosecurity, genetic selection and herd management.

If there's risk of disease, vaccination to prevent or minimise this disease will be a worthwhile investment.

The cost of the vaccine, including mustering and handling costs, can be significantly lower than the potential cost and impact of disease within an unprotected herd.

However, while in most cases vaccination will prevent death or production loss, it may not stop an animal being infected or transmitting the disease.

When deciding to vaccinate, key considerations include:

- if any diseases are present or likely to occur on the property
- if a vaccine is available, and it's efficacy and duration of action (how long it lasts)
- alternative control options.

Even if a property is located outside of endemic areas such as coastal or swampy regions, it's recommended that cattle being sold or moved are vaccinated to decrease the likelihood of death or carcase damage from disease contraction.

When should I vaccinate?

Vaccination can coincide with routine husbandry procedures such as branding, weaning or pregnancy testing.

While weaning is considered the ideal time to begin the vaccination process, other beneficial times are when selecting replacement heifers and at bull testing.

Vaccinating against leptospirosis, vibriosis and pestivirus during this period will be effective in decreasing abortion and infertility in breeders, and mortality and birth defects in calves.

Other vaccines can be administered at any time; however, clostridial is often given in conjunction with leptospirosis as 7-in-1.

Leptospirosis vaccination is highly recommended to all producers regardless of whether they have breeding stock as there is risk of transmission of the disease to humans.

What is the best vaccination technique?

Most vaccines are given by subcutaneous injection. The preferred injection site is in the neck area forward of the shoulder (Figure 1) to minimise potential for carcase damage and financial loss, if trimming is necessary.

It's important to inject vaccines under the skin as severe reactions can occur if oily vaccines are injected into muscle.

Key techniques to ensure safe and effective vaccination include:

- Use a short needle (12.7mm) for subcutaneous vaccine administration and a longer needle (20mm) for intramuscular administration.
- Set the needle on the syringe so the open end of the bevelled needle is facing the injection site and is not visible to the operator (Figure 2).
- Inject at a 45-degree angle.
- Use a two-hand technique*, if the animal's head can be restrained, to lift a fold of loose skin and inject the 'tented' skin's base, or use a one-handed technique if cattle are being injected in the race.

Cattle in poor body condition or under severe stress may not respond as well to vaccination. ■

*Take extreme care when injecting cattle using the two-hand technique as accidental needle-stick injury to the operator can occur if cattle are inadequately restrained. Use shrouded self-tenting needle guards to avoid potential injury to the operator.

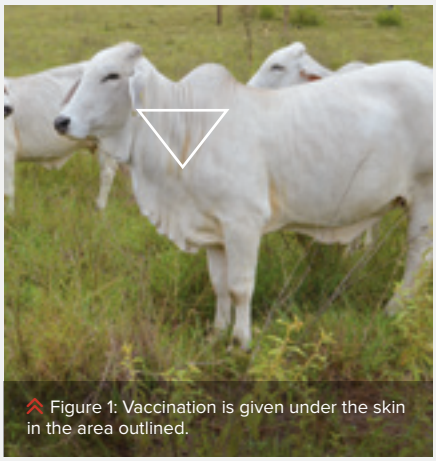


Figure 1: Vaccination is given under the skin in the area outlined.

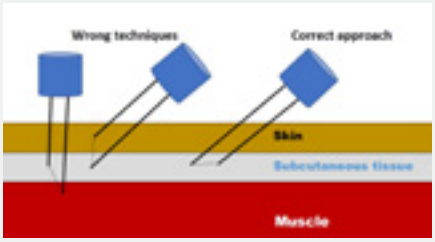


Figure 2: Injection administration technique.

SEASONAL ACTION PLAN

Access more vaccination strategies for northern beef herds by scanning this QR code.

For more information on vaccinating sheep and cattle across Australia, visit **mla.com.au/vaccinating**

Test your knowledge on vaccination with MLA's free eLearning packages – visit **elearning.mla.com.au/library**

Vaccination checklist

- ☑ Contact your local veterinarian to seek advice on vaccines ideal for your herd.
- ☑ Always follow manufacturer's instruction on vaccine handling, storage and timing between doses.
- ☑ Use a cooler box on-site to prevent light damage and keep the vaccines cool.
- ☑ Use separate syringes for each vaccine and administer to different sites – approximately 10cm apart.
- ☑ Change needles frequently – every 50 jabs is recommended. Do not used disinfectant to clean needles or injection site for modified vaccines.
- ☑ Thoroughly wash vaccine guns before and after use in warm soapy water.

Michael Laurence **mlaurence@mla.com.au**

Vetch earns its place

When WA producers, brothers Michael and John Bertola, faced medic pastures which fell short of providing adequate feed, they turned to vetch and haven't looked back.

Agronomist Theo Oorschot with Michael and John Bertola.

The Bertola family runs a mixed enterprise across three properties in Beaumont, near Esperance. They crop 3,000ha of wheat, barley and canola and run a self-replacing flock of 1,600 Kojak breeders.

They are one of few sheep enterprises in the predominantly cropping region, where the distance from the coast and the Mediterranean climate means producers can count on only three to four months of green feed each year.

This makes the additional management requirements of sheep an uncertain proposition for many. Even John and Michael went through a stage where they got out of sheep altogether, in 2009–10.

"We were getting too many feed gaps," Michael said.

"It was slow growing any feed early in the year and it died off too quickly at the end. With cropping in the mix, you're always spraying weeds, then when the pasture phase comes around, you're not left with a very dense population of feed."

Trial and error

The Bertolas tried field peas as a legume break, but the nitrogen benefit wasn't obvious, and they didn't like harvesting it every year.

After five years, they decided to reintroduce sheep, so they cast around for an alternative pasture legume option. Theo Oorschot, their agronomist, suggested vetch.

In 2016, they trialled half a paddock of Rasina, a high-yielding variety for medium to low-rainfall areas, and were surprised by the amount of biomass it grew, with no management. The following year they sowed a few bags of seed and "it went bananas".

"There was so much feed there and it nodulated brilliantly," Michael said.

"We now sow a quarter of the operation to vetch every year. The sheep do well on it and the following cereal crops get a great benefit."

SNAPSHOT

MICHAEL AND VERONICA BERTOLA, JOHN BERTOLA (Michael's brother), **PAUL AND PAULINE BERTOLA** (Michael and John's parents), Beaumont, Esperance, WA

AREA
3,800ha over three properties

ENTERPRISE
Sheep and cropping

LIVESTOCK
1,600 self-replacing Kojak breeders

PASTURES
Pasture program is run over two properties, with 25% total hectares sown to Rasina vetch.

SOIL
Heavy clay/loam

RAINFALL
380mm

The vetch is sown in early April. This provides time for the plants to develop bulk while sheep are in the feedlot, before they are put onto the paddocks in June for July lambing. They stay on the vetch until October.

"We give them as much time as we can on the vetch before we have to spray it off; it's a weed management issue," Michael said.

"Ideally, we'd like to include species such as barley in the pasture mix, but with my cropping hat on, it's more important to keep the ryegrass under control."

The sheep then go onto a couple of small, late-sown cereal paddocks.

Kojak ewes and lambs on vetch pastures.

In this system, the lambs gain around 400g/day. Wethers are drafted off and sold once they reach a target weight of 42kg – around November/December – to reduce numbers over summer. Ewe lambs are kept as replacement breeders.

Following harvest, the sheep are run through stubble paddocks to clean up spilt grain and any remaining heads, which takes roughly two to three weeks per paddock. If feed is tight, the lambs are weaned prior to the ewes grazing stubble paddocks.

Confinement feeding

In the past, a late start or poor year meant the Bertolas had to sell their sheep, because the feed on offer was insufficient. In response, they've developed and refined a system of seasonal confinement feeding to provide them with the necessary consistency and flexibility.

"It's a critical part of having sheep, because we have such a short season here," Michael said.

After a couple of crude attempts at confinement feeding in the sheep yards, they knew they had to do it better.

They built proper pens and bought a feed mixer. With the assistance of their nutritionist John Milton, they developed their own mixed ration of straw and grain produced on the farm, with legumes, a mineral mix and probiotics added.

Confinement feeding usually commences in January once the stubbles have been grazed. The ewes are drafted into lines and penned appropriately. The rams are introduced into the pens in February for a joining period of four to six weeks.

All ewes are scanned six weeks after joining. Ewes scanned as dry are rejoined then sold, to further optimise reproductive efficiency. The remaining ewes are drafted according to their scan results. Singles, twins and ewe lambs are drafted into separate lines so they can be fed according to differing nutritional needs.

Joining ewe lambs

The Bertolas chose Kojak (shedding) sheep because they were a low maintenance fit in their cropping enterprise. However, without a wool cheque to rely on, getting the maximum number of lambs on the ground each year is a priority.

"We focus on trying to get them to have a lamb as a lamb, and we select for multiples as well," Michael said. "We're hoping to get to a point where we can just retain ewes that are out of a twin."

The ewe lambs (seven to eight months old) run with teasers for two weeks prior to joining. The ewe lambs average 78% in lamb (from joined) which produces an average of 80% marking rate. Of the other mixed-age ewes, 97% joined get in lamb, of which 60% have multiples. Total marking rates from these ewes is usually 120–125%.

A reliable system

Michael said the major lesson they've learned is the need to have a system that's reliable, regardless of what the season presents.

"There are images that are just burned in our brain of driving past sheep that are lambing onto bare ground. We thought, we've got to get better at this, otherwise we might as well not have them," he said.

Now the Bertolas no longer experience angst when it doesn't rain.

"By utilising the feedlot over summer and only grazing the vetch for a short period, the paddocks have benefitted. This system has allowed us to increase our flock numbers and get a better dry sheep equivalent (DSE), and our sheep have got it pretty good these days.

"From a cropping perspective, the vetch is awesome for the cereals following. The protein levels are higher, and the crops just look head and shoulders above anything else. We wanted to find profitable ways to include livestock in our cropping rotation and, for our enterprise, vetch has been the answer." ■

The Bertolas' vetch pastures produce abundant feed through winter and into spring.

Vetch roots showing excellent nodulation for good nitrogen fixation.

LESSONS LEARNT

- Try to achieve a good knockdown prior to sowing to get a solid vetch stand.
- Aim to have vetch sprayed off before seed set, otherwise you'll be swamped with vetch over summer and in the following crops.
- Cut the vetch vine over summer when conditions are hot and dry to ensure the smooth flow of the air seeder the following year.
- If you're planning to harvest vetch, apply two passes of fungicide to prevent Botrytis grey mould wiping out the crop.

SEASONAL ACTION PLAN

- Sow vetch by late March/early April to enable good establishment for the ewes prior to lambing.
- Ensure there's enough grain and straw on hand to keep sheep in confinement for up to six months.
- Weed control is paramount to ensure nothing sets seed, especially ryegrass.

TO DO

Visit MLA's resource hubs for timely management tips:

- **mla.com.au/persistent-pastures**
- **mla.com.au/weeds**
- **mla.com.au/feedbase-hub**
- **mla.com.au/seasonal-hubs**

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» DAF researchers collecting samples for diagnostic analysis.

New insights to tackle pasture dieback

Two MLA co-funded projects run by Queensland's Department of Agriculture and Fisheries (DAF) have unearthed new findings about the causes of pasture dieback, and how best to manage it.

Stuart Buck, DAF Principal Pastures Agronomist, and his team collected thousands of samples from across Queensland to better understand dieback causes.

They set up six on-farm trial sites to determine how best to manage pastures affected by dieback.

The team examined the role of mealybugs, which are known to cause classic dieback symptoms, but also looked at other insects, as well as bacteria, fungi and viruses. They undertook a range of diagnostic tests and analysis, including on-farm trials.

"Our on-farm trials demonstrate mealybugs can cause pasture dieback," Stuart said.

"However, microbiome diagnostic testing indicates they may be working in combination with a virus or something else to cause the full suite of dieback symptoms, including the final ashy grey appearance of affected pasture."

Digging into the variables

While mealybugs cause dieback, there may be other causes of dieback-like symptoms. For example, at DAF's Boonah trial site, the paddock grew Rhodes grass for about 10 years before succumbing to dieback in 2019, with mealybugs present in the pasture.

When the grass species trial was planted in February 2020, patches of dieback again occurred in some Rhodes grass plots. However, no mealybugs were detected despite multiple inspections by trained scientists over a 12-month period.

The team brought mealybugs into the trial at the end of 2020 to assess their impact on the 30 grass species planted.

"We have seen that some grass species can coexist with mealybugs quite happily, whereas others are very susceptible and can die out," Stuart said.

When the DAF team assessed hundreds of paddocks with dieback across southern, central and north Queensland, their findings demonstrated that numerous variables determined whether dieback took hold.

"We sampled a massive geographical area, taking thousands of samples to find out why variability in dieback severity occurs," Stuart said.

"Some producers believe dieback is more prevalent on the cracking clay soils, as opposed to the non-cracking soils, but our objective surveying process and field sampling didn't pick up any differences in soil type."

Three contributing factors

The researchers believe three broad factors need to come together for dieback to occur:

- the presence of pathogenic organisms
- environmental stressors
- specific pasture management practices.

"One necessary element is the presence of pathogenic organisms," Stuart said.

"Multiple pathogenic organisms are usually present in pastures with dieback, including mealybugs.

"We also see many fungal pathogens including one called buffel grass blight, which is commonly associated with dieback in buffel grass pastures.

"Environmental stress such as heat and/or moisture stress is also needed for dieback to affect large patches or whole paddocks.

"The third aspect that's needed is the right species of grasses managed in a certain way; what I classify as pasture management."

Susceptible grasses

The team had already noted that some grasses – such as Gayndah and American buffel grass, Bisset bluegrass, Nixon sabi grass and pangola – were highly susceptible, whereas others – such as Biloela buffel grass and Mekong Briz™antha – were more tolerant.

If a producer's dominant pasture species is susceptible, and if it's managed well from a land condition point of view with high biomass, those pastures are more commonly affected by dieback than shorter pastures that have been more heavily grazed.

> **"In some cases, only one or two factors are present so dieback might not occur, whereas if all three occur together, dieback usually happens."**

> **"We know enough now to provide useful solutions to reduce the impact of pasture dieback and restore productivity – and in many cases make the pasture better than it was before."**

"These three things need to happen together, and I suspect this is why we see such variation across landscapes or properties," Stuart said.

"In some cases, only one or two factors are present so dieback might not occur, whereas if all three occur together, dieback usually happens."

Monitor regularly

Stuart said producers should regularly monitor their paddocks and be on the lookout for dieback, however the identification process can be difficult. He said this was because other pasture conditions, such as nutrient or water stress, can generate similar symptoms, especially initially.

DAF has produced fact sheets to upskill producers on dieback identification, and an identification guide is also available.

Once dieback is detected, it's important to determine what level of impact it's having, because although it starts in very small patches, it can spread quickly.

"If there are only small patches here and there, we found the best thing to do is just watch it and graze the remaining feed in the paddock," Stuart said. "But if it's quickly spreading and affecting tens or hundreds of hectares, other options come into play."

Pasture management

Perennial pastures have an excellent capacity to regenerate from the seedbank, but it is here that pasture management plays an important role.

Stuart said when producers actively manage the grazing pressure on pasture that's trying to recover, by spelling the paddock once the pasture's coming back by taking the cattle off, then the pasture regenerates much quicker.

Where possible, spraying broadleaf weeds also speeds up the pasture recovery process.

Producers can also reseed to actively change the species composition in that paddock, especially with legumes and tolerant grasses.

"It's challenging to resow if you don't have the right gear, but our field trials are showing it's a successful way to overcome production loss from dieback," Stuart said.

"However, in some instances the resown grass has been affected by pasture dieback. Therefore it's important to sow more tolerant grass varieties."

If reseeding, it's also important to include a perennial legume in the mix (ensure adequate soil nutrients including phosphorous to aid establishment) because legumes are resistant to dieback. Growing a forage such as sorghum, lab lab or oats for a year or two before replanting with perennial pastures has also proven very successful, and the following pastures have performed very well too.

Stuart said good pasture management must be the cornerstone of the beef production system going forward.

"We know enough now to provide useful solutions to reduce the impact of pasture dieback and restore productivity – and in many cases make the pasture better than it was before.

"There are challenges identifying highly tolerant grasses, however there are grasses that are more tolerant than Gayndah buffel or Bisset bluegrass, which have been the main varieties used over large areas of Queensland.

"We're using our existing knowledge to improve our pastures – that is, put legumes in, make sure there is adequate soil fertility and graze them the right way – and are continuing research and development to identify better grass varieties options.

"It's about monitoring pastures, accurately diagnosing what is happening then getting the right advice to implement the most suitable practices for the situation." ■

Turn the page to learn how a Queensland beef producer has achieved pasture recovery after dieback.

Pasture dieback visible in a buffel grass pasture in central Queensland.

SEASONAL ACTION PLAN

- Regularly monitor pastures, starting in spring through to autumn, to diagnose whether dieback is present, and the area impacted.
- If dieback is present, obtain advice about the best management strategy for the situation: manage for recovery, improve the pasture, sow a break crop or control the pathogen.
- Implement the appropriate management strategy and monitor the pasture for recovery.

TO DO

Learn more at:

mla.com.au/pasture-dieback

futurebeef.com.au/pasture-dieback

MLA's *Pasture Dieback* management manual – scan this QR code.

MLA's feedbase hub: **mla.com.au/feedbase-hub**

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Renovator's delight at dieback recovery

Warren Luhrs lost about half of his pastures to dieback and Indian couch over the past 10–15 years, but renovating paddocks and improving grazing management has promoted excellent pasture recovery on his Moura, Queensland, cattle property.

The number of dry seasons over the past 10 years meant the Luhrs weren't able to get a handle on how badly their paddocks were affected until they received rain. If the main species to bounce back was Indian couch, they would know dieback was present.

Warren took part in a Queensland's Department of Agriculture and Fisheries (DAF) trial with Stuart Buck (see story previous page) to look at potential options for managing dieback.

He said hosting the trial highlighted the benefit of renovating his country, and what grass and legumes species work in his enterprise.

It also introduced him to some new species that he hadn't previously considered.

"The Strickland digit grass and the Sabre (b) Rhodes grass are two grasses that look promising. Desmanthus and stylo legumes are also doing well," Warren said.

"It'll be interesting to see how they stand up to a bit of continuous grazing."

Managing mealybugs

Warren accepts that mealybugs are endemic, so managing his country well provides the best chance of maintaining his pastures.

"I would try to limit mealybugs if I knew how to, but they're already everywhere," he said.

"Soil health and better ground cover is going to help recovery of the grasses and the paddocks that have become run down, so I'm trying to minimise run-off and shade the ground more."

Part of Warren's strategy involves dividing the property up into smaller paddocks, to give him greater flexibility in terms of rotations.

"I'm hoping to go a couple of years with lower stock numbers, so I'm fencing the paddocks to make them smaller – this will allow me to spell them longer and rotate them better," he said.

Eventually, Warren plans to build his numbers up again but while his stock numbers are low, he's concentrating on renovating his country to give the grasses the best chance of recovery.

This includes using a cutter-bar on some sloping areas to break up the ground without turning it over and avoid erosion.

"I planned to plant forage sorghum into one of the ploughed areas before I put grass and legumes into it. However, the buffel grass has responded so well that I may end up leaving it or ploughing it again."

In addition to the renovation program already underway, Warren monitors his paddocks regularly and has recently done a DAF workshop on biosecurity. ■

SNAPSHOT

WARREN LUHRS,
Moura, Queensland

AREA
1,200ha

ENTERPRISE
Cattle

LIVESTOCK
230 breeders

PASTURES
Buffel, Rhodes grass, panic, urochloa

SOIL
Sandy loam and clay-based black soil

RAINFALL
500mm

LESSONS LEARNT

- Don't look at your paddocks with rose-coloured glasses – do a thorough assessment. When our paddocks didn't recover after rain, I started ploughing and renovating, fencing and thinking about stock numbers.
- Manage your grazing. We were overgrazing without realising the impact that dieback and Indian couch were having.
- Take action. If you delay, it makes the situation worse long term.
- Seek advice. One of the best things I did was to get involved with DAF because I have learned so many valuable lessons there.

"Soil health and better ground cover is going to help recovery of the grasses and the paddocks that have become run down, so I'm trying to minimise run-off and shade the ground more."

Warren Luhrs in a rehabilitated paddock.

Warren Luhrs **luhrswt@bigpond.com** Felice Driver **fdriver@mla.com.au**

Hungry for BredWell FedWell?

Updated workshops kick off this year

On the back of a decade of success, MLA's BredWell FedWell (BWFW) workshop is relaunching this year to reflect evolving best practice genetics and nutrition management.

The workshop program has undergone an in-depth review by the Schuster Consulting Group, Dubbo, to ensure BWFW continues to meet the needs of producers wanting to increase the welfare, productivity and profitability of their herds and flocks through improved genetics and nutrition.

The review included input from a panel of industry experts, who provided advice in areas ranging from practical breeding and nutrition strategies, cattle and sheep production in northern and southern regions, as well as approaches to capability building and adult learning.

The revised program developed through the review process has been refined after piloting, and will be rolled out nationally via a network of trained and accredited deliverers.

The workshop is designed for a range of sheep production systems, as well as northern and southern beef.

New content

Peter Schuster of Schuster Consulting Group said producers can access the latest information at the new workshops.

"The extension and adoption field has changed significantly since BredWell FedWell was first launched, with more information and tools such as Flock Profiling and new indexes now available to help producers apply the outcomes of genetics and nutrition research," Peter said.

"We've focused on integrating these tools into a new format that balances genetics and nutrition decision-making across the whole livestock production cycle, with a specific focus on an individual's profit drivers.

"The new format is designed to help producers increase their productivity and profitability through improving genetics and nutrition."

What to expect

Building on the workshop's first iteration, participants will come away with skills to help them develop a customised breeding objective aligned to their profit drivers, identify sires, and select and feed animals that help meet their objective.

The new highly graphical, easy to follow one-day workshop will continue to be delivered on-farm and is intended to drive practice change, as well as whet participants' appetites for further learning.

Producers will gain fresh knowledge about the latest research and management strategies in the field and will apply this knowledge through guided learning that includes practical exercises.

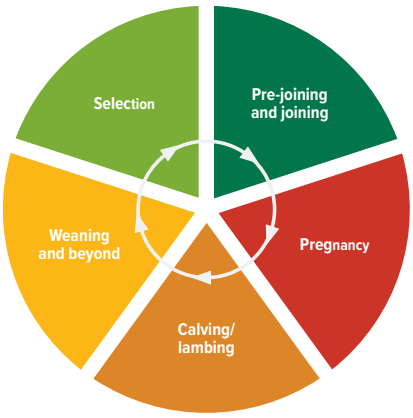
The structure of the workshop will utilise the BWFW breeding and feeding production cycle – see right – which covers pre-joining and joining, pregnancy, calving/lambing, weaning and beyond, and selection. Each 'wedge' in the cycle represents a major decision point in a producer's commercial enterprise, where consideration of both breeding (genetics) and feeding (nutrition) is required.

Workshops aim to improve the knowledge and skills of producers so they can:

- develop a customised breeding objective for a livestock enterprise aligned to its profit drivers
- identify sires and select animals that help meet enterprise objectives
- feed animals well to achieve objectives and maximise genetic investment.

More than 140 predominantly MLA-supported resources, research papers, tools and reports have informed the refreshed BWFW workshops, with the focus being on delivering implementable research outcomes to participants. ■

BredWell FedWell
Breeding and feeding to maximise profit



The updated workshop is based on the breeding and feeding production cycle.

1.9M
cattle influenced by the BWFW workshop

45 workshops | **1,155** BWFW participants

$2.98 net benefit per cow mated | **639k** breeding females

19.6M
sheep influenced by the BWFW workshop

186 workshops | **4,316** BWFW participants

$2.48 net benefit per ewe joined | **12.7M** breeding ewes

The impact of previous BWFW workshops on the red meat industry.

Visit **mla.com.au/bredwellfedwell** to register your interest and to see upcoming workshop dates.
Peter Schuster **peters@schusterconsulting.com.au** Sarita Guy **sguy@mla.com.au**

« Victorian producer Richard Wallis.

Soil profile supports perennial pastures

Richard Wallis was fully aware of the benefits of soil testing and maintaining optimal soil fertility in the top 10cm of soil, but subsoil management was more of a mystery. Here's how he navigated the unknown to reap the rewards.

Richard and his wife Angela farm 350ha near Seymour, Victoria. They run a self-replacing Merino flock and join 50% of the ewes to Poll Dorset rams each year.

They have creek flats where lucerne has been grown for more than 40 years for grazing and hay production, and sedimentary (ironstone) hill country where pastures are mainly phalaris and sub-clover.

"My main issues about soil management are keeping the soil on the flats in good condition to keep the lucerne going, and perennial pasture persistence in the ironstone country," Richard said.

Richard and Angela employ a regular soil testing regime (0–10cm depth) to refine the maintenance fertiliser program and prioritise any capital inputs of fertiliser or lime.

The farm has a long history of superphosphate applications, so phosphorus and sulfur levels are generally very good. Molybdenum is applied periodically, and lime is applied to the lucerne paddocks and to any hill paddocks prior to sowing.

Diagnosing the problem

In autumn 2020, Richard first observed a one-year old lucerne paddock, which had good establishment, contained one section looking stressed while the rest of the paddock was growing well.

As a member of the Grassland Society of Southern Australia (mid-Goulburn branch), Richard was part of the local MLA-supported Healthy Soils group, co-ordinated by Lisa Warn. He approached the group to investigate.

In June 2020, topsoil and leaf sample tests were taken on the two different sections of the paddock to help diagnose the problem.

Leaf analysis indicated molybdenum was low. The soil tests showed that where the lucerne was stressed, pH was lower and aluminium higher, compared with the good section. The poor section had pH 4.8 ($CaCl_2$) and an exchangeable aluminium of 5.6%, versus the good section with pH 5.2 and aluminium of 0.05%.

"The verdict was the whole paddock required lime and the poor section a higher rate," Lisa Warn said.

"By spring, the difference in growth was less obvious between the two sections.

"Plant growth improved in spring when there was more moisture available and possibly more roots had got past the high aluminium layers in the poor section."

Soil profile samples

The group was studying the soil profile at depth, and they decided to further investigate.

Soil profile samples were taken from the lucerne paddock and a phalaris paddock in 2021 with the assistance of Brad Costin from Agriculture Victoria.

SNAPSHOT

RICHARD AND ANGELA WALLIS,
Seymour, VIC

AREA
350ha

ENTERPRISE
Sheep

LIVESTOCK
Self-replacing Merino flock, half joined to Poll Dorset rams

PASTURES
Lucerne, phalaris and sub-clover

SOIL
Creek flats, sedimentary (ironstone) hill country

RAINFALL
600mm

Workshop participants used a soil profile assessment checklist tool, developed by Lisa, to assess the soil performance at 10cm intervals down the profile. The tool outlines the appropriate test to use

(field tests or laboratory tests) to allow the user to identify any constraints to plant growth and recommends appropriate management options.

"None of the group members had taken subsoil samples for pH, aluminium and cation analysis before," Lisa said.

"They were surprised to see what was happening to pH and aluminium levels down the two different soil profiles studied."

In Richard's stressed lucerne paddock the topsoil pH (0–10cm) was just below the desirable range for lucerne, but the pH was much lower at the 10–20cm depth, before improving again.

"The results indicate the lime applied in the past has maintained the topsoil pH to some extent, but there is a subsoil acidity issue, and the profile may be acidifying."

High aluminium

Aluminium levels were also high at the 10–20cm depth.

"The exchangeable aluminium level at 10–20cm depth was 35%, which is too high for a sensitive species such as lucerne," Lisa said.

The target for lucerne is less than 5% aluminium. Aluminium will be affecting the lucerne root growth and restrict nutrient and water uptake.

"This would support the explanation that the poor section of lucerne would have been struggling because the roots were pushing through the high aluminium layer in the topsoil and the 10–20cm layer, and then growth improved once it got more roots past there," Lisa said.

Recent research into subsoil acidity has revealed that to achieve effective lime movement down the profile, the surface pH ($CaCl_2$) needs to be maintained at or above 5.5.

Soil-type constraints

In the phalaris paddock, the changes in pH and aluminium down the profile showed a similar trend to the lucerne paddock. The different soil type in this paddock had an additional constraint in the subsoil.

"The clay subsoil was very dispersive due to the high exchangeable sodium percentage, which is a common problem in soils derived from sedimentary rock," Lisa said.

A simple dispersion test on the clay subsoil sample from Richard's phalaris pasture showed a small piece of the clay subsoil soon became cloudy after it was added to water.

"Dispersive subsoils restrict water infiltration, but it is not practical to get gypsum down there to fix the problem," Lisa said.

"The best solution is to keep the phalaris well fertilised and rotationally graze it, like Richard is doing, to ensure it gets its roots well down. The root channels then create pathways for water movement."

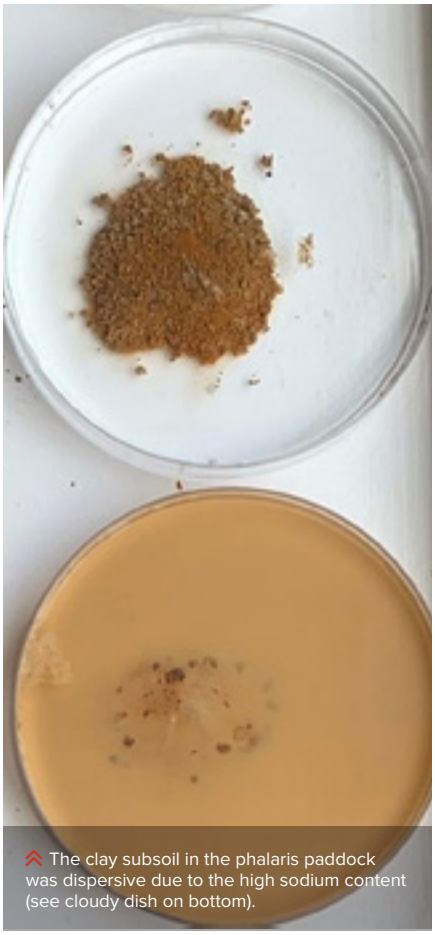
Focusing management

Richard said his experience with the Healthy Soils group was valuable and gave him focus for future management.

"My regular topsoil sampling had shown the lucerne paddock was due for another application of lime, but the subsoil test showed I really need to put more lime on the surface than I was planning, if I want to prevent the subsoil acidifying," he said.

"After being involved with the Healthy Soils group. I think I will be able to manage soil acidity better.

"I'll be doing more testing to see what the pH and aluminium levels are at depth and using different rates of lime. I would also like to improve how I rotationally graze the phalaris to optimise its growth and persistence." ■



The clay subsoil in the phalaris paddock was dispersive due to the high sodium content (see cloudy dish on bottom).

SEASONAL ACTION PLAN

- Find more soil resources at **mla.com.au/healthy-soils**
- Find seasonally relevant management tips and tools at **mla.com.au/seasonal-hubs**
- Read more case studies and access practical resources at MLA's feedbase hub **mla.com.au/feedbase-hub**

Brad Costin from Agriculture Victoria showing the soil profile for the lucerne paddock.

LESSONS LEARNT

- Topsoil and leaf sample tests can help diagnose pasture problems.
- To achieve effective lime movement down the profile, the surface pH ($CaCl_2$) needs to be maintained at or above 5.5.
- Dispersive subsoils restrict water infiltration, so keep phalaris well fertilised and rotationally graze so it gets its roots well down, to create pathways for water movement.

Southern Farming Systems **sfs.org.au** Richard Wallis **rjcwallis@bigpond.com** Lisa Warn **l.warn@iinet.net.au**

The FEED365 project is evaluating different fodder options for livestock in Mediterranean environments.

Solving the need for feed

Increasingly hot, dry and variable seasons are creating a fresh set of challenges for sheep producers in southern WA – but a new SheepLinks project is set to fill widening feed gaps and take flock productivity to the next level.

Jointly funded by MLA and the WA Department of Primary Industries and Regional Development (DPIRD), the FEED365 project aims to design forage systems providing quality, year-round fodder for livestock grazing in Mediterranean environments.

DPIRD's Senior Research Scientist, Dr Daniel Real, said the project is evaluating forage systems that will produce all year round.

"We're also evaluating forages to see what forage mixtures drive the highest production in terms of advancing live weight gain in sheep flocks," he said.

Testing the waters

With initial modelling of potential new and modified feedbase strategies now complete, trials are currently underway to assess the productivity of these forage mixtures at DPIRD's Katanning Research Station, as well as at six other demonstration sites hosted by grower groups across the state.

"The FEED365 project is evaluating a large range of commercial forage species in half-hectare plots, from annuals, perennials, legumes, herbs, shrubs, grasses and more," Daniel said.

"At each demonstration site, we've concentrated on forage for those times of the year when they don't have good options for feed, and we've worked with grower groups to explore different options for these feed gaps based on their location, annual rainfall and soil type."

Finding fodder

By the time research is completed in 2025, the project will have defined forage mixtures for each region that will deliver live weight gains year-round.

"With bio-economic modelling, we will have identified the complementary forage species and how they should be sown in an area for optimal forage and returns," Daniel said.

"For example, we can recommend producers sow species A in 10% of the area, species B in 30% of the area and so on.

"We'll be able to advise producers which forage option will drive the most production in each season, and how they should combine it with other options to have the highest levels of production all year round."

As research continues producers will be able to learn about the project's findings by attending a series of field days at the Katanning Research Station and engaging with on-farm demonstration sites.

The optimised forage systems developed by FEED365 are set to be implemented in at least 30 sheep enterprises in southern WA by 2025, with more expected to follow. ■

SEASONAL ACTION PLAN

- Determine the cost-benefit of resowing pastures – scan this QR code to access MLA's Pasture improvement calculator.
- Compare and assess the performance of more than 100 pasture varieties using the Pasture Trial Network tool: **etools.mla.com.au/hub**
- Check out this fact sheet for practical tips to successfully establish a new pasture this autumn: **mla.com.au/establish-new-pasture**

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Take control of resistant worms

If you've noticed your go-to drenches aren't killing worms as well as they used to, you're not alone.

Cattle producers across Australia are facing a rapid onset of resistance to their most commonly used chemicals.

Here are some tips for managing these chemicals to give them a longer lifespan and provide better care for livestock.

Too much of a good thing

The macrocyclic lactone (ML or 'mectin') class of products has been the dominant chemical used for parasite control in cattle for the past 30 years.

Mectins are popular because they are:

- safe, with very few problems with toxicity, unlike the previous generation of chemicals
- effective against adult and larval worms, with extended duration of action
- flexible – as well as worms, they control a range of external parasites including buffalo flies, ticks, lice and mange mites.

However, the enthusiasm for these products has seen many cattle producers neglect to rotate and use older chemicals (levamisole and benzimidazoles) or new chemicals (monepantel), or combinations which may have greater efficacy and ease the selection burden on the mectin class.

Selection for drug resistance

Every population of parasites contains a small number of individuals (possibly only one in a trillion) that already carry genes for resistance.

When this population is exposed to a chemical (drench), all of the susceptible worms will die but the resistant one will survive.

Over time, repeated treatments will continue to reduce the number of susceptible worms until resistant worms make up the bulk of the population.

Table 1: Estimated resistance status of currently available drenches in Australia (2022).

Chemical group	Barber's pole worm	Brown stomach worm	*Cooperia*
Macrocyclic lactones	Some resistance	Some resistance	Established resistance
Levamisole (clear)	No resistance	Some resistance	No resistance
Benzimidazoles (white)	Some resistance	Some resistance	Some resistance
Monepantel	No resistance	No resistance	No resistance

'Refugia' means the population of worms that aren't exposed to the chemical. In wet years this is large, because of the high numbers of worm larvae on pasture, but in dry areas, most of the worms will be inside the animals.

Cattle properties naturally have refugia as only some mobs (usually the younger ones) are treated, allowing susceptible genes in the untreated worms to survive and dilute the numbers of resistant worms selected by the treatment. However, repeated treating of all animals on a property eliminates refugia and selects for rapid resistance to chemicals.

Diagnosing resistance

Methods of testing if a drench still works include:

- Post-treatment worm egg count (WEC). This will give a rough indication of how well the drench worked. Samples are taken two weeks (day 14) after treatment. A worm identification (larval culture) added to the test will also tell the type of worm that survived the drench. If a single treatment is used, samples can be collected from the ground (less than 10 minutes old) or taken from the rectum using a gloved hand. If multiple products are used, samples must be taken directly from the rectum.
- Before and after test. The same as above, but the results are compared with the worm egg counts from prior to treatment (known as day 0) to calculate the efficacy (% kill) of each treatment against each worm type.
- Full drench test. Cattle are randomly split into groups, then treated with several treatments, to assess how each drench group works against each type of parasite present.

Resistance trends

Unlike for sheep, where good data is available, there isn't currently a comprehensive picture of cattle drench resistance across Australia.

However, trials conducted by state government and pharmaceutical company researchers in many locations reveal some obvious patterns (Table 1). These trends reflect what is happening worldwide[1]. ■

Different chemicals and administration types (injectable, oral or pour-on) can be used in a drench test. However, animals treated with a pour-on treatment need to be separated from the rest of the herd, including untreated animals, to prevent accidental transfer of chemical from one group to the other.

Seven tips to stop drenches failing

1. Use non-chemical options, such as pasture spelling, rotational grazing, supplementary feeding or genetically selecting for worm-resistant stock. Scan this QR code to access pasture management strategies, or visit **wormboss.com.au**
2. Test your treatments and only use effective drenches: **wormboss.com.au/tests-tools**
3. Take worm egg counts (WECs). Research shows higher WECs are strongly related to a greater impact on average daily gain in young cattle[2]. Conducting a WEC is a simple and inexpensive way to decide on whether a treatment will be necessary or economical – learn more at **wormboss.com.au/worm-egg-counts**
4. Use combination products, as they have higher efficacy and will select more slowly for resistance.
5. Rotate chemical groups (treatment by treatment or year by year) to choose the most suitable treatment for each application or worm type present (Table 1).
6. Use specific external parasite treatments, instead of just reaching for an 'all-in-one' product.
7. Read product labels and use only as directed.

[1]Baiak et al. (2018) Anthelmintic resistance in cattle: A systematic review and meta-analysis. *Livestock Science* 217: 127–135. [2] Shephard et al. (2022) A systematic review and meta-analysis of impact of strongyle parasitism on growth rates in young cattle. *Veterinary Parasitology* 309.

Visit **paraboss.com.au** for more information on slowing the onset of resistance to all parasiticides. Subscribe to the Boss Bulletin for monthly updates and articles on other parasite management strategies: **paraboss.com.au/register** Hilary Connors **hconnors@mla.com.au**

« A Dryland Legume Pasture Systems field walk near Dongara, WA, where producers looked at summer-sown French serradella cv. Margurita pasture. Image: Dean Thomas.

How to lift winter grazing with novel legumes

Southern producers could earn $100 more per winter-grazed hectare by adopting novel hard-seeded pasture legumes.

The Dryland Legume Pasture Systems (DLPS) project investigated new and improved cultivars of pasture legume species (novel legumes) over five years (2017–22) with investment from MLA, the Australian Government Department of Agriculture, Water and the Environment as part of its Rural R&D for Profit program, Grains Research and Development Corporation, and Australian Wool Innovation.

Overcoming challenges

In southern Australian mixed farming systems, pasture phases are necessary in low to medium rainfall zones to support productive livestock and provide optimal crop production.

These are often short-lived annuals which complete their life cycle from winter to early summer.

This can be challenging for producers in these regions due to unreliable rainfall patterns which cause fluctuating legume growth, negatively impacting feed supply and quality for grazing animals.

To combat this challenge, novel hard-seeded legumes have the potential to:

- fill existing nutrient gaps and reduce supplementary feed required for optimum ruminant performance
- maintain or improve livestock productivity through higher growth rates
- provide disease/weed breaks and fix nitrogen for subsequent crops.

Summer sowing

Sowing these novel legume species in summer gives the hard seed time to break down slowly and they are ready to germinate on first rains.

They don't take long to get up and going after rain, and produce more biomass providing more feed for animals, more competition for weeds and more nitrogen for crops.

The novel legume species also produce seed heads at a height above ground which means producers can use a conventional header to harvest their own seed, reducing on-farm costs.

On-farm content

Dr Dean Thomas from CSIRO, a researcher involved in the five-year DLPS project, said improving and introducing novel pasture legumes has unearthed on-farm benefits for producers.

"These novel hard-seeded legumes benefit the whole farming system, through increased profit and reduced financial risk," he said.

"The higher quality feed from novel legumes provides a significant feed advantage for the livestock enterprise, while the pasture legume phase reduced input costs in subsequent crops.

"However, successful legume pasture establishment and high pasture utilisation are required to achieve high profitability from pasture phases."

Tapping into profit

According to Dean, incorporating novel pasture legumes can have a $100/ha increase in profitability compared with continuous cropping rotations.

"The increase in profitability per hectare was through productivity by improving feed quality, but also through reducing financial risk as the novel legumes still proved equally as profitable in poorer seasons," he said.

The project also found that the more producers pushed their stocking rates and utilised the additional pasture grown, the greater that difference in profitability

» Livestock Systems Scientist, CSIRO Agriculture and Food, Dean Thomas in a productive *biserrula cv. Casbah* pasture where 10t/ha of biomass was measured. Image: Angelo Loi.

Six tips for summer sowing novel legumes

There are some important steps to take to get the most out of novel legumes. Here, Dr Belinda Hackney – who managed the NSW component of the DLPS project – shares her top tips for incorporating novel legumes into your pastures system this coming summer.

The Dryland Legume Pasture Systems research site at Condobolin, NSW, in August 2021 with summer-sown bladder clover on the left, conventionally sown (late May) arrowleaf clover in the middle and summer-sown arrowleaf clover on the right. Image: Belinda Hackney.

1 Clean up your weeds

Weed invasion is the leading cause of establishment failure in any new pasture. Take a zero-tolerance approach to weeds in the years leading up to sowing new pastures, and keep fallows and stubbles clean.

2 Check your herbicide labels

Be sure to check the labels of all herbicides used in the years leading up to pasture sowing (don't forget herbicides used to control summer weeds) to meet the requirements for safe plant-back periods. Remember, you're going to be sowing five months ahead of when you conventionally would be.

3 Choose the right novel legume species

The project found there were differences in the species and cultivars that could be used in NSW compared with other states, such as WA. Species also vary in their tolerance to specific soil conditions such as pH and drainage, so do your research to find out what species performs best in your region.

4 Sow at the right time, rate, depth and the right form of seed

The best results occur when unprocessed seed (bare-seeded species) or pod segments (serradella) of suitable species and varieties for your region are sown in mid to late summer. Minimum seeding rates are 12kg/ha for bare-seeded species and 20kg/ha for serradella pod. Seed and pod segments need to be sown at a depth of 10mm. Placing seed too deep will result in significantly lower emergence.

5 Start with a nursery paddock

A nursery paddock of between 10–80ha is a good way to test the water without having to commit to something that you've never grown before. Remember, seed of these species can be harvested using a header, so you can quickly scale up seed supply to enable renovation of larger areas.

6 Manage the paddock in the establishment year for seed set

The priority in the establishment year is to achieve adequate seed set, as this is the cornerstone of building a seedbank for future regeneration. In dry years, this may mean minimal grazing in the establishment year. In wet years, paddocks need to be grazed for prolonged periods to control the large quantities of herbage (in some cases up to 8t DM/ha by the end of winter).

TO DO

Scan this QR code to watch a video showing the difference in herbage availability of summer sowing of legumes versus conventional sowing.

Scan this QR code to watch a video with producers who have planted novel legumes.

Scan these QR codes to read MLA's fact sheets:

How do I... use serradella in permanent perennial grass-based pastures in the high rainfall zone to increase livestock profitability?

How do I... grow more phosphorus-efficient pastures?

was between improved pasture versus a novel legume pasture.

"We looked at what would happen in these rotations if you established a novel pasture, but then didn't graze it in the first establishment year – on an annualised basis there was about $100/ha difference in profit," Dean said.

"This really reinforced the importance of grazing the novel legumes in the first year."

Reduced input costs

Switching from a traditional legume-based pasture to a novel hard-seeded annual legume pasture can provide producers with the opportunity to decrease costs associated with applying nitrogen to following crops.

"In mixed farming scenarios, crops following novel hard-seeded legumes only required a third of the nitrogen inputs, meaning producers purchased less nitrogen," Dean said.

"The nitrogen that's fixed during the pasture phase, even when pastures were grazed, provided enough nitrogen for the subsequent cereal or canola crop – a significant saving in input costs and a real win for these systems." ■

Visit MLA's legumes resource hub at **mla.com.au/legumes** Dean Thomas **dean.thomas@csiro.au**
Belinda Hackney **belinda.hackney@shell.com** Cameron Allan **callan@mla.com.au**

Upgrade your skills to drive

MLA works with partners across Australia to deliver programs that equip producers with the knowledge and skills to implement the latest research into action. There are many ways you can upskill – whether that be online, at an event, trying out a training program or getting involved in one of our longer-term programs such as a Producer Demonstration Site.

Different seasons call for different skills and autumn is the perfect time to focus on grazing land management. Managing your grazing land well is a key profit driver which underpins the health of your livestock business. Hit the road now and improve the management and utilisation of your feedbase.

Use
a tool or calculator

The **Australian Feedbase Monitor** is a world-first tool helping producers to improve grazing management, forage budgeting and ground cover.

The **Stocking rate calculator** is designed to determine the number of cattle or sheep producers should put into a paddock based on its carrying capacity.

The **Pasture improvement calculator** helps to determine the costs and benefits of upgrading existing pastures, improving infrastructure, applying capital rates of fertiliser and establishing new pastures.

The **Feedbase planning and budgeting tool** assists with planning rotational grazing systems, determining appropriate stocking rates, calculating pasture growth rates, determining how long paddocks will last and calculating the most economical ration for stock.

mla.com.au/tools

Attend
an event

meatup FORUM

Held throughout southern Australia, **MeatUp** forums introduce producers to the outcomes of MLA research and development projects, and the next steps to drive profitability and productivity on-farm.

mla.com.au/meatup

beefup FORUM

Held throughout Queensland, NT and WA, **BeefUp** forums are designed to demonstrate the value of implementing new practices or technology on-farm. They showcase MLA activities, programs and projects that northern producers can get involved in to further build their knowledge and skills.

mla.com.au/beefup

Watch
a webinar

FutureBeef is a collaborative program between MLA and the Queensland, NT and WA governments. **FutureBeef webinars** share the latest practical tools, scientific insights and relevant, timely advice.

futurebeef.com.au

Productivity and Profitability webinars present new and topical information to help southern producers increase the productivity and profitability of their businesses.

mla.com.au/ppwebinars

long-term productivity

Learn

by completing an online short course or visiting a resource hub

Why do cattle need phosphorus? This online training course outlines why phosphorus is important, how producers can identify a phosphorus deficiency in their herd and how to supplement for P-deficient beef herds.

elearning.mla.com.au

Visit one of MLA's **resource hubs** for practical online resources such as fact sheets, guides and short videos to help producers manage pastures for optimal performance.

Sign up

for a training program

mla MEAT & LIVESTOCK AUSTRALIA EDGE NETWORK

Grazing fundamentals EDGE is a one-day workshop that gives northern producers a broad understanding of the environment in which they operate and the core principles behind successfully maintaining grazing land condition and long-term productivity.

Grazing land management EDGE is a three-day workshop helping northern producers thoroughly understand their grazing environment, and how to strategically manage their grazing business to optimise land condition and productivity in the long term.

mla.com.au/edgenetwork

The **Profitable Grazing Systems (PGS) Satellite-assisted forage budgeting** package helps upskill producers in how to utilise satellite imagery to develop grazing budgets on a large scale.

Profitable Grazing Systems your pathway to success

The **PGS PayDirt** package value-adds to soil testing results and helps producers determine how to get the most bang for their fertiliser buck.

The **PGS Dry time ready** training package will leave producers with a fully developed drought management strategy focused on production and resource allocation.

mla.com.au/pgs

Producer Demonstration Sites (PDS) support producers by working in peer-to-peer groups to pursue new skills, knowledge and management practices applicable to their own commercial livestock production systems.

Producer Demonstration Site

mla.com.au/pds

Ready to get in the driver's seat and upgrade your skills now?

Find out more at **mla.com.au/grazing** **getinvolved@mla.com.au**

Supply chain
delivering value

Short lairage could drive productivity

In Australia, standard lairage time for slaughter cattle is 15 hours and typically involves an overnight stay. New MLA research into short-duration lairage (SDL) of between three to four hours has shown positive impacts on hot standard carcase weight (HSCW), dressing percentage, sustainability and welfare, with no negative outcomes to meat quality and food safety parameters found.

Significantly, SDL has been assessed as a viable option for large-scale, commercial feedlots and abattoirs. It's important to note, however, a range of factors need to be addressed before widespread adoption can occur. Identifying and offering solutions to these challenges will open up opportunities for greater productivity across the supply chain.

This article is relative to grainfed cattle only. Further research is required in grassfed supply chains.

Study findings

MLA and Bovine Dynamics engaged Beattie Consulting Services and Richmond Hill Agribusiness to conduct an impact assessment of the research results and engage with 27 stakeholders, to assess current usage of SDL, requirements for its effective use, and potential and actual challenges associated with adoption of the practice.

This project demonstrated that reduced lairage duration provided a significant benefit in the profitability across the supply chain, as well as improved animal welfare and sustainability outcomes.

SDL of four hours or less was found to:

- yield a 7.4kg advantage ($p<0.05$) in HSCW as compared to mid-duration lairage
- yield a 6.2kg advantage ($p<0.05$) in HSCW as compared to long-duration lairage
- deliver significant economic benefits, estimated at $35/head using five-year average historical prices
- improve animal welfare by reductions in stress and dehydration
- deliver environmental and sustainability benefits via reduced emissions intensity per carcase (estimated as a 1.2% reduction in emission intensity equal to 0.34kg CO_2-e per kg carcase weight).

Animal welfare

Improvements in animal welfare were confirmed by higher levels of liver glycogen levels in cattle exposed to SDL – an indication of lower stress levels.

Other practices found to contribute to better welfare outcomes included:

- minimising time off feed
- reducing loud unfamiliar noises near cattle
- not mixing unfamiliar animals
- ensuring lairage design and conditions maximise animal welfare with shade and shelter, space allowance, easy access to clean water etc.

Environmental sustainability

The increases in HSCW per head for cattle slaughtered after exposure to SDL resulted in a reduction in the emission intensity of the carcase – an estimated reduction of 0.34kg CO_2-e per kg carcase weight. This was produced by reducing lairage time from around 16 hours to four hours or less – a big win for the red meat industry in its journey towards being carbon neutral by 2030 (CN30).

Looking forward

SDL will not be suitable for all supply chains and may only be suitable for a portion of the annual slaughter for individual supply chains given logistical challenges.

The research found that vertically integrated supply chains offer the greatest potential for large-scale adoption of SDL due to the lower risks associated with timely supply of cattle.

Simplifying the logistical challenges of implementing SDL in commercial environments will boost future adoption and needs to include:

- electronic submission of regulatory paperwork such as National Vendor Declarations (NVD)
- transport scheduling
- scheduling ante-mortem inspection
- improving coat cleanliness prior to abattoir arrival to reduce washing intervals required before slaughter. ■

MLA feedlot research and development: **mla.com.au/feedlot** National Vendor Declarations: **integritysystems.com.au/nvd** Integrity system for transporters: **integritysystems.com.au/transporters** CN30 **mla.com.au/cn30** MLA's fit to load guide **mla.com.au/fittoload**

Dr Joe McMeniman **jmcmeniman@mla.com.au** Melissa George **melissa@bovinedynamics.com.au**

Strong ties between the north and live export

Northern Australia is crucial to live cattle exports as it provides 74% of the trade's $1 billion farm-gate value.

Overall, Australia's live cattle exports contribute $1.4 billion (directly and indirectly) to the national economy and employ 6,573 people.

These insights into the importance of the industry to regional communities are from a study commissioned by the Livestock Export Program (LEP), a collaboration between LiveCorp and MLA.

The proximity of northern Australia to South-East Asia, and the similar climate, are highly beneficial for the livestock export industry in terms of animal welfare and transportation costs.

The trade also benefits people in destination markets who rely on Australian cattle to provide nutrition and contribute to food security and affordability.

Key regions

The LEP study focused on the benefits of live cattle exports to regions across the top of WA, NT and Queensland.

The Summer 2022 edition of *Feedback* looked at the stories of a producer and pre-export quarantine facility. This edition follows the supply chain, and profiles the transport link in getting cattle from station to ship. ■

Steve Beatty, the NT Manager for Road Trains of Australia.

Transport

Trucks keep live exports moving

Livestock transporters are unique – they're part truck driver, part stockperson, with a bit of tyre-fitter and mechanic thrown in for good measure.

Steve Beatty, the NT Manager for Road Trains of Australia, knows this better than most, as he's been driving livestock trucks since 1979.

He currently manages a team of about 15 drivers and 15 mechanical staff, out of their base near Darwin. The company also has depots in Longreach and Mt Isa in Queensland, and Broome, Geraldton and Perth in WA.

"We transport cattle all over the NT and from northern Queensland, between properties, to pre-export quarantine yards and to Darwin port," Steve said.

"The trucks average 120,000–150,000km a year, and it's pretty slow going on outback roads so the hours are long, with trips lasting days or even weeks as the drivers go from station to station."

The average load of feeder steers bound for Indonesia is about 180 head/truck.

Transport considerations

Live export work comprises about 30–40% of RTA's business and it can be quite seasonal in the north, where very little moves during the wet season.

"Transporting livestock is all about planning, so the cattle reach their destination in the shortest possible time and the drivers get the right breaks. It's not like moving freight, as we stop at least every two hours to check the cattle and make sure they're travelling okay, and more often if they're restless.

"Producers want their animals moved as quickly as possible and with the least stress. We rely on them to help us out by ensuring the cattle are curfewed and drafted correctly and ready to load onto the trucks when we arrive," Steve said.

"It's all about communication and staying in touch to get the job done.

"Most of the stations are also great if there is a breakdown or another issue, helping us manage the cattle while we wait for another truck or repairs."

When it's time to load cattle onto a ship for export, multiple trucks need to work in convoy.

"Depending on how close the yards are to the port, you need anything from four trucks to as many as 14 shuttling between the pre-export quarantine yard and the port."

Training new drivers

Learning how to manage livestock is critical for animal welfare and effective transport – and not every driver grew up around livestock like Steve did.

With fewer people entering the industry, retaining drivers and providing them with effective on-the-job training has been essential for his company.

"When new drivers start, we pair them with someone more experienced who can show them how to safely load and work around livestock. They learn how to work quietly and not rush the cattle and also how to identify animals that may not be fit to travel.

"After a few months they progress to driving on their own, but even then we pick and choose the routes which have multiple trucks driving together, so they have support around them.

"There are a few nuances to transporting cattle that you've got to learn – you have to remember there are animals on board and drive them with care." ■

Read *The economic contribution and benefits of the Northern live export cattle industry* report at **livecorp.com.au** or scan the QR code Road Trains of Australia **rta.net.au** MLA's fit to load guide **mla.com.au/fittoload**
Nicholas Baker **nbaker@livecorp.com.au** Steve Beatty **steve@rta.net.au**

Shelf-life indicator cuts food waste

A Norwegian innovation could help reduce food waste in Australia's red meat supply chains through accurate shelf-life measurements.

It's a critical step on the road to sustainability and works hand in hand with Australia's red meat supply chain system, which is already one of the safest in the world.

Keep-it Technologies, based in Oslo, Norway, in conjunction with MLA and Australian Beef Group (ABG), ran an eight-month trial with grocery chain Harris Farm Markets to test a device that calculates expiry dates in real time – allowing for reductions in food waste and cost-effective purchasing for retailers and consumers.

ABG's Lachlan Chadwick said this type of supply chain efficiency was a key driver in reducing food waste and retaining profits across the industry.

"Currently, 60% of food waste comes from the household side of the supply chain – this technology is a tool to help consumers and retailers decrease their food waste, because it takes the guesswork out of what can be safely consumed after purchase," he said.

How it works

The Keep-it technology is an expiry date indicator. A device is attached to a product to calculate perishability through real-time temperature measurements.

With traditional date stamping, the expiry is calculated using baseline microbe levels at a temperature of 4°C. With this method, the day count is reduced by 10% to account for consumer fridges that may be running at 5°C or 6°C, and other shelf-life abuse. In contrast, Keep-it is an active sampler that views temperature continuously.

"We've got a measure of temperature through the entire supply chain, so rather than making estimates on expiry, we're giving an accurate forecast," Lachlan said.

This project builds upon a model developed by MLA and the University of Tasmania (UTAS), where expiry is estimated using theoretical shelf-life calculators.

"The incredible thing is how dynamic and accurate it is," Lachlan said.

"If you're using a cooler bag to bring your fresh meat from the retailer to your home, and your fridge is also running at a low temperature, the benefits of the good shelf-life management will be communicated – the tag will change with the temperature shift."

Instead of a product having a static expiration on, for example, 10 March, this sort of good supply chain management would see the Keep-it tag give the consumer until 15 or 16 March to safely consume the meat.

Economic and sustainability impacts

A distinct limitation of traditional date stamping is lower sale capacity for retailers – leading to food wastage and reduced profits.

"For a package of meat with 20 days of shelf life, a 10% discount would be two days – two days without sales, or sales at marked-down prices depending on their markdown policy," Lachlan said.

With Keep-it's level of accuracy, retailers and consumers can make better purchasing decisions and buy/sell products closer to expiry, without fear of poor quality.

"It's completely simple to implement, cheap and all automated," Lachlan said.

"This technology aligns with producers' and retailers' existing goals of reducing food wastage, maximising profit and improving sustainability.

"The largest benefit I see for using the technology is that it gives consumers the confidence and accountability in their purchase decision. They're armed with the information necessary to continue the high food safety standards already in place from producers and retailers," Lachlan said.

While this product is planned to be released commercially following these trials, there are a few steps to take to ensure success, including communicating the benefits to consumers, ensuring retailers are confident to implement the devices, and putting in place logistics to distribute the devices. ■

The Keep-it device is attached to the packaging and reads temperature in real time.

Benefits of Keep-it shelf-life indicators:

- more efficient meal-prepping
- less food wastage and retained economic value without markdowns in the days before expiry
- benefits flow back to the farm gate through premiums and reduced profit cuts.

For more information on Keep-it Technology, visit **futurefoodsolutions.com.au**

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Red meat sizzles from US BBQs to China campsites

MLA is keeping Aussie red meat on the centre of the plate in key international markets.

US summer beef campaign

Australian red meat is already well-placed as a great choice for American consumers during summer, and MLA's International Markets team helped grow the love of Aussie beef as the temperature soared in the northern hemisphere.

Summer is 'grilling season' in the United States – a time when cooking outdoors is on the mind of consumers, along with wanting to keep their hard-earned beach-bod in shape.

These cultural desires make it a great time to focus the messaging and marketing of Australian grassfed beef as a grill-ready, healthy choice.

MLA's International Markets team in North America expanded their 2022 summer marketing campaign, with funding from the Victorian government.

Doug McNicholl, MLA's Regional Manager for North America, said specific marketing was used to promote Australian red meat in this market.

"We look for innovative marketing tactics to help us make best use of producer levies to grow awareness and brand equity in Australian grassfed beef," he said.

"Personalised digital advertising targeting beef consumers in key cities during key moments of their day, coupled with carefully selected consumer influencers with inspirational food videos, have proven the most successful tactics.

"We also pass on our learnings to Australian exporters and importers, so they can apply them to their marketing efforts."

This 'personalised moment' advertising works by targeting specific consumers at the exact moment they're searching for relevant content.

In the case of red meat, late afternoons when meal prep is on their minds is an ideal time to be influencing consumers through digital marketing channels.

Beef camps out

Our beef and lambt also took to the outdoors in China, with another MLA marketing campaign.

The popularity of camping and outdoor activities surged in China over the past five years, as a way for the growing middle class to embrace a more Western lifestyle, which includes higher premium red meat consumption.

While camping in Australia requires the bare essentials, China gives it a glamorous twist, to cater to the needs of wealthy urban consumers. These campers go to nature 'in style' in their expensive SUVs, with North pole-worthy gear. Most importantly, they don't compromise on their meals.

To raise the brand awareness of Aussie beef and spotlight Australian beef and lamb as the preferred choice, MLA's International Marketing team partnered with 20 famous chefs from across China and held a Steak Camp in October.

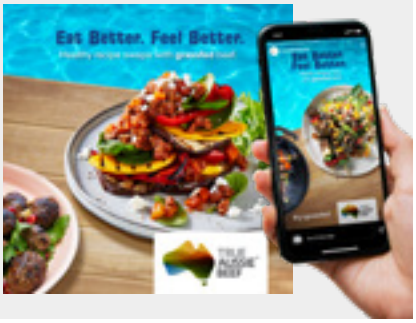
The chefs, from premium hotels and fine-dining restaurants, gathered at a camp site outside Shanghai and had a cook-off – presenting their dishes to 35 guests, ranging from food-based media, influencers, and government representatives from across Australia and China.

The undisputed stars of the night were a trio that presented an eye-catching hand-crafted Texas barbecue wagon, complete with apple-wood smoked beef and a plate of lamb ribs, briskets, chops and shoulders.

Under the star-lit sky and warmed by a bonfire, with the best meat from Australia cooked by the best chefs of the country, it was truly a meat lovers' ultimate camping experience. ■

US Summer 2022 campaign

- **35,232,524** consumers reached
- **1,700,000** video views
- **33,345** new Aussie beef fans (new followers and clickthroughs to **aussiebeefandlamb.com**
- **100%** growth (over the 2021 campaign) in engagement with video and social media content.



China Steak Camp

- **20** media articles
- more than **350,000** views
- more than **2,070,000** unique followers.

Guests ranged from food-based media, influencers, and government representatives from across Australia and China.

Camping is the newest trend in China – as a way for the growing middle class to embrace a more Western lifestyle.

Learn more about MLA's international markets at **mla.com.au/international-markets**

Doug McNicholl **dmcnicholl@mla.com.au** Joe Zhu **joezhu@mla.com.au** Josh Anderson **janderson@mla.com.au**

One-stop shop for export markets

The Australian red meat export supply chain – from producers to retailers – now has a single-source of resources and services to assist with buying, selling, promoting and marketing beef, lamb and goatmeat globally.

MLA's new Aussie Meat Trade Hub gives producers an insight into their exported product, as well as servicing exporters, retailers and other export partners, with features designed to suit their specific business needs.

Previously, users had to visit multiple websites to obtain this information, but the Aussie Meat Trade Hub brings it all together via a single sign-on to myMLA.

Here's how the Hub helps increase demand for Australian red meat:

Red meat exporters database

Licensed red meat exporters and brands can use this database to build their online presence to international customers. This tool has been expanded to enable exporters to add information to their profiles, including images, catalogues and videos. A new enquiries function matches the requirements of the customer with suitable exporters – providing quality leads for exporters to convert into sales.

Brand and licensing

MLA's Aussie Beef & Lamb brand is used to promote Australian red meat across all global markets. It acts as a trust mark, providing reassurance to international customers that they're choosing a high quality, safe and nutritious product – which in turn drives demand and justifies premiums for producers. The licensing program enables Australian red meat brand owners to leverage the value of the brand and ensure consistent and compliant use of the brand across the globe.

Assets

Approved licensees have access to a broader range of exclusive assets including photography, logos, icons, publications and videos.

Trade shows

Trade shows provide valuable opportunities for networking with export market customers – fostering existing relationships and facilitating new business development. An event calendar provides visibility of food shows around the world. Exporters can register their interest to co-exhibit with MLA at selected shows. Potential customers can see what exhibitors will be at MLA's stands and connect in advance.

Global insights

The global insights tools analyse brands, product attributes and growth drivers – see story on right for more details. ■

AUSSIE MEAT TRADE HUB

Access the Aussie Meat Trade Hub at **aussiemeattradehub.com.au**
aussiemeattradehub@mla.com.au Josh Anderson **janderson@mla.com.au**

Your road to markets

MLA's Insights team recently unveiled a new resource for detailed export data, consumer research and new possibilities – the Global Insights site, found within the Aussie Meat Trade Hub (see main article).

This information was previously only available through direct contact with MLA – now Australian producers, exporters and processors can access exclusive content that will help their products meet the market via their myMLA log-in.

Here's a closer look at the tools and how they inform decision making.

Identify opportunity

MLA has red meat growth drivers for key destinations of Australian red meat, including the domestic market. These are based on consumer needs, market trends and Australia's point of difference against our competitors.

Users can enter specific traits – such as breed, sustainability claims, marble score and feed supplementations – to see markets and opportunities that best align with their product. The tool provides a downloadable summary table of key factors for the relevant drivers, outlining target consumers, retailers and foodservice channels.

Guide market strategy

The MLA market classification tool provides an objective view of Australia's key red meat markets. Each classification is broken down by:

Meat type – grassfed beef, grainfed beef, lamb, mutton and goatmeat

Market attractiveness – market size and potential

Ability to impact – trade access, consumer attitudes and country risks

These markers guide market strategy based on multiple data points, consumer insights and in-market intelligence.

Keep an eye on trade

The Trade Watch is an interactive dashboard displaying export data, allowing users to filter and view the data most relevant to them and easily identify emerging export trends.

This site also links to MLA's market snapshots, which provide a summary of critical market information for each of Australia's main export markets. ■

« Pictured during the sustainable menu development and training on board P&O's cruise ship, the *Pacific Encounter*, are Corporate Executive Chef P&O Australia Uwe Stiefel, Executive Chef of the *Pacific Encounter* Roberto Dordas, MLA Corporate Chef Sam Burke and MSA retail training facilitator and butcher Kelly Payne.

» Beef sauerbraten – red meat is front and centre on the *Pacific Encounter*'s menu.

Keeping red meat on the plate, from the footy to the high seas

Sam Burke is a hard man to pin down. It's no wonder, as his unparalleled dedication to growing demand for Australian red meat sees him travelling on a weekly basis.

As MLA's Corporate Chef and Foodservice Business Development Manager, Sam's driving goal is to make sure red meat is a staple on menus and dinner tables.

With 25% of red meat consumed in domestic markets in the foodservice sector, it's a huge undertaking – but Sam holds sway with large, turnkey foodservice companies that will make a real difference, shift volume and grow demand for Aussie red meat.

On any given day, you might find Sam or Julie Ballard, MLA's Product Development Executive and Culinary Chef, on a cruise ship creating innovative menus to reduce waste, in a pub kitchen upskilling trainee staff on how to make the most of affordable cuts, or consulting with a major hotel chain, as they did with ALH Hotel Group for the launch of the well-received Broncos beef burger during the NRL finals series.

Tailored solutions

Sam takes the time to create bespoke solutions for each individual business MLA partners with – working to engage and attract new diners and ensuring company objectives are met.

"In a post-COVID environment, businesses are dealing with staff shortages and increasing costs of red meat – we need to support them to get back on their feet," Sam said.

The process begins in the kitchen. Cooking skills and available equipment varies between venues, so assessing these is the first step to identifying opportunities to keep red meat front and centre. A focus on back-to-basics menu development and how to cook cheaper cuts well, is having an impact on business.

"We train staff how to prepare cost-effective cuts in the best way possible to deliver fantastic eating experiences for customers.

"Our mantra is to listen, see their operation and work out how much money they can spend on a menu item in order to make a profit," Sam said.

Supply is another important consideration.

"If we put a burger on a menu, we have to make sure that product is available nationally. For example, beef cheeks would not be a good choice for a pub – with only two on each carcase it may not be a good selection for a big pub group resupply. You just don't have the supply there to meet that demand," Sam said.

"We train staff how to prepare cost-effective cuts in the best way possible to deliver fantastic eating experiences for customers."

Bouncing back from COVID

During lockdown, MLA's foodservice business development team refocused MLA's foodservice program and expanded the Rare Medium Academy website, which houses beef, lamb and goatmeat recipes and resources targeted at commercial kitchens.

"We ran live masterclasses on YouTube for foodservice operators to help them pivot and adapt to takeaway and home delivery options. We demonstrated the best kinds of packaging to have success with our protein and offered delivery solutions," Sam said.

Partnerships driving demand

MLA's Broncos beef burger collaboration with ALH Hotel group during the 2022 National Rugby League finals week was a prime example of a marketing campaign spurring red meat consumption and its profile as a key source of nutrition for athletes.

This initiative involved 112 Queensland food venues from the Gold Coast to Mackay, which sold a combined 24,845 of the specialty burgers. Sales increased by 23.7% across all venues, with the best-performing site going to The Beer

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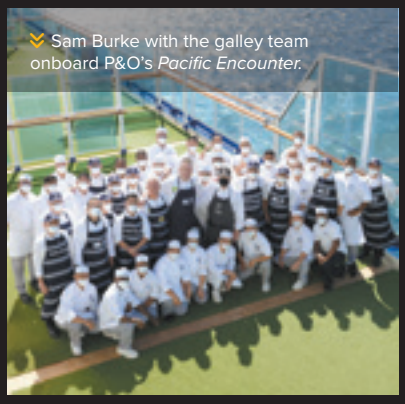

Sam Burke with the galley team onboard P&O's *Pacific Encounter.*

Garden at Surfers Paradise, which saw an increase of 118% compared to the same period in 2021.

Sustainable cruising

Reducing food waste and maximising the whole carcase is key to a sustainable foodservice industry, and it's driving a shift in how cruise companies such as P&O Cruises are feeding their on-board guests.

"At the end of the day if the chef cooks it and it goes to waste, then all the resources that went into producing the animal are wasted," Sam said.

Sam has been developing sustainable menus with P&O since cruising restarted post-COVID in late 2022.

He was on board the first ship off the dock, the *Pacific Encounter*, where 2.5 tonnes of red meat is prepared over a typical three-day cruise.

"We went on the ship and worked hand in hand with their chefs to keep red meat on the menu. We used a food court system where customers are given smaller portions of red meat, rather than the traditional pile-your-plate buffets, to limit food wastage," Sam said.

On the horizon

Looking forward, Sam wants red meat to further infiltrate the snacking space, and diverge from traditional lunch and dinner options (think breakfast brisket with beans at fast-service restaurants).

He's also excited about the trend towards diners sharing big, centrepiece cuts.

"We're seeing a lot more share steaks at restaurants – showcase tomahawks, rib eye on the bone – centre stage in the middle of the table and people sharing it as an experience, along with sides and different sauces," Sam said. ■

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Red meat trendsetters

As editor of MLA's foodservice e-magazine, *Rare Medium*, Mary-Jane Morse has her finger on the pulse of what's happening in Australia's restaurants and foodservice venues.

Through her close connection to chefs and venue operators, Mary-Jane has witnessed their remarkable capacity to adapt to the changes caused by COVID and come out on top.

Whether it's a $200 steak or a $10 burger, red meat's versatility has kept it on nearly every menu around the country.

Here's a look at some of the trends emerging on the dining scene, and how lockdowns led to the revival of some old classics.

Big is back

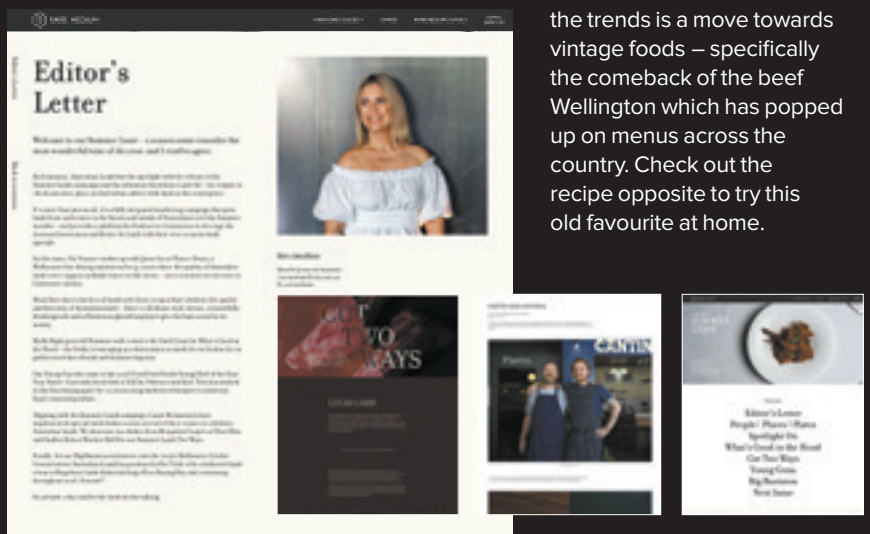
Large cuts are taking pride of place at fine dining venues, with diners more willing to fork out for a communal, shared experience. Chefs are rising to the challenge of increasing red meat costs, and creating some impressive centrepieces. Focusing on presentation and provenance is a strategy that businesses can use to build their stories and generate a wow factor for their customers.

Nose-to-tail eating

Chefs are increasingly expanding their repertoire beyond loin cuts, with many high-end restaurants introducing items including offal, sub-primaled steaks like rump cap and centre, and lamb ribs. Making use of the whole carcase is not only a boon for sustainability but is also good for their bottom line and driving demand across the supply chain.

Comfort food

COVID lockdowns presented unique challenges for foodservice venues and fuelled a move towards menus offering comfort foods and boosting takeaway options. This trend has remained, with nostalgic, affordable staples taking diners back in time. One of the trends is a move towards vintage foods – specifically the comeback of the beef Wellington which has popped up on menus across the country. Check out the recipe opposite to try this old favourite at home.



MLA's quarterly *Rare Medium* e-magazine journeys through the Australian beef and lamb supply chain with insights, innovation and inspiration from paddock to plate.

Share steaks like this one, served up at WA's Burnt Ends at Beerfarm, are taking centre stage, offering diners a quality eating experience – together. Image: Sarah Hewer.

Keeping red meat on the menu

Despite COVID-induced staff shortages and skills deficits, Mary-Jane is keen to support businesses as they continue to recover.

"The biggest challenge for foodservice currently is a severe labour shortage resulting in reduced trading hours and the need to simplify menu offerings to meet the skill level of inexperienced kitchen staff," Mary-Jane said.

She tells of one restaurateur paying a chef $75,000 but needing to teach them how to poach an egg.

"Red meat is a premium menu item and so it must perform well; eating quality needs to be consistent and the customer experience exceptional.

"The good news is that it's a versatile, reliable protein that staff can be trained to cook well. Beyond skill sets, we need to help businesses strategically rethink menu options and keep them inspired by Australian red meat." ■

Rare Medium **raremedium.com.au**
Read the latest *Rare Medium* **raremediummag.com**
Mary-Jane Morse **mmorse@mla.com.au**

COVID-induced comfort eating is here to stay – see story opposite. Try your hand at this old favourite to warm up as the days get cooler.

Beef Wellington

Serves **6** Prep time **60 minutes** Cooking time **30 minutes**

INGREDIENTS

1kg beef eye fillet, trimmed
20ml vegetable oil
30g Dijon mustard
10 thin slices prosciutto
70g pate
375g butter puff pastry
1 egg yolk, lightly whisked

Mushrooms

200g Swiss brown mushrooms
200g button mushrooms
50g butter, chopped, melted
50g eschallots, finely chopped
10g thyme leaves
Salt and pepper to season

Crepes

75g plain flour
Pinch salt
1 egg
125ml milk
20g burnt butter
Salt to taste
Butter to grease

METHOD

1. Take the beef out of the fridge 30 minutes before starting this recipe. Season with salt and rub with half the oil. Heat a large frying pan over high heat, add beef and cook, turning for 6–8 minutes or until browned all over. Transfer to a plate, refrigerate for 15 minutes. Brush with Dijon mustard.
2. Meanwhile, place mushrooms, butter and eschallots in a large pan over medium heat, season with salt and pepper. Cook, stirring, for 20–30 minutes or until all liquid has evaporated. Add thyme and set aside to cool. Place in a blender or food processor and process. Place between two trays lined with paper towel. Weigh down, refrigerate for a few hours.
3. Place flour and salt in a bowl. Make a well and gradually whisk in the milk, egg and burnt butter until smooth. Pour into a jug. Set aside for 30 minutes.
4. Heat butter in a frying pan over medium-low heat. Add ¼ of the batter. Swirl to cover base. Cook for 2–3 minutes. Flip. Cook for one minute or until light golden. Transfer to a plate. Repeat to make three more crepes.
5. Spread pate evenly over beef. Lay crepes in a line, overlapping, top with prosciutto, followed by an even layer of mushroom, then beef. Roll to enclose and wrap tightly in plastic wrap, refrigerate 30 minutes.
6. Pre-heat oven to 200°C. Wrap the beef in the puff pastry and brush with egg yolk. Gently score pastry, sprinkle with salt. Bake for 25–30 minutes for medium or until cooked to your liking. Rest the beef for 10–15 minutes. Serve in thick slices with a red wine jus.

Beef Wellington is a best seller at Rothwell's Bar & Grill in Brisbane.

Stay informed

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Don't miss out on timely information which matters to your business - sign up for MLA's e-newsletters, and make sure your membership details are up-to-date. Others in your business - such as family members, property managers or livestock managers - can also sign-up to receive *Feedback* magazine and e-newsletters.

The Weekly

(weekly)

News, views and advice delivered to your inbox every Friday. Covering producer case studies, industry news, market information, on-farm tools and more, this e-newsletter is your one-stop-shop for the latest in the red meat industry.

Integrity Matters

(monthly)

A wholly owned subsidiary of MLA, Integrity Systems Company publishes a monthly enewsletter keeping industry stakeholders informed with the latest news and information on NLIS, LPA and NVDs.

Sign up to myMLA

People often use a number of MLA products and services, rather than just one. We've created myMLA as a single login point so it's easier for you to access MLA's catalogue of products and services on offer, all in one place.

By signing up to myMLA you'll also gain access to:

- a single sign-on facility to your NLIS, LPA, NVDs, LDL and MSA accounts
- customised market information based on your livestock species and location
- a localised seven-day weather forecast
- industry news and local events
- Australian Feedbase Monitor tool to help producers improve grazing management.

Connect on socials

Keep up-to-date by connecting with MLA on Facebook, Twitter and YouTube.

- **@meatandlivestockaustralia**
- **@meatlivestock**
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Spread the word

Encourage fellow producers to become an MLA member

Membership of MLA is free of charge to all levy paying producers of cattle, sheep and/or goats. Simply complete the short membership application form to access a range of benefits including:

- free access to the Australian Feedbase Monitor tool to help producers improve grazing management
- free subscription to MLA's regular member magazine *Feedback*
- free subscriptions to MLA's suite of e-newsletters
- discounts for a range of MLA products and services, ordered via the myMLA catalogue
- access to up-to-date publications and information tools
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- eligibility to apply for funding via MLA's Co-Marketing Program.

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