

**SPECIFIC
FOR YOUR
SUCCESS**

IN THE MIX #64

SPRING 2024

**Silage powers
weaner program**



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COOLER EXCHANGE

Do you have inoculant cooler bags laying around in the shed from previous seasons?

Instead of discarding them, consider repurposing them as lunch bags. Their sturdy construction and insulation make them perfect for keeping your meals fresh and protected. Alternatively, you can collect the used cooler bags and return them to your Lallemand Technical Services Manager at the end of the season. This initiative helps reduce waste and supports our efforts to be more environmentally conscious.

Our inoculant cooler bags are crafted from Tyvek, a remarkable material known for its durability and versatility. Tyvek is a tough, paper-like substance that is both lightweight and water-resistant, making it an ideal choice for protecting your inoculants. Additionally, these cooler bags are thermo-insulated, ensuring that your products remain at the optimal temperature throughout the day.

By recycling and reusing these cooler bags, you can make the most out of these versatile and durable bags.



Welcome

As we navigate through another year, it's heartening to reflect on the resilience and adaptability of our agricultural community. This year, seasonal conditions have presented both challenges and opportunities. The unpredictable weather patterns have tested our mettle, but they have also underscored the ingenuity and determination that define Australian farmers.

Silage, as we know, is a critical component of our livestock feed strategy, ensuring that our animals receive the necessary nutrients throughout the year. The quality of silage produced this year has been commendable, thanks to the innovative practices and unwavering commitment of our farmers. From advanced harvesting techniques to improved storage solutions, the strides we've made are a testament to our collective effort and expertise.

Agriculture in Australia remains a positive force, feeding the nation and contributing to the global food supply. Our farmers' dedication is the backbone of this success. Let's celebrate this season's achievements and look forward to a bright future together.

Alex Turney - Country Manager

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Beef Australia

Modern silage production was firmly in the spotlight at this year's Beef Australia, with hundreds of beef producers from throughout Australia visiting the Lallemand Animal Nutrition stand.

Lallemand Animal Nutrition mounted a major display at the event in partnership with CLAAS Harvest Centre, Davey Group, Eagle Direct, Fodderlink, Pacific Seeds, RotoMix and a number of silage contractors.

Managing Director, Alex Turney, says there has been a marked increase in interest about the role of silage in 'future proofing' extensive livestock operations. "Many livestock producers can see the benefit of silage but they are unsure how to go about it," he says. "Our site was specifically designed to help them along that journey.

"Our seminar program throughout the week was extremely well-received, while the 'sundowner' sessions each afternoon gave everyone a chance informally learn how to grow, store and feed silage from experts in their field. We are extremely grateful to our trade partners, who were able to provide livestock producers with a 360-degree view of modern silage production."

Commercial beef producers, Sandy and Jamie McCartney, were also on hand to share their experience with silage over the past three years. The McCartneys run about 3500 high-grade Brahman cattle across 12,000 hectares of owned and leased land based around 'Bucca Station', 25 km north of Bundaberg.

The enterprise turns off about 1,000 steers, surplus heifers and cull cows for the EU and MSA-graded domestic markets each year. The introduction of a silage-based weaner feeding program is helping the McCartneys to ensure their cattle attain feedlot weights at less than 24 months of age.

Beef Australia organisers are hailing this year's event as the most successful event staged, with more than 120,000 people passing through the gates of Rockhampton Showground during a week-long celebration of all things beef.

The next **Beef Australia** is 2-8 May 2027 in Rockhampton.

\$50,000 to help future proof your livestock operation

The Queensland Government is offering primary producers grants of up to \$50,000 to assist with the purchase or installation of capital infrastructure that will improve the drought preparedness of their properties.

Administered by the Queensland Rural and Industry Development Authority, the Drought Preparedness Grant will cover 25 per cent of the cost of purchasing new permanent infrastructure to a maximum cumulative amount of \$50,000 over five years.

Lallemand Animal Nutrition Country Manager, Alex Turney, says the grant is an excellent opportunity to consider the role of silage in both the northern beef production and dairy farming systems.

"Silage is the proven way to store high quality fodder for months, years or even decades, giving you more options to breed, background and finish your livestock, or simply feed your dairy cows high quality fodder, whatever the season," he says.

"As Australia's leading provider of forage inoculants, sealing systems and technical support, Lallemand Animal Nutrition has all the advice you need to grow, harvest, store and feed out quality silage.

"Our proven 'roadmap' covers everything you need to grow quality silage, including crop and varietal selection, pit design, inoculant selection, sealing technology, feeding out and process improvement."

To be eligible for Drought Preparedness Grant, the proposed project must improve the applicant's ability to continue to operate in, or recover from, drought conditions and be part of an approved Farm Business Resilience Plan.

Alex says the Drought Preparedness Grant could be channelled towards the construction of a silage pad or bunker, a feed pad or feeding equipment.

"This grant can be put towards anything associated with the storage, mixing and feeding out of grain, fodder, molasses and other supplements, including any costs associated with consumables, freight and contractors," he says.

In addition, applicants must be bona fide primary producers, obtain any necessary regulatory approvals and demonstrate sufficient funding to complete the project.

Contact Lallemand Animal Nutrition and find out how home-grown silage can help to 'future proof' your feed requirements.

For more information, visit qrda.qld.gov.au/program/drought-preparedness-grants



Silage powers weaner program



Pictured left to right: Trish and Luke Gadsby and Jordan Minniecon, Lallemand Technical Services Manager.

A silage-based feeding program is driving the efficiency of a large-scale northern beef operation by placing early-weaned calves onto a rising plane of nutrition that ultimately reduces the age of turn-off and improves meat quality.

John and Mary Atkins, together with their daughter and son-in-law, Trish and Luke Gadsby, run an integrated breeding and finishing operation based at 'Spion Kop' in Queensland's Western Downs, combined with 'Marqua Station' in the Northern Territory.

'Spion Kop' is a 4,141 ha. property located 65 km south-west of Taroom.

It hosts a 3,000 head silage feed pad, an 1,800 head feedlot, as well as having a backgrounding capability of approximately 2,000 cattle on grass.

The 4,500 square kilometre (441,000 ha) 'Marqua' station is located near the Queensland-Northern Territory border and runs an average of 6,000 Santa Gertrudis breeders, which includes first calf heifers.

The breeding herd is mustered in July/August, with the majority of calves weaned.

"We can only do one muster a year because of the heat and the cost," Trish Gadsby says.

Replacement heifers and heavier steers remain on 'Marqua', with the lighter and

younger weaners transported to 'Spion Kop' for finishing.

Depending on the year, up to 2,500 weaners weighing approximately 260kgs and under, are transported 1,800 kilometres to 'Spion Kop', where they are fed a silage-based ration for about 3 months, or until the season breaks and the spring rain arrives.

"With the ability to feed a silage ration to the weaners at 'Spion Kop', it allows us to wean quite young, down to about 10 weeks, which then allows the cows the best chance of getting back in calf before the summer heat.

"This program significantly contributes to a higher calving percentage and weaning rate."

The weaners are fed just hay for the first day or two before silage, grain and other commodities are introduced to the ration.

The ration contains 60% silage, 30% grain (barley and sorghum), cotton seed, molasses, premix concentrate and LEVUCCELL SC.

The ration is delivered once a day and fed into a concrete or home-made conveyor-belt troughs.

Daily feed intake approaches 17 kg/head/day, by the end of the feeding period.

A nutrient analysis is conducted on all ration ingredients before being formulated by nutritionist, Steve Blake from Ultralix, Charters Towers.

As mentioned, the weaner ration contains LEVUCCELL SC probiotic, a natural, strain-specific live yeast that has been scientifically-proven to develop rumen function and a stable rumen environment.

Its beneficial effects upon rumen function, digestibility and feed conversion efficiency have been documented in more than 60 scientific papers published throughout the world.



"LEVUCCELL SC is such an important aspect of our ration, especially for the baby weaners. Being able to improve their rumen function is vital. Maximising their feed conversion by increased digestibility of the ration, is also leading to long term greater weight gains, which is an asset in itself." Trish says.

"The goal is to get them going and moving forward before we put them onto pastures in spring.

Steers are then turned onto buffel pastures for 3 to 12 months until they reach 400 kg liveweight, ready for finishing in the feedlot for a minimum of 100 days.

On average, the feedlot steers weigh approximately 680 kg liveweight to produce 360 kg carcass when sold as certified grain fed to Kilcoy Global Foods.

The females are sold as replacement heifers or processed for the domestic market.

"The pre-conditioning program also means we can maintain grass cover over winter and get a quicker response when the season breaks."

"In a drought year at 'Marqua', this feeding program allows us the option of having a much earlier muster. Being able to wean the majority of the calves also allows the cows a greater chance of survival."

Besides their own station-reared steers, the company purchases approximately 1,000-1,500 store steers each year to maintain capacity.

The enterprise finishes between 3,000 and 4,000 steers, and puts between 500 to 1,000 heifers up for sale annually.

Stud bulls are sourced annually from Dangarfield Santa Gertrudis Stud, Taroom, with particular focus on temperament, fertility and conformation.

The Atkins' three-way focus on genetics, low-stress stock handling and ensuring cattle remain on a rising plane of nutrition helps to optimise meat quality.

In 2017, John and Mary won the inaugural Progress Award for Queensland at the Meat Standards Australia Excellence in Eating Quality awards.

The citation noted the Atkins' efforts to improve fat cover and reduce ossification score and carcass pH.

"We strive to produce the best cattle possible for our business, and the MSA grading is one of many tools used to measure this" Trish says.

"We certainly see a difference between our 'Marqua' bred cattle and the purchased steers."

'Spion Kop' also supports a 650 ha. cropping program, including forage oats, barley (for hay) and forage sorghum (for silage).

John and Mary have been growing silage for more than 20 years.

"Silage is the backbone of this operation," Luke Gadsby says.

"This is a great fattening and backgrounding property, but I think we would struggle to turn off 1,000 steers annually on pastures alone.

"The use of silage and LEVUCCELL SC has certainly played, and will continue to be, a major part of our success."

The Atkins' have worked closely with the technical services team from Lallemand Animal Nutrition for many years, including the late Trevor Schoorl and more recently, Jordan Minniecon.

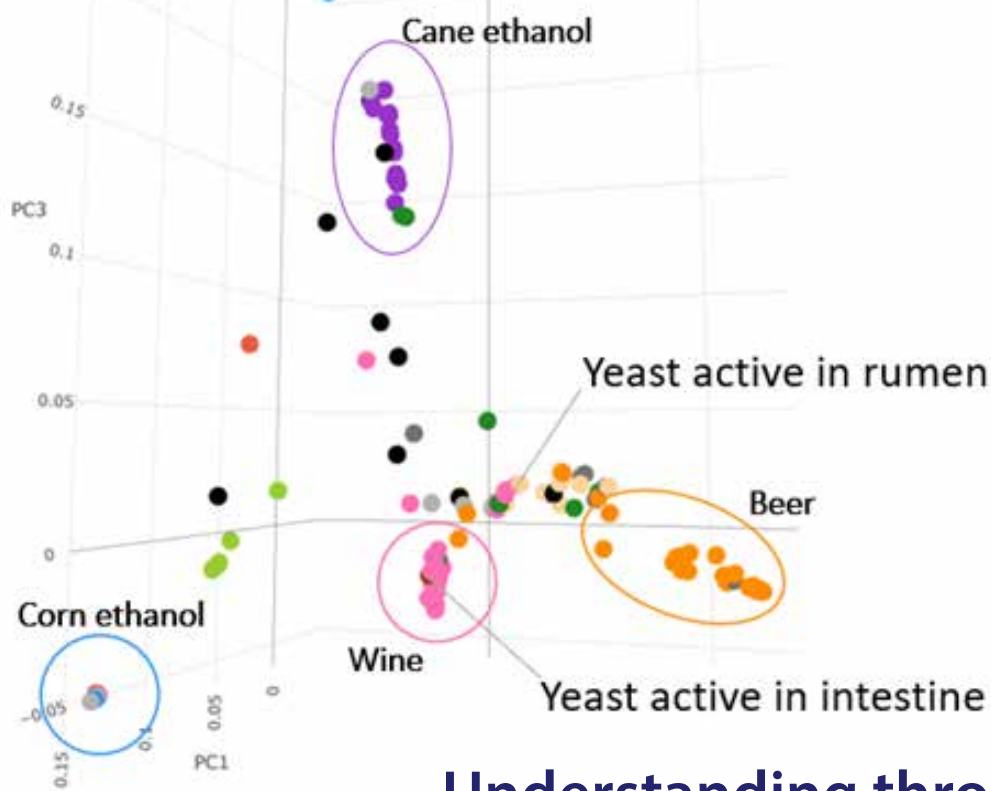
Harvested sorghum is treated with MAGNIVA Platinum forage inoculant, a unique combination of bacteria that promotes rapid 'front end' fermentation and 'back end' aerobic stability.

In effect, it allows silage to be opened earlier and last longer after opening.

"We aim to grow as much forage sorghum as possible, with approximately 1,500 to 2,500 tonnes of silage chopped annually and stored in three short-term pits" Luke explained.

"Most of the silage gets used in the weaner program and the feedlot each year but we also like to have at least another 2,500 tonnes in long-term storage as a drought mitigation measure. It also gives us the ability to trade cattle when the season isn't favourable." Trish says.

"It's like having money in the bank and we know it's there if we need it. Having this continues to prove extremely beneficial. With weather and cattle market conditions being less than favourable at the end of 2023, we were able to hold onto heifers for an extra three months, and dramatically increase their selling price in early 2024."



Understanding through bioinformatics and data science

Figure above: How strains are related: This 3D Principal Components Analysis (PCA) visualises the relatedness of strains based on core genome similarities. Strains farther apart in PCA space are more distantly related. This analysis compares ~350 *Saccharomyces cerevisiae* strains across 300k genome mutations and can be interactively rotated, filtered, and zoomed online.

For centuries, humans have harnessed the unique properties of yeast and bacteria to create bread, beer, wine, pickles, cheese, and even medicines. These microorganisms not only serve our culinary and medical needs but also coexist within us, forming a crucial part of our microbiome. The human body hosts over 30 trillion bacterial cells, matching the number of our own cells. While the human genome contains about 23,000 genes, the gut microbiome boasts a staggering 3 billion genes.

Our microbiome is a complex ecosystem comprising bacteria, yeast, viruses, archaea, and protozoans. Each species within this ecosystem exhibits remarkable diversity. Although every cell contains DNA, the core genome sequence is just the foundation. The activity of each cell varies significantly in response to diet, stress, environment, host signalling, and interactions with other microorganisms.

Since the pioneering work of Louis Pasteur in the 1860s, we have advanced our ability to categorise species and strains through genome sequencing. This has led to a deeper understanding of the functions these microorganisms can perform under different conditions. Even probiotics with identical names can exhibit vastly different activities.

A striking example of this diversity is seen in the yeast species *Saccharomyces cerevisiae* (Figure 1). Principal Components Analysis (PCA) reveals functional differences between genotypes of the same species. This analysis helps us understand not just “who they are” but “what they do.” The accessory genome, a small fraction of the yeast’s DNA,

significantly influences its behaviour in various environments. For instance, it can determine whether the yeast aids in cow digestion, reduces inflammation, produces ethanol, enhances wine fragrance, or adds a punch to IPA beer.

Researchers like Dr. Sebastian in Montreal challenge yeast strains to identify unique variants, or “weirdos” that survive specific conditions such as heat, acid, or new brewing mediums. These variants are then proliferated and their PCA mapped across generations to ensure consistent and reliable performance for commercial use.

Bacteria, with their robust signalling capabilities and ability to acquire DNA from healthy cells, are even more fascinating. Beneficial bacterial strains can support our gut health, aid farmed and companion animals, and populate environments like medical facilities to reduce infectious bacteria. Bacteria are also used in food preservation, such as turning cabbage into pickles or curing grass into silage for herbivores.

The differentiation of bacterial strains is illustrated through their accessory genes (Figure 2), which can produce proteins that modify the host environment, target harmful bacteria, or accelerate reactions to break down toxins. In an era of increasing antibiotic resistance, understanding and harnessing these beneficial microorganisms is more crucial than ever.

Our understanding of microorganisms within and around us and how they can interact is developing dramatically through the use of bioinformatics and data science. Through this technology we are also able to find new microorganisms to improve our health and that of our animals.

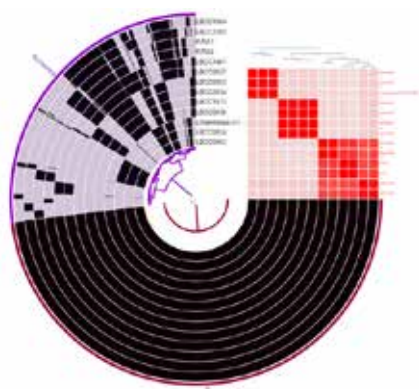
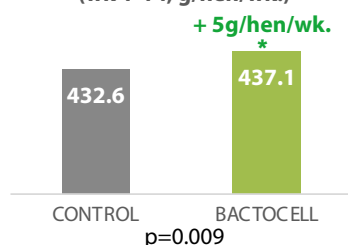


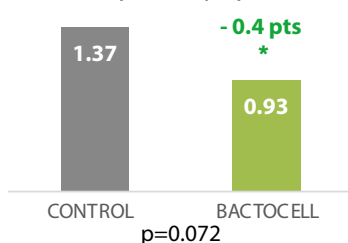
Figure 2: Why Strains Act Differently: This visual summary of a pangenome analysis shows each strain as a circular line. The black line represents the core genome (genes common to all strains), while purple areas show absent genes. The accessory genome includes genes present in some but not all strains. This project identified accessory genes that benefit lipid metabolism in nematode gut models and human clinical trials.

The benefits of BACTOCELL on eggshell quality and hen bone strength

MARKETABLE EXPORTED EGG MASS (wk 1-14; g/hen/wk.)



REJECTED EGGS/TOTAL EGGS (wk 1-14; %)



BROKEN EGGS/TOTAL EGGS (wk 1-14; %)

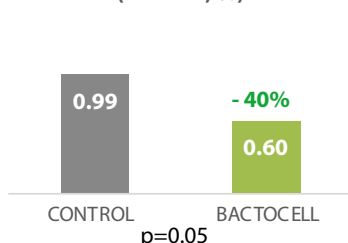


Figure 1: The effect of Bactocell on Eggshell Quality Measurements

BACTOCELL, scientifically known as *Pediococcus acidilactici* CNCM I-4622, is a bacteria that metabolises complex carbohydrates into lactic acid. In monogastric animals, BACTOCELL has been shown to maintain a balanced digestive microbiota, support gut maturity, and bolster the host's natural defences. Recent trials with BACTOCELL in laying hens have highlighted its benefits on laying rate, hen survivability, and eggshell quality. Additionally, improvements in eggshell thickness, calcium retention, and a reduction in the rate of rejected eggs have been reported.

The primary objective of this study was to evaluate the effect of BACTOCELL supplementation on eggshell quality and hen bone strength, and to investigate endocrinal parameters to better understand the involved mechanisms.

The trial was conducted at the University of Dankook, South Korea, in 2021, over a period of 14 weeks. The study involved 480 Hy-Line Brown hens, divided into two groups of 240 each, starting from 50 weeks old to 64 weeks old. The control group received a standard diet, while the BACTOCELL group received 100 g/ton of feed (109 CFU/kg of feed), with a double dose during the first three weeks. Both control and BACTOCELL diets were formulated according to breeder recommendations, except for a 10% reduction in total calcium.

Mature hens, which produce larger eggs, have a high calcium requirement and are prone to bone health issues, particularly osteoporosis. This trial, conducted under dietary calcium deficit, demonstrated BACTOCELL's ability to improve eggshell quality (Figure 1) without compromising bone status (Figure 2). The calcitriol hormone regulates calcium mobilization from the digestive system and medullary bone content. After 14 weeks of supplementation, BACTOCELL-fed hens showed an 83% higher calcitriol concentration in the blood compared to control hens (Figure 3). This suggests that BACTOCELL enhances calcitriol activity throughout the hen's lifespan, supporting calcium mobilisation from dietary sources and reducing reliance on bone calcium. This hypothesis is supported by a 5% higher calcium concentration in the blood and previous observations of bone health status.

This study confirms the benefits of BACTOCELL on eggshell quality, providing new insights into the mechanisms involved. BACTOCELL appears to stimulate calcitriol activity over the hens' lifespan, promoting calcium dietary uptake while minimising excessive bone mobilisation, thereby limiting bone health damage in later cycles.

References available on request.

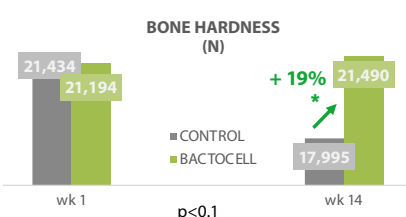


Figure 2: The effect of Bactocell on Bone Health Status

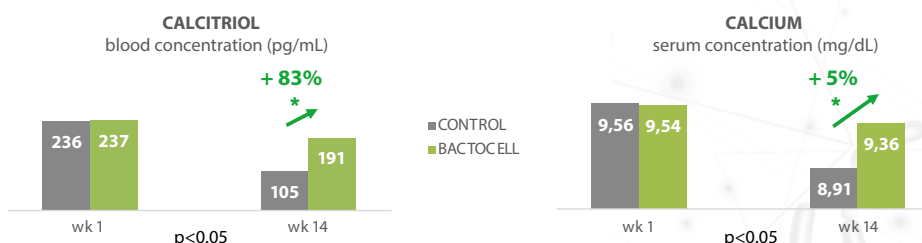


Figure 3: The effect of Bactocell on Calcium Metabolism

Spring silage is a favourable option for cereal crops

Deteriorating grain prices are prompting growers in some circumstances to consider the silage option for winter cereal crops, especially with cattle prices on the increase over the past three months.

It's just one contributing factor in what is shaping up to be a significantly larger than normal spring silage harvest across Eastern Australia in coming weeks and months.

Nathan Lister, technical services manager, Lallemand Animal Nutrition, says recent weather patterns with a favourable winter across large parts of eastern Australia has stimulated interest in winter silage this year.

Barley being the most popular choice, and to a lesser extent triticale and oats were the dominant sources, for winter-grown silage this year.

"Typically for a dryland barley silage program we would expect to see yields of 5-6 tonnes/acre as-cut. I think Queensland and NSW crops will be better than that this year. Some of those NSW crops this year will easily go 8-10t/ac, as-cut," he said.

"Given the last lot of rain that has just come through, I think many silage crops are still 2-4 weeks off harvest. They certainly do not need any more moisture," he said.

Planting times being equal, the pattern of east coast winter silage harvest generally starts in the northern growing regions, which warm-up first allowing crops to start to mature earlier. A few contract silage harvesters are already started on the western Darling Downs, where some crops were planted earlier.

"But I think mid-late September will see silage harvest operations going flat out across Eastern Australian growing areas, and then extending through to the end of October," Nathan said.

Nathan said the outlook for winter silage programs just a couple of months ago was still 'quite modest', but circumstances had turned around rapidly in the past few weeks.

"Quite a number of growers I've spoken to are looking at their barley crop and thinking, I'm not going to take this through to grain based on pricing predictions. Cattle prices are on the increase, so more of them are deciding to chop it, and put it away as feed," he said.

Generally there is a window of about four weeks from where many crops are now, to the soft dough stage, allowing it to be direct-cut. But with winter cereals, as conditions warm up, crop maturity could move very quickly. Ideal moisture level at harvest is 65-68 percent, which tends to happen naturally once crops reach the soft-dough stage.

"In a season like this, where cattle prices are on the improve, silage has appeal for everything from weaners to grower/backgrounder/finisher cattle, right through to breeders," he said.

In the case of feedlot buyers for silage crops, cattle numbers on feed are at an all time high. There is now a tendency among lotfeeders to build silage reserves whenever the seasonal opportunity arises, as insurance against the next shortage.

"A barley grower currently might be looking at \$300/t on farm for grain and dropping. Silage comes into calculations if it is worth \$60-\$80/t, standing in the paddock," he said.

"But with grain prices heading where they are, and the amount of potential silage crops around, I think the lower end of that range is more realistic, based on the 5:1 rule of thumb. But that is very general and depends what is going on in the local marketplace."

Additionally, taking the silage option gave the grower back his country a little quicker, as well

as reducing some risk in having the silage crop off, and gone.

Nathan said some contractors this year had dealing with first-time silage customers, as stakeholders look to build up a feed reserve to future-proof their business.

There had been a distinct rise in interest in winter-grown silage across eastern Australia over the past few years, Nathan said.

"But there is also much greater recognition among users now that winter cereals can make really good quality silage – very palatable and generally higher in protein than what summer crops can offer. Whole-crop barley silage can often deliver 12-14pc protein. When it comes to backgrounder cattle, which need slightly higher protein levels, winter-grown silage is ideal," he said.

Lotfeeders and others were showing increasing interest in winter silage over the past few years, especially with the increased risk of fall army worm pressure in summer crops.

"Summer-grown silages will continue to be the primary target, but users are now seeing winter-grown silage as an important secondary option – and a 'second chance' in those dry years," he said.

With silage stocks likely to be high leading into summer after a large winter/spring harvest, Nathan says it will be interesting to see what eventuates in terms of a summer grain/silage crop decisions.

"With the extra rain that's been around, there will be good soil moisture reserves, which suggests some early summer crop will go in for silage."



The importance of UV protection for silage



Silage, an essential component of many dairy and beef operations, requires careful management from harvest to feeding. While proper inoculation, packing, and sealing are crucial for successful fermentation, one often-overlooked factor can significantly impact silage quality: ultraviolet (UV) radiation from sunlight and other environmental factors.

Sunshine might seem harmless, but its UV rays can degrade silage by breaking down valuable nutrients like protein and carbohydrates. This not only reduces the overall feed value but can also lead to the formation of harmful mould and mycotoxins. These toxins pose serious health risks to your animals.

Fortunately, there's a simple and effective way to combat UV and other physical damage: SilageKeeper woven UV protection covers. These heavy-duty, reusable covers act as a protective shield, blocking out UV rays and minimising their impact on your silage.

Here's how SilageKeeper UV Covers benefit your operation:

- **Preserves valuable nutrients:** Minimises UV degradation to ensure your silage retains its nutritional value.
- **Reduces mycotoxin formation:** Limits sunlight exposure, creating a less favorable environment for mould growth and minimising the risk of mycotoxin contamination.
- **Enhances long-term silage quality:** With improved protection from UV and physical damage from animals and the environment, your silage will maintain its quality for longer, ensuring a consistent source of nutritious feed.
- **Double duty protection:** The tightly woven fabric covers go beyond UV protection. They also act as a physical barrier against wildlife and other factors such as tyres, preventing them from damaging the silage film and introducing oxygen and other contaminants.

SilageKeeper UV protection covers are an investment in the health of your animals and the profitability of your feeding operation. By ensuring high-quality, nutritious silage, you can expect:

- Improved animal health and fertility
- Increased milk production
- Reduced feed costs due to minimised waste

Ensuring your silage remains airtight and well-protected is crucial. The way you seal your silage stack significantly impacts the filling process speed, forage quality, and labour hours required during feed-out.

Silage pit maintenance tips:

- **Regularly inspect silage covers to ensure nothing has moved, been damaged or failed.**
- **Reposition gravel bags or tyres if they have moved off joins or edges to maintain a proper seal on the silage.**
- **Do not allow silage covers to flap in the wind, as this significantly shortens their lifespan.**
- **Check for animal damage by walking over the silage, as it is difficult to see from afar.**
- **Avoid agricultural chemicals being sprayed or drifting onto plastics, as they are known to degrade plastic compounds.**

To ensure the longevity of your SilageKeeper UV protection covers, make sure you fold them up after use and store them in the shed for next season.

Ensiling losses can be avoided in the short term with the right sealing system. However, in the longer term, you also need to make sure your silage storage remains fit for purpose, sealed, secure, and protected for short, medium, and long-term storage.

Now is the time to inspect your silage pits.

Corn turns dairy business on its ear

The addition of maize silage to the nutrition program is helping to power an ambitious expansion program for Gippsland dairy farmers, Alex and Olivia McArthur.

Together with their team of eight full-time staff, the McArthurs milk about 1000 Holstein, Jersey and crossbred cows across 440 ha of owned and leased blocks on the Macalister River outside Maffra.

The aggregation has nine centre pivots and a 250 ML irrigation licence.

The McArthurs are about to plant and their third 'home grown' maize crop.

"The introduction of maize silage has turned this business on its ear," he says.

"The improvement in our cows has been phenomenal.

"There's only so much you can feed a cow.

"Maize is allowing us to keep the grain at 7 kg/day but increase the starch and fibre content.

"Our production has jumped to about 600 kg milk solids per cow.

"Better nutrition is not just about production, it's about health and fertility.

"Cows are putting on weight during the lactation and some are even getting fat."

Alex says the maize is extremely cost-effective.

"It's much cheaper to grow than buying grain or hay," he says.

"Regardless of its cost, the real beauty of maize silage is that I know what it is and where it is.

"As a dairy farmer, I am always going to be a price-taker, but at least with silage, I have some control of my input costs.

"Maize is a bit daunting to grow but it's better than waiting to find out what happens.

"You have to be in control of your destiny.

"A couple of years ago, we got caught out and had to buy hay.

"Until then, I hadn't completely realised that 700 cows don't just need hay, they need haysheds of it.

"At one stage, we were paying up to \$400/t for really poor quality hay."

After experimenting with strip-grazing millet and sorghum with mixed results, Alex grew his first maize crop in 2021.

"We had just purchased another block with a 24 ha centre pivot, which meant we could grow a dedicated forage crop," he says.

"We did everything right but we had a terrible year with a flood and then two inches of rain.

"There were carp swimming in the paddock!

"You can always recover a moisture-stressed crop but a flooded crop never recovers.

"We lost two hectares outright but we managed to get 20 t/ha from the rest."

Undeterred, he planted a second 41 ha crop last year across five elevated paddocks.

"We managed our inputs a little more conservatively," he says.

"We planned for a yield of 18 t/ha and harvested 20 t/ha.

"This year, we are going to plant 60 ha of maize, which should produce about 1200 tonnes of wet silage."

Alex relies heavily on Maffra-based Nutrien Senior Agronomist, Jim Colquhoun, and Yarram-based silage contractors, Wayne and Hayden Bowden.

"We do everything ourselves, except the maize, and for that, we rely on Bowdens to plant and harvest the corn," he says.

The stack is built on a shaped 'hump and hollow' gravel base above the flood line.

Harvested forage was treated with MAGNIVA Platinum forage inoculant during processing.

It combines a patented strain-specific bacterium, *L.hilgardii* CNCM I-4785, with the industry standard, *L.buchneri* NCIMB 40788.

It contains a number of special enzymes to assist with rapid fermentation.

The 20 x 100 m stack was then covered with SiloStop oxygen barrier film to limit the growth of spoilage-causing yeasts and moulds.

The 45 micron film is protected by an outer layer of SilageKeeper UV covers, designed to protect against the impact of UV light and damage caused by animals and environment.

The two layers are sealed with SealKeeper gravel bags, which are re-useable and environmentally-friendly alternative to car tyres.

In addition, cement-stabilised sand was used to seal the edges.

Alex says moving to bulk silage was reasonably cost-effective.

"People think you need to spend a lot of money but we didn't," he says.

"We picked up a second hand wagon for \$10,000, we already had another tractor to tow it and we feed out into the paddock, the same as everyone else.

"It's not ideal but it's working for us at the moment.

"The most expensive thing we've bought so far is a used wheeled loader with a 4.5 cubic metre bucket for \$50,000.

"We are saving at least an hour a day compared to using a tractor and a bucket.

"Ideally, we should be using a shear grab to prevent oxygen from entering the face, but we're removing a lot of silage every day, so we are keeping ahead of potential spoilage.



"We've probably only thrown out three cubic metres, max."

Alex says maize silage is underpinning his growth plans.

"I wish we'd done this years ago but we had a dozen other projects that had to be completed first," he says.

"Olivia and I did a training course with our bank a couple of years ago and it emphasised the importance of doing the little things that count.

"Maize is the most important 'one percent' we've done.

"Being able to produce our own source of high quality fodder is going to enable us to grow.

"Currently we are running the cows as two herds and milking them in separate dairies.

"The ultimate plan is to expand to 1200 or 1400 cows and construct a new dairy and feed pad.

"In the meantime, we're looking at other crops, such as fodder beet."

Alex still produces approximately 500 tonnes of tube-wrapped silage for feeding during the shoulder season.

"If you can't do pit silage, then tube-wrap silage is the next best thing," he says.

"We used to cut about 2000 4' bales but the amount of spoilage was horrific.

"Every time you grab a bale, you squeeze air out of it, which simply sucks back in when you put it down.

"You can easily waste a third due to spoilage and we had lots that were cooked half-way through – that's three quarters of the bale gone.

"Plus they produce enormous amounts of waste plastic.

"Now we are wrapping two 5' bales, which is the equivalent of three 4' bales, with



Pictured left to right: Scott Atkinson, Lallemand Technical Services Manager, with Alex McArthur inspecting his corn silage.

significantly less spoilage and half the plastic."

Alex and Olivia purchased their first 100 ha block outside Maffra in 2006.

"Our original intention was to get into lambs and beef but we decided to go dairying instead because it made more sense," Alex says.

"There was already a dairy on the farm and that's the main industry around here.

"We bought 180 cows and got started.

"I grew up on a beef and sheep farm and had never milked a cow in my life, so it was a very steep learning curve.

"We had a drought and then a flood in our first year.

"When we started, we were 100% focussed on getting the pivot going and growing

more grass.

"Now we're focussed on growing better feed and nutrition.

"You can have the best grass and the best genetics, but if you don't have the feed in front of them throughout the lactation you're never going to see a return.

"It's all come together in the past two or three years."

Ash contamination in silage results in more than just energy loss

There are a variety of factors that impact the ensiling process, and one of those is soil contamination. The amount of soil brought into the silage bunker with the forage can be shown by the percentage of ash.

Ash in the silage

The plants' internal ash provides minerals like magnesium, calcium and potassium that can be utilised by ruminants, although it adds no calories. The average ash content in forages is normally 3 to 5 percent in corn, 6 to 8 percent in grasses and 8 to 10 percent in legumes.

On the other hand, high ash content due to soil contamination is characterised by elevated concentrations of iron, aluminium and silica. There are different manners that soil contaminates the plant: weather (rain, flooding, wind), plant lodging, grazing and mechanical operations during harvest and soil from dirt silage yards.

Lowering the cutting height increases the total yield but will likely increase the content of ash. In addition, it reduces the forage quality due to the high proportion of fibre and will negatively affect the stand life of some grasses. Cutting height should be about 75mm or even 100mm on loose soils that risk increased soil inclusion.

Heavy rain splashing soil onto leaves – and extreme weather conditions and flooding of crop fields – can result in contamination. On the flip side, dry weather and drought conditions may also contribute to soil contamination in terms of dusty winds and

dust from dirt roads near the field.

Swath width may have an impact on ash contamination, and one would expect the issue when wide swathing – due to sometimes driving over the mowed swath. However, research has not shown significant differences in ash levels, likely because the bottom portion of a narrow swath remains wet for a longer period of time, sagging to the ground and leading to soil contamination when the windrow is picked up. So, keep your forage on top of the stubble, not in contact with the ground.

The type of knives on disc mowers can also impact soil contamination: Curved knives can retrieve forage from the ground better, but they also tend to pick up more ash; flat horizontal knives create less suction and introduce less soil in the mowed forage.

Mergers can be an option to rakes because the windrow is picked up and moved horizontally by a conveyer rather than being rolled across the ground, resulting in 1 to 2 percent less ash on forage. If rakes or tedders are the option, make sure the tines are adjusted so they won't touch the ground and move soil into the forage. Scalping the field is more likely in uneven fields or if driving fast, which causes the equipment to jump up and down.

Silage piles and bunkers directly on the ground can incorporate soil into the crop during filling. Under wet, muddy conditions, soil can accumulate onto tyres and tyre treads of tractors and trucks, bringing more

dirt into the forage mass conversely dry dusty conditions in the silage yard can bring layers of dust onto the silage with every load that comes past and to the silage pile.

Feeding implications

Ash can be a contaminant of the fibre content. Although pectin is in the plants' cell walls, the "fibre" portion for ruminant diets relates to the amount and proportion of cellulose, hemicellulose and lignin. Moreover, only the organic matter in fibre will generate energy to the animal. Dirt is not a nutrient. Excess ash from soil contamination replaces real, productive nutrients in the diet

Soil contamination can become a big issue when formulating a diet, especially for high-producing cows on a full TMR diet. As much as 2 kg of dirt could be fed per cow daily. For every 2 points of external ash contamination, there can be a 5-point decrease in relative forage quality (RFQ).

Although soil contamination affects the ensiling process, soil contamination will also bring issues with unwanted spoilage micro-organisms, poor fermentation and impaired quality of silage and compound challenges to the animals.

Furthermore, feeding the compromised silage results in issues for most dairy herds with lower feed intake and milk production, high somatic cell counts, lowered milkfat.

All this makes it extremely important to focus on producing silage that is a nutritious and clean feed for animals.

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