

ISSUE 58, SPRING 2022

SPECIFIC
FOR YOUR
SUCCESS

IN THE MIX

Keep rumens
running strong
during **heat stress**

**SPECIFIC
FOR YOUR
SUCCESS**

IN THE MIX ISSUE 58 SPRING 2022

#PASSION FOR FERMENTATION



↗ Visit Lallemand Health Solutions brand new bacteria plant in Mirabel, Canada.

Inside a bacteria plant

Ever wondered how bacteria are produced at Lallemand? Our human nutrition sister company Lallemand Health Solutions has produced a virtual tour of Lallemand's brand new 11,000-square metre, cutting-edge plant in Canada that is equipped with state-of-the-art probiotics production machinery. Through a series of 360° environments and interactive activities, you can learn step-by-step how probiotics are made!

<https://lallemand-health-solutions.com/virtual-visit-tour/story.html>

Welcome

Hi Everyone, Welcome to another edition of *In The Mix*. As the world sits still in its chair looking at the cards on the table, its no wonder the markets are on edge. The world seems nervous, as do the Australian markets. With geopolitical tension high, global inflation and recession concerns, the La Nina threepeat, Foot and Mouth on the doorstep, Lumpy Skin Disease coming, chronic staff shortages, and even Varroa mite it seems we have a lot coming at us. Its putting continued pressure on biosecurity - imports, pricing and supply chain. Be sure to know the best strategy moving forward will be one of productivity over your compatriot. The use of sound elements of forage planning, technology, biological nutrition and technical support in your business is critical. The ITM is a great source of information. Be sure to contact one of the team!

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DID YOU KNOW?

Microbial solutions work for insects, too!

The recent search for alternative sources of proteins for animals and humans has led to the development of insect farming. For instance, black soldier fly larvae and other insects such as *Tenebrio Molitor* are now mass produced for animal feed. They are increasingly used in feed (poultry, aquaculture, etc.) and petfood. And decades before that, insect farming was developed for biocontrol and sterile insect technologies used for plant protection applications.



But did you know that insects are really keen on yeast?

Indeed, yeast derivatives have been used to feed insects for decades. Today — to address the novel market of insects for feed — the Lallemand Animal Nutrition team is joining forces with Lallemand Bio-Ingredients to further develop a microbial solutions range for insects, which already has several areas of applications on the radar. For example, trials conducted with black soldier fly larvae have shown the potential of certain yeast-based nutrients to increase production outputs for insect farming when used on top of the organic food waste.

We believe that microbial solutions — whether yeast or bacteria, active or inactive — open doors to a new perspective for mass rearing insects for production.

Want to know more about insect solutions?

Visit <https://bio-lallemand.com/insect-nutrients/>

3 questions for Caroline Achard about the impact of heat stress on pig microbiota



Caroline Achard, Ph.D.,
Research Scientist at the Lallemand
Monogastric Centre of Excellence

This year, a publication in the British Journal of Nutrition¹ explored the relationship between gut microbiota and adaptation to heat stress in pigs. We met with Caroline Achard, who has been conducting the metagenomic study behind this publication, to ask her more about this study.

1. Is there a clear relationship between the microbiota profile and the animal's response to heat stress? How can this be interpreted?

In our study, we demonstrated that heat stress modulated the gut microbiota composition in pigs. Heat stressed pigs notably showed increased levels of *Clostridium sensu stricto* group, *Romboutsia* and *Ruminococcaceae* taxa

compared to the thermoneutral period. We hypothesize that these changes are likely to be involved in deleterious consequences on pig performance.

2. What was the effect of the live yeast *Saccharomyces cerevisiae* boulardii CNCM I-1079 supplementation at the microbiota level in the heat stress model?

The probiotic supplementation attenuated some of the deleterious effects of heat stress while it **increased the abundance of some beneficial bacteria** such as *Lactococcus lactis* and *Subdoligranulum* genera. *L. lactis* may beneficially interact with the host's immune system.

3. Could we link this shift in microbiota profile to the observed physiological response of the pigs?

Interestingly, higher levels of *Lactococcus lactis* were indeed positively correlated with better dry matter intake and energy retention during heat stress, which translated into preserved performance. Moreover, higher levels of *Ruminococcus bromii* before heat stress are correlated with higher dry matter intake and energy retention during heat stress (Figure 1). Thus, this keystone species promoting the growth of other microorganisms able to degrade resistant starch, helps the pigs cope with a heat stress challenge.

¹ Labussière, E., Achard, C., Dubois, S., Combes, S., Castex, M., & Renaudeau, D. (2022). *Saccharomyces cerevisiae* boulardii CNCM I-1079 supplementation in finishing male pigs helps to cope with heat stress through feeding behaviour and gut microbiota modulation. *British Journal of Nutrition*, 127(3), 353-368. doi:10.1017/S0007114521001756

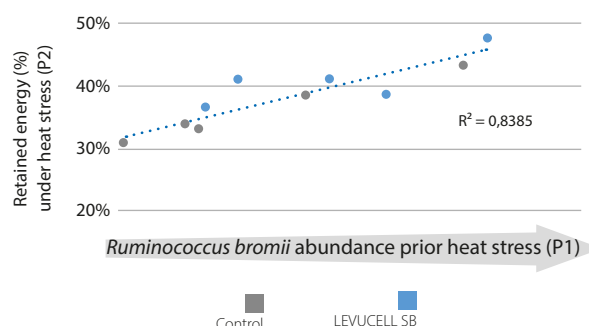


Figure 1

Correlation between the microbiota composition prior to heat stress and energy retention during heat stress.



Tips to keep rumens running strong during **heat stress**

Temperature	% Relative Humidity																		
°F	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
72	22.0	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81
73	23.0	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82
74	23.5	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83
75	24.0	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83
76	24.5	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83
77	25.0	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84
78	25.5	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84
79	26.0	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84
80	26.5	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85
81	27.0	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85
82	28.0	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
83	28.5	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
84	29.0	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87
85	29.5	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87
86	30.0	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88
87	30.5	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88
88	31.0	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89
89	31.5	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89
90	32.0	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
91	33.0	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91
92	33.5	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91
93	34.0	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92
94	34.5	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92
95	35.0	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93
96	35.5	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93
97	36.0	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94
98	36.5	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94
99	37.0	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
100	38.0	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
101	38.5	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
102	39.0	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97
103	39.5	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97
104	40.0	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98
105	40.5	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98
106	41.0	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99
107	41.5	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99

Table 1

Temperature-humidity index.

Climbing temperatures may be inevitable at this time of year, but dairy cow productivity doesn't have to be a casualty of heat stress. The key to success is minimising decreases in dry matter intake and keeping rumens – and your herd – operating at peak efficiency.

"Reduced intake can lead to digestive upsets and lowered milk and milk component production," says Scott Atkinson, Technical Services Manager. "But investing in heat reduction technology and in your herds' ration – from dry cows to lactating cows – is crucial. Focusing on quality forages, plus management changes will help diminish the negative influence heat stress has on feed intakes, your herd and your bottom line."

As you prepare for the upcoming heat stress season, consider these four factors to overcome its effects:

1. Focus on rumen function

Heat stress in dairy cows is a function of heat and humidity, along with increased body heat generated during dietary fermentation and digestion. When cows are exposed to heat stress, they often experience a reduction in the diversity of the rumen microbes, leading to digestive disruption.

In short, intakes drop, rumen pH is affected, rumen microbes do not operate at peak efficiency, rumination time decreases and fibre digestion suffers. As do milk production, milk component production and feed efficiency.

"When these rumen changes occur, they result in a reduction and inefficiency of fibre digestion," says Scott. "This causes perfectly formulated rations to not work as hard as they could or should."

A study from Penn State University revealed a clear correlation between environmental heat stress levels, rumination time and milk

production. With each 10-point increase in the Temperature Humidity Index (THI), daily rumination could be reduced by one hour and milk production by up to 2.7 litres.^[1]

For a 1,000-cow herd, that's 2,720 litres of milk a day or \$2,040 if milk is \$10.20 per kg milk solids.

2. Invest in ration performance

There's a simple, economically attractive solution to overcome these losses and maintain profitability during heat stress. Adding an active dry yeast (ADY) probiotic — like LEVUCCELL SC (*S. cerevisiae* CNCM I-1077), help drive rumen function and milk component production during times of heat stress for a return on investment of 5:1 or greater.

Research^[2] published in the January 2020 Journal of Dairy Science reinforces the ability of live yeast to drive rumen function and keep it operating at peak performance. Results showed lactating cows supplemented with *S. cerevisiae* CNCM I-1077 under severe heat stress conditions demonstrated:

- 7.6% higher feed efficiency
- 5.7% increase in energy-corrected milk yield

In fact, more than 20 years of extensive research demonstrates cows exposed to heat stress show improvement in rumination activity, fibre degradation and manure consistency when supplemented with *S. cerevisiae* CNCM I-1077.^{[3],[4],[5]}

Plus, data shows ration inclusion of live yeasts such as *S. cerevisiae* CNCM I-1077 could result in a return on investment of \$0.54/head/day based on milk component improvement alone. A 1,000-cow herd could gain \$540/day.



3. Feed high-quality aerobically stable forages

Forage quality is always important, but even more so during periods of heat stress. Aerobically unstable silage can cause the entire ration to heat, leading to lowered intakes and reversing the work you've done to optimise rumen function. Additionally, aerobic instability is a sure sign of nutrient loss, as well as an indicator of spoilage, moulds and toxins.

"The negative effects of heat-stressed dairy cows offered a hot and aerobically unstable TMR is a disastrous combination," cautions Scott.

Keeping cows eating can be very expensive to "fix" once these feedstuffs are in the feed bunk. These types of products, such as acids, TMR stabilisers and mycotoxin binders can be costly ration additions, adding as much as \$0.15 per cow per day to your feed costs.

Instead, focus on providing lactating cows with the highest quality, most digestible forages and strive to maximise the inclusion of forage neutral detergent fibre (NDF) within the appetite limit of each pen.

For future harvests, producers should use MAGNIVA Platinum forage inoculant, which combines *L.hilgardii* CNCM I-4785, with the industry standard, *L. buchneri* NCIMB 40788, to help improve the aerobic stability of silage if heating is a consistent challenge.

4. Remember the basics

In addition to normal heat stress strategies, these nutrition-focused management tips help protect feed consumption and rumen efficiency:

- Provide adequate water in clean troughs
- Alter feeding times to counteract higher temperatures
- Push-up feed frequently
- Prevent sorting

"Cows can continue to perform very well during the summer, despite the complications of heat stress," concludes Scott. "Paying attention to details, reducing feeding disruptions and investing in effective nutrition solutions pay dividends in ration and cow productivity, even in the face of challenging conditions."

Help your cows power through heat stress with rations formulated to help protect them against expensive inefficiencies.

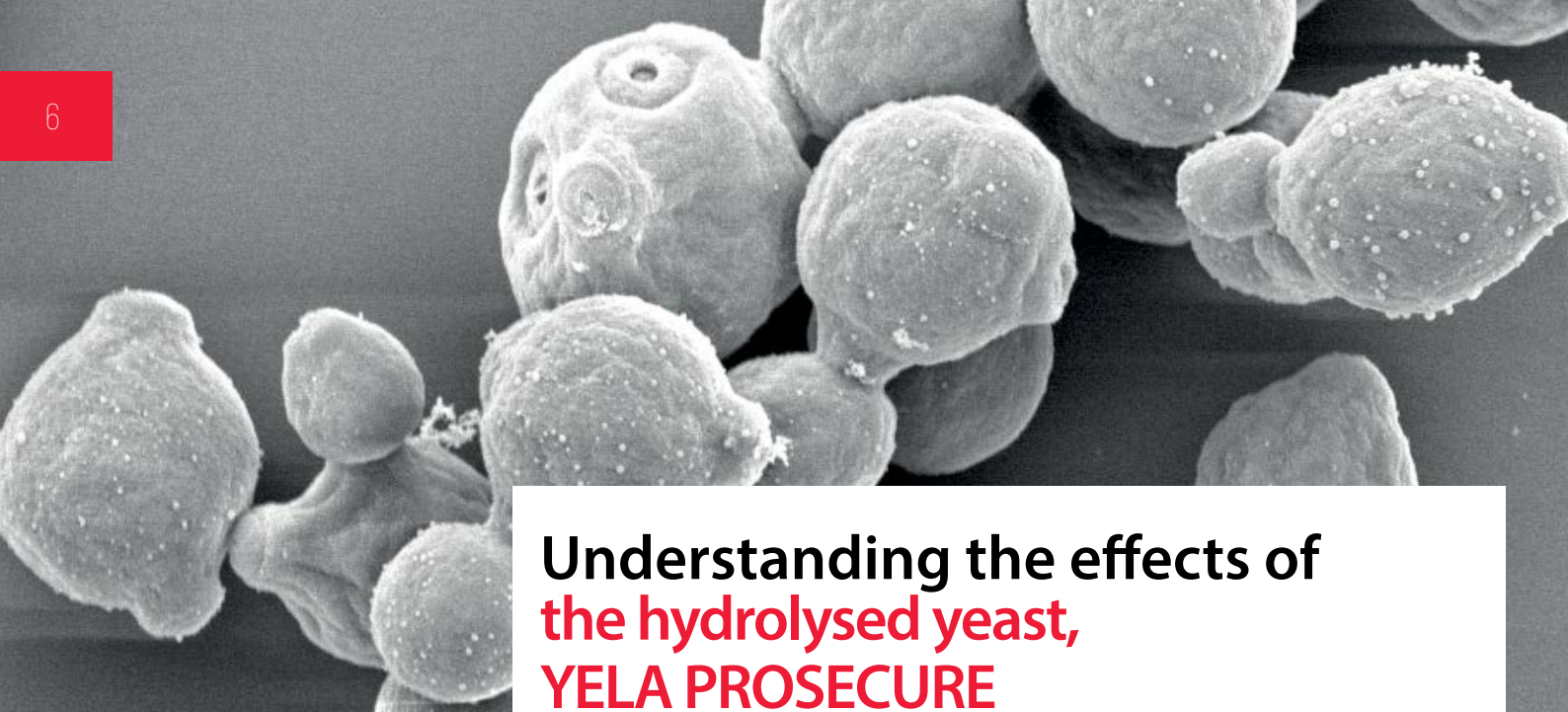
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**Want to take
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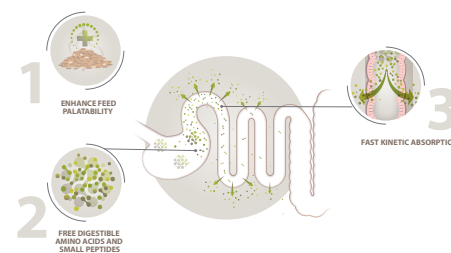
Understanding the effects of the hydrolysed yeast, YELA PROSECURE

The Lallemand R&D team has focused on the screening of different feed-grade yeast biomasses and on production process optimisation to introduce a specifically designed, functional hydrolysed yeast: YELA PROSECURE. A controlled hydrolysis process is applied with the addition of specifically selected exogenous enzymes, ensuring high nutrient digestibility and functionality while providing reliability in terms of quality and availability of appropriate volumes.

How does it work?

A dual action in the gut

YELA PROSECURE provides functional nutrients with a dual action: in the upper gut and in the hindgut.



1. In the upper gut, the hydrolysed yeast provides highly digestible proteins, which offer a high level of free digestible amino acids with an early and fast absorption kinetic.

This was demonstrated through *in vitro* kinetic studies comparing the digestibility of YELA PROSECURE to different feed raw materials and to yeast-based competitive products (Figure 1). YELA PROSECURE is one of the faster protein sources in terms of absorption kinetic alongside whey protein concentrate. This advantage is related to the specificity of the production process applied, showing the importance of a controlled hydrolysis, which

makes proteins more accessible, having been lysed into free functional amino acids and small peptides that are readily and directly absorbed.

2. Once it reaches the hindgut, the remaining part of the hydrolysed yeast consists mostly of fermentable insoluble carbohydrates, inducing a late energy release supporting fibrolytic microbial populations leading to an improvement of microbial diversity and activity, with a release of valuable short chain fatty acids (SCFAs), such as butyrate, and a decrease in proteolytic microbial compounds production, like ammonia.

The effect shows on the outside

When it comes to practical benefits at the farm level, these have been demonstrated in research and commercial farm studies confirming it is a valuable solution to improving animal performance (piglets, aquaculture, etc.) and palatability (pet food), while contributing to the feed protein balance.

YELA PROSECURE can be used in all animal species, especially during the early stages of development when digestive maturity has not yet been achieved and when providing highly digestible and quickly absorbed nutrients is key to supporting animal growth and digestive care.

To learn more about our specifically designed hydrolysed yeast, visit the page:

<https://lallemandanimalnutrition.com/en/australia/our-products/product-details/yela-prosecure/>

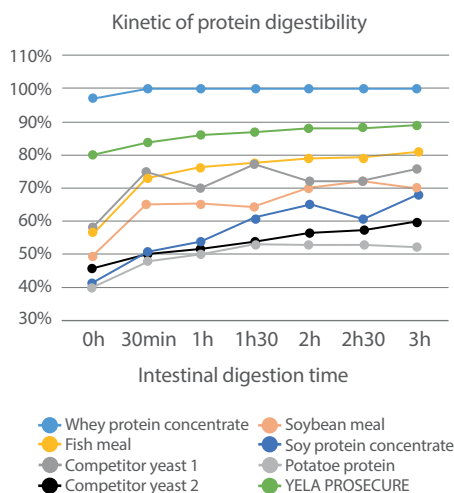


Figure 1

Protein digestibility kinetic of different feed raw materials *in vitro* (Lallemand Animal Nutrition, internal data).



Protect the film **that protects** your silage

With the crop finally in the silage pit, the focus turns to protecting this valuable future feedstock from the entry of spoilage-causing oxygen in order to preserve its dry matter content and nutritional quality.

As guide, aim to achieve a silage density of at least 250 kg DM per cubic metre in the top 0.75 to 1.0 metre of your stack or pit, then cover immediately with a quality silage film, UV cover and sealing system.

Protecting your silage is a three-way combination of:

- Oxygen Barrier (silage) film, which helps to prevent the entry of oxygen into the silage
- A quality UV protection cover, which protects the silage film from the environment and physical damage, and
- Sealing weights, which keep the silage film and UV cover in place.

Independent testing of the Oxygen Barrier (Silostop) has confirmed Silostop is 60 times more effective than conventional black/white polyethylene (PE) film in preventing oxygen transfer, thereby protecting your future feed, silage, from spoilage-causing yeasts and moulds. Even better, it uses just 55% less plastic, dramatically reducing wastage and recycling costs.

SilageKeeper UV protection covers help to protect silage film against the damaging effects of sunlight or physical damage caused by animals and environment. They are ideal for covering Silostop oxygen barrier or conventional PE films.

SilageKeeper is made from premium grade flat PE yarn that provides superior 'grip' for workers. By comparison, conventional covers are made from round monofilament wires, which can be slippery and do not provide adequate UV protection.

The twill-weave 235 gsm covers unfold easily and follow the contours of the stack without creasing. The interval between the chain waft and the weft provides a 100% closed and opaque cover.

SilageKeeper is manufactured under the internationally-recognised ISO 9001:2015 quality assurance and ISO 14001:2015 environmental management systems. With proper care, these reusable covers will last for at least five years permanent use, or longer for seasonal use.

Finally, SealKeeper gravel bags help to create an airtight seal along the seams and edges of your silage, minimising spoilage in the top layers of the silage. These flexible, oblong-shaped and re-useable bags are an environmentally-friendly alternative to tyres or tyre walls.

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Liam and Jessie's excellent adventure



▲ Jessie Lanyon in the tractor at Moxey Farms.



▲ Liam Stienen during his time spent with Priebbenow Silage Contractors.

The inaugural winners of the Trevor Schoorl Memorial Scholarship, Jessie Lanyon and Liam Stienen, have completed a unique 10-week immersion program in the Australian livestock production and nutrition sectors.

The scholarship honours the memory of leading silage production and nutrition consultant, Trevor Schoorl, who was tragically killed in 2018.

The \$6500 scholarships provide young people studying agriculture or a related discipline to further their knowledge of forage preservation, ruminant nutrition and livestock production via placements with some of Australia's leading silage contractors; premix, supplement and stockfeed manufacturers; and dairy and feedlot operations.

Participating companies included BEC Feed Solutions, Lallemand Animal Nutrition, Masterchop Custom Silage, Moxey Farms, Priebbenow Silage Contractors, Riverina Stockfeeds, Stockyard Kerwee Feedlot and Wilmar Trading.

Jessie Lanyon, a third-year student in the Bachelor of Agricultural Science / Bachelor of Agribusiness program at the University of Queensland – Gatton, says his six-week stay with Moxey Farms was the highlight of his tailored program.

"I got to rotate through all facets of the business – feeding, livestock health, genetics and farming," he says.

"I was amazed not only by the sheer scale but the attention to detail.

"Those 'one percenters' make a huge difference when you're milking 8000 cows."

Jessie's passion for the dairy industry started with showing dairy cattle at high school.

For the past seven years, he has worked at Parker Pastoral, Kenilworth, which conducts a 700-cow TMR-based production system, during weekends and holidays.

He has also worked as a relief milker for several other local herds and as a university research assistant.

Jessie says the scholarship has firmed his intention to pursue a career in agronomy.

"This program has definitely broadened my mind about nutrition," he says.

"I used to think nutrition was feed in the bunk.

"Now I realise that growing crops, making premixes and livestock management are all interconnected.

"At the moment, I am still focused on working as an agronomist but I'd like to think it will be the start of a pathway to becoming a dairy nutritionist."

Liam Stienen, who has recently completed his Bachelor of Agricultural Science / Bachelor of Agribusiness program at the University of Queensland – Gatton, says his placement with Priebbenow Silage Contractors was an eye-opener.

"I didn't know what to expect, but after an hour of instruction I was in the driver's seat of a \$750,000 forage harvester," he says.

"It was amazing to see how the contracting team works together to get the crop off and how closely Lallemand works with growers, contractors and end-users to get the best silage outcome."



Stockyard Beef General Manager Operations, George Lubbe, and People and Culture Manager, Lauren McNally, welcoming Liam Stienen (middle) and Jessie Lanyon (second from right) to Kerwee Feedlot. Also pictured is Nutriment Health Sales Manager, Andrew Doljanin.

Liam has a strong passion for intensive livestock production and worked in the university's research dairy and pig units throughout his studies.

He is about to start an extended work placement program at North Florida Holsteins, which milks 10,000 registered cows at Bell, Florida, USA, and then 12 months on his uncle's 350-cow automated dairy farm in Germany.

"This scholarship has really broadened my understanding of nutrition and agriculture as a whole," he says.

"It really shows you the big picture that you don't see at uni.

"It wasn't until the end that I realised the wide range of business that are technically competitors but they all work together to provide quality livestock feed and ultimately, food for consumers.

"I'm proof that you don't have to be the best student to win this scholarship – but you do have to be committed to getting the most out of it."

Jessie agrees.

"This scholarship took us places that you don't get to see at university," he says.

"We weren't visiting these companies for an hour or two; we were working across each business for five or seven days.

"A lot of our mates at uni and even the people we worked with said they wished they'd had this opportunity."

The scholarship was established by Trevor's family, friends and colleagues.

It is administered by Genevieve Schoorl, Lallemand Animal Nutrition Managing Director, Alex Turney and Nutriment Health Sales Manager, Andrew Doljanin.

"Something I took away from the scholarship was the genuine mentorship from Genevieve, Alex and Andrew," Liam says.

"They really wanted us to get the most from this program and worked hard to create opportunities for us.

"The other thing was how much respect there was for Trevor Schoorl.

"At least one person in every business knew Trevor and it was clear what a big impact he had on their business and the friendships he had."

Trevor Schoorl was a highly-respected figure in the Australian dairy, feedlot and contracting industries.

Graduating from the University of Queensland – Gatton in 1993, Trevor spent more than a decade working in the genetics industry in Australia and managing large dairy operations in the USA and the Dominican Republic.

In 2004, he returned to Australia as Technical Services Manager with Quality Silage Systems (now Lallemand Animal Nutrition).

He quickly rose to become one of the country's leading silage production and nutrition consultants, providing expert technical support to livestock producers, silage contractors and Lallemand staff throughout Australia and Asia-Pacific.

Trevor had a thirst for knowledge and was always trying to find ways to deliver even better results for his clients.

He credited much of his success to actively seeking out the best operators and working closely with them.

His honesty, accountability, humility and hard-working nature earned him the enduring respect of his many clients, colleagues and friends.

Time to think outside the ZINC OXIDE box for piglet weaning

PIGLET

How to maintain piglet health and reduce the need for antimicrobials?

- 1 Manage external microbial pressure with appropriate biosecurity measures
- 2 Improve piglet quality at weaning by paying attention to sow nutrition and farrowing conditions
- 3 Favor a resilient piglet gut microbiota and properly manage intestinal inflammation
- 4 Stimulate feed intake by increasing palatability
- 5 Reinforce piglets' natural defenses and immunity
- 6 Provide quality, highly digestible, functional proteins and nutrients

For swine producers all around Europe, 2022 marks the end of medicinal zinc oxide (ZnO) use and the deadline to find alternative strategies for weaning. Our swine technical team has been busy presenting new data on yeast-based alternative approaches at various international swine conferences. Here is an overview of these approaches.

■ The power of yeast-based solutions

Yeast-based products are a good alternative to reduce the use of pharmacological levels of ZnO in feed. To provide additional data, a team of researchers from Dankook University in Korea teamed up with Lallemand Animal Nutrition to assess the effect of the supplementation of a combination of yeast products containing:

- The live yeast *Saccharomyces cerevisiae boulardii* CNCM I-1079 (Levucell SB),
- The yeast fractions association YANG, and
- The hydrolysed yeast YELA PROSECURE

The study was conducted in 200 weaning piglets measuring growth performance and nutrient digestibility in comparison to pharmacological levels of ZnO¹.

Results clearly indicated the yeast-based products combination exerted a similar level of benefits on the piglets' growth performance as well as on the digestibility of crude protein and gross energy compared to the pharmacological levels of ZnO.

■ Functional hydrolysed yeast

YELA PROSECURE, a specifically designed functional hydrolysed yeast, has been recently developed as a novel source of highly digestible and functional nutrients (free digestible amino acids and small peptides). The trial presented at Zero Zinc Summit, conducted in a context of free-ZnO diets, shows that YELA PROSECURE compares favorably to fishmeal by stimulating post-

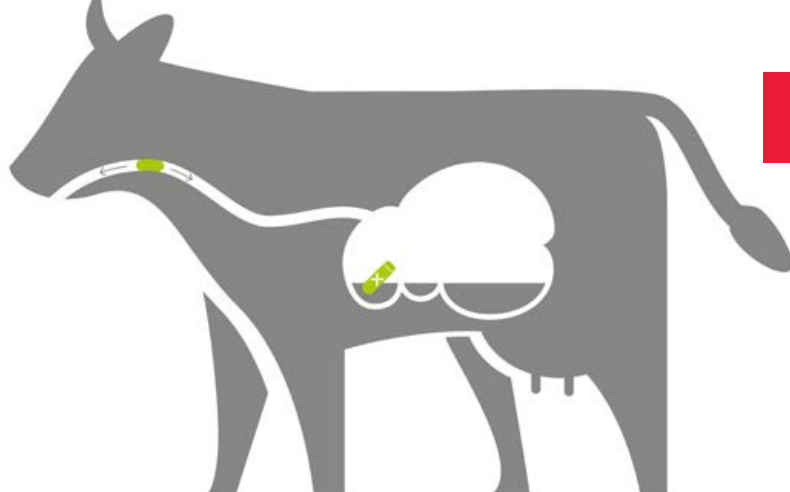
weaning feed intake, growth performance and economical production efficiency².

■ The importance of maternal imprinting

Other presented studies focused on the importance of planning the sow's nutrition as early as possible. They confirmed the concept of maternal imprinting when it comes to preparing the piglet digestive system (through microbiota establishment), colostrum immune quality and immune transfer.³ Piglets benefit from the sows' diet supplementation with live yeast during gestation and lactation with improved performance up to, and after, weaning.

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Step up your cow health monitoring with smaXtec



smaXtec's bolus technology guarantees reliable heat detection and facilitates easier calvings, providing you with precise insights on herd health, reproduction and feeding.

The smaXtec bolus measures inner body temperature, activity, rumination and drinking behaviour directly inside the cow, thus providing health data with unrivalled accuracy. You receive precise insights into your cows' health, reproduction and feeding status, enabling you to combine animal health with profitable dairy farming.

With smaXtec, cows' health is not only monitored in the critical phase around birth, you are also informed when calving is imminent. According to customer experience, the smaXtec system notifies you on average 15 hours before calving and gives you enough time to take necessary measures.

So how does it work? Inner body temperature decreases considerably when the calving process starts. This commonly accepted and scientifically proven indicator for calving is reliably detected by smaXtec. You are informed upfront via push notification and email. This lets you make sure early on that you and your cow are prepared and ready for a problem-free birth. You can take your animals to a separate calving box, administer calcium boluses to prevent milk fever, assist the cow at the right moment, contact your vet if needed and save the life of cow and calf in an emergency.

Equally important to the economic success of any dairy farm is good fertility management and the efficient insemination of the herd. Farmers working with smaXtec benefit from the system's automatic and reliable heat detection which is based on the recognition of behavioral changes. These typical changes often only occur for a short period of time or at night. Thanks to continuous monitoring, you detect the slightest estrus signs. Together with the automatically generated recommendation for an ideal insemination time window, you can significantly improve insemination success and reproduction figures on your farm.

For herds on pasture both temporarily and permanently, smaXtec offers solar-powered read-out devices, too. With a specially developed algorithm, smaXtec also supports you on pasture with reliable heat detection, and all other functions (calving detection, health and rumination measurement) work just as in the barn.

By monitoring key health parameters – inner body temperature, activity and rumination – continuously and comprehensively, smaXtec enables you to keep a close eye on your animals, protecting the herd, providing stable milk yield and significant cost savings.

HOW TO MINIMISE SILAGE SHRINK



Nutrients lost through silage shrink have a real cost to your operation. Here are some tips to efficiently harvest, pack, and seal your silage to reduce shrink and add dollars to your bottom line.

- 1. Safety is the most important goal.** Plan and communicate for safe operation in the fields, on the roads, at the pit/stack, and everywhere in between.
- 2. Prepare the storage site.** Remove old feed, dirt and mud. Slope the pit/stack to shed water away from feed. Repair holes in pit walls to keep out oxygen.
- 3. Order enough oxygen barrier plastic.** Account for a 1.5m overlap at seams and an extra 1m at the edges.
- 4. Get enough gravel bags or tyres/sidewalls.** Discard any with exposed steel cords so they don't damage plastic or cause injuries. Stack them in a place where they can be quickly moved to the pit/stack.
- 5. Protect silage film with UV covers.** A woven UV-stable cover protects the film from sunlight and potential damage. Overlap joins 1-1.5m and an extra 1m at the edges.
- 6. Use a quality inoculant.** Your inoculant should be research-proven to promote an efficient fermentation, thus reducing dry matter (DM) loss and preserving valuable nutrients. Do not assume all inoculants 'work' or have the same efficacy.

7. Monitor chop length. Continue to monitor moisture and adjust as the season progresses. Establish objective targets and use appropriate tools to measure.

8. Pack well. Packing density should be at least 250kg DM/m³. Spread incoming forage in thin layers (6 inches). Packing tractor tyres should pass over the entire surface before the next layer is added.

9. Seal efficiently. Overlap plastic so it sheds water from the surface instead of between the seams. Gravel bags or tyre sealing weights must be touching to form continuous lines sealing the edges and joins. Solid lines of gravel bags or tyres should also be placed in a grid pattern every 5-7m.

10. Manage the silage face at feedout. Keep the silage face vertical and tight and remove all spoiled silage daily. Keep the leading edge of plastic and covers sufficiently weighted down to prevent air infiltration between the plastic and silage mass. Regularly inspect the silage pits/stacks looking for any movement of covers or damage that can let the air and water penetrate the silage mass.

IN THE MIX

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