

Breeding virus-resistant poultry

POULTRY could be bred to resist damaging viral infections, following a Roslin Institute study of genes linked to chicken immunity, according to an article published on the institute's website.

A study of different types of chickens – known to be either more resistant or more susceptible to common poultry viruses – has uncovered dozens of variations in genes with a central role in the chicken immune response to infection.

The findings may point to genetic variations that determine birds' responses to infection, to help breed poultry that are resistant to disease.

Researchers analysed DNA from chickens that have been found to be naturally more resilient or prone to avian influenza, Marek's disease, infectious bursal disease or infectious bronchitis virus, all of which are costly viruses for the poultry industry.

The study's lead author Joshua Mountford said, "Viral infections are a significant challenge for the poultry industry as well as impacting on animal welfare."

"Determining genetic factors that enable birds to present a robust resistance to infection could deliver a host of benefits."

Computer analysis looked



Roslin Institute genome scientist Dr Jacqueline Smith.

for variations in the genes linked to production of immune proteins, known as interferons, and other associated molecules.

The team sought to compare their findings with a standard reference genome for chickens to determine the effect caused by variations in these regions of DNA and how they might be associated with each bird's response to infection.

In all, their analysis highlighted 60 genetic variations that are likely to influence resistance or susceptibility to one of the four infections.

Further research could involve testing the impact of these DNA variations on chicken cells and exposing these to each of the four viruses in the laboratory to better understand the mechanisms involved.

Roslin Institute genome scientist Dr Jacqueline Smith said, "Our study is a good first step to understand the genetic factors influencing innate immunity to a range of viral infections in poultry."

"The variants we have discovered merit further investigation and could be valuable in breeding chickens resistant to disease."

This could help determine which genetic variations could be bred into chickens to enable the birds to resist viral infection.

The discovery could also inform research into drug design or vaccine improvement to protect poultry against infection.

This may also have relevance for immunity in people, as the human immune system has similar processes to those investigated in this study, and viruses such as avian flu also have the potential to transmit to humans.

The study was published in *Animal Genetics*.



The author was invited to speak in Dubai about the challenges the poultry industry faces in terms of gut health.



The author's presentation focused on the gut brain axis and exploring how human-based research could be mirrored in chickens.

Prime poultry industry events

THIS month I have the pleasure of returning to overseas travel.

I was invited to speak in Dubai about the challenges our industry faces in terms of gut health and some of the novel approaches we may be able to employ to alleviate them.

This presentation gave me the opportunity to focus on the gut brain axis and explore how what has been already researched in humans could be mirrored in chickens.

There was a high level of engagement at the meeting and a great opportunity to network in person.



by **TAMSYN CROWLEY**
Director



Despite the challenges of domestic flight cancellations, it was well worth the effort and I look forward to meeting more people at the upcoming

World Poultry Congress in Paris.

I will be presenting two papers, including the benefits of our Virtual Reality Chicken.

The VR Chicken is now available for purchase on

the App Store, so get in touch if you are keen to see what it is all about.

We also have subsidised options for educational institutions and Poultry Hub Australia members.

This month, our PHA Job Ready training has kicked off again in Tamworth.

The training has been quite popular despite the current low unemployment rate.

It's a great opportunity to showcase what the Australian poultry industry does, and it also provides a great opportunity to dispel myths too.

Also, we have recently employed Mohsan Javed as a new trainer.

Mohsan has strong experience in the chicken meat industry and has held training positions in the past.

I would like to take this opportunity to welcome him and I look forward to sharing the outcomes of our training program over the coming months.

Ideas Exchange 2022 has been booked in for mid-October in Melbourne

We are looking forward to catching up with you in person finally – sharing our great achievements and also exchanging new ideas for the future of the industry.

Ideas Exchange is a great avenue for industry personnel and researchers to come together to develop relationships and collaborations that benefit the entire industry.

Registration for the conference is by invitation only, so if you are interested in attending or want to find out more, contact us at poultryhub@une.edu.au



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Poultry Industry Calendar of Events

2022

OCT 19 – Poultry Industry Golf Day, Sydney, Australia, info@ew-nutrition.com

OCT 30- NOV 1 – Poultry Tech Summit, Atlanta, US, www.wpsa.com

NOV 6-10 – SIMA Paris, France, en.simaonline.com

NOV 8-10 – European Symposium on Poultry Genetics, Hannover Germany, www.espg2022.org

2023

Jun 21-24 – European Symposium on Poultry Nutrition, Rimini Italy, www.wpsa.com

SEP 4-8 – Congress of the World Veterinary Poultry Association, Verona Italy, www.wvpac2021.com

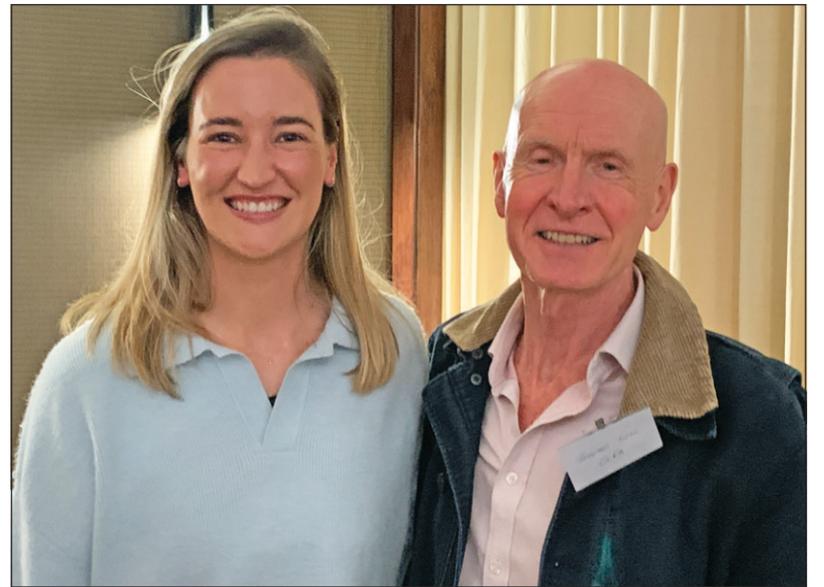
How to supply event details: Send all details to National Poultry Newspaper, PO Box 162, Wynnum Qld 4178, call 07 3286 1833 or email: design@collins.media

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The Commercial Egg Producers Association of Western Australia Sundowner event held recently.



Farewell to CEPA executive officer Rachel Wilson, pictured with Bernard Egan who will take her place.

CEPA Sundowner Event highlights

EGG Farmers of Australia's Board and staff members were thrilled to attend the Commercial Egg Producers Association of Western Australia Sundowner event held recently.

While in Western Australia, EFA representatives had the opportunity to also visit Forrestdale Farm Fresh Eggs owner Joe Sacca.

The CEPA Sundowner event is the highlight on the calendar for many Western Australian egg farmers and egg industry stakeholders, who come to show their support for the egg industry.

The event was attended by upwards of 40 people.



Egg Farmers of Australia Inc.

by **MELINDA HASHIMOTO**
CEO



Guest speakers at the event included CEPA president and EFA Board director for Western Australia Ian Wilson, Rowan McMonnies of Australian Eggs, and I represented Egg Farmers of Australia. The opportunity to talk

about the work programs of our organisations was crucial.

The event was also a farewell to CEPA executive officer Rachel Wilson.

Rachel was the EO at CEPA for five and a half

years and worked at Fremantle Egg Company for eight years.

Rachel may seem quiet, but she is an absolute powerhouse in the work she undertakes on the farm.

Working with her parents, uncles and cousins, Rachel felt encouraged by family members to strive to look at new perspectives and investigate new innovations for their free range farm.

She applied her skills in areas that included farm manager, book work and new ways to market their unique eggs, and Rachel has special interests in flock welfare and advocacy.

In the role as EO, Rachel has worked with farmers in the egg industry and sector groups for many years.

Rachel, the experiences from the work you have undertaken in the egg industry will be valuable.

And the commitment you have shown to the CEPA monthly meetings is commendable.

Egg Farmers of Australia thank you for your support, teamwork and friendship.

We wish you all the very best for your adventures ahead.

EFA also welcomes Bernard Egan who will be replacing Rachel in the executive officer role. 🐔

Educating through on-farm transparency

CONSUMER education is frequently the goal for Danish farmers.

In a new venture of providing on-farm transparency to the public, a conventional Danish broiler farm has a livestream camera in one of their sheds.

From the livestreaming page, the shed design is explained and there are two cameras that switch between each other regularly to show all areas of the shed interior.

Interestingly, there is a 'live' count of the number of chickens present and some statistics on their feed and water consumption.

Nordic News
by **ASHLEY NORVAL**



It is a first for Denmark – to be livestreaming from a farm – and you have to admire the commitment of the Danish broiler industry to true transparency.

Consumers have been invited on a journey with broiler producers from Struer in western Jutland, who have partnered with the Danish Agriculture and Food Council (Landbrug og Fødevarer) – the

latter having created the platform for the livestreaming.

The broiler producers are profiled with video introductions of themselves and their facilities, in addition to facts about the Danish broiler industry and explanations of husbandry processes.

The journey began with the delivery of 32,000-day old chicks from a Danish hatchery on February 8.

At the time of writing, the remaining 31,709 chickens were 13 days old and drinking an average of 64ml of water per day and eating 32g of

food in a 29.4C shed.

The shed will continue to be livestreamed until the final chicken is loaded out of the barn for processing at 35 days old.

During this period, the Danish Agriculture and Food Council hope to dispel some of the myths around broiler chicken production in Denmark and provide Danish consumers with an opportunity to follow the journey of the chicken's lifecycle.

Schools are also encouraged to follow along, providing an easy option for teachers and students to check-in daily. 🐔



Two cameras switch to regularly show all areas of the shed interior.



A close up of the ground from one of the two alternating cameras in the shed.

NATIONAL
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Wake up to ABC Radio National

■ Never be bored in bed before breakfast again

SUNDAY mornings I lay in bed listening to *Background Briefing* on ABC Radio National.

Investigative narrative journalism at its best, it doesn't shy away from tackling rural issues and gently coaxes you to think deeply about the subject it covers deeply over a half hour or so.

By way of contrast, my working week starts by waking up alongside – not literally – Patricia Karvelas on *RN Breakfast* for what's much more hardcore.

Anyway, on a recent cold wintery Sunday morning here in Western Australia, I was wrapped in my doona and rapt in the story covered on *Background Briefing*.

Essentially, it was about the bureaucratic barriers faced by small-scale livestock producers, with a focus on chicken farmers.

It also featured upfront Michael Sommerlad – the doyen of pasture-raised purpose-bred chickens and the ethical farming thereof.

I've referenced him and his eminently edible Sommerlad chickens in this column before.

I was first alerted to the man and his flock when reading *The Ethical Omnivore* by Laura Dalrymple and Grant Hilliard of Sydney's Feather and Bone butchery fame.

They describe Sommerlad chickens thus, "Unlike the white broiler chickens that struggle to remain agile after eight weeks – let alone cross the road – Sommerlad birds are a riot of colour and are built to run, hunt and explore,

with long strong legs and powerful feet."

"Slower growing, athletic and selectively bred over 15 years to thrive in the Australian climate."

So, back to *Background Briefing*.

Below is most of what went to air and pricked my ears the other Sunday.

In the 1970s, on the family farm in Tenterfield, a young boy named Michael Sommerlad dreamt of raising the ideal chicken.

He was conscious of the way nature helps itself – "I consider my father one of the genuine environmentalists," Michael said.

"He was able to look at his surroundings holistically to try to work his agricultural practices with what nature was providing."

Michael spent his childhood observing the variety of characteristics across the diverse breeds of his farmyard chickens, fascinated by the way they interacted with the Australian environment.

His dream was to make the perfect chicken for Australian conditions.

That vision would see him not only breed chickens faster than his father but become an expert consultant on chicken genetics.

And his dream was realised ... until he was confronted with an industry resistant to change.

When his father was forced to sell his farm, Michael decided to join the commercial industry.

The experience was a stark contrast to the birds he raised throughout his childhood.

"It was interesting for me, having that background to see how divorced modern commercial production was from that diversity," he said.

"I still recall the day I walked into that first breeder shed and was presented with 11 or 12,000 birds in a 130-metre long shed."

"They all looked almost identical."

Michael thought he was going to faint – "It was a violent shock to the system."

He said that while the conventional industry has fine-tuned the production of cheap animal protein for the public, he was uncomfortable with the birds' behaviour.

They lacked the natural instincts he was used to – to run, hunt and forage in the wild.

The two commercial meat breeds in Australia – Ross and Cobb – had been genetically fine-tuned through selective breeding to the point where



Cant Comment by BRENDON CANT

they couldn't perform the way nature intended outside.

"I have a set of values and ideals around how animals should be treated," Michael said.

"I mean, if we're going to eat something, if we're going to take something's life and eat it, I believe that it should be afforded certain respect."

"I wanted to see optimal animal welfare outcomes, not acceptable animal welfare outcomes."

"So, in the end, my wife and I decided to bite the bullet."

"And we started down the path of developing our own bird."

Michael travelled across Australia, visiting poultry farms and hand-picking a variety of chickens based on characteristics that would flourish in the heat of northern Queensland and weather the winters of Hobart.

"There were actually nine different characteristics, and I used 12 to 15 strains of breeds from all over Australia," he said.

Like a chicken detective, Michael would examine each breed's rate of feathering, leg length and chest width.

"Diversity is the key in any sustainable ecosystem or environmental situation," Michael said.

"The gene pool has to be broad and deep enough to be able to respond to challenges that we haven't yet faced."

Equipped with his genetic recipe for a perfect Australian chicken, he approached major figures in the industry.

But he said he was stonewalled.

"On every occasion, my approaches were pooh-poohed out of hand as unnecessary," Michael said.

A handful of small-scale producers embraced his vision and began raising his chickens.

But they too hit roadblocks.

They were trying to improve the industry, but state regulation got in the way.

"I have seen both at a state and local level where matters of interpretation have, in the best-case scenario, slowed things down... worst-case scenario, stopped them altogether," he said.

Milking Yard Farm in central Victoria is one of those worst-case scenarios.

Four months ago, the heritage-breed producers sold the last of their Sommerlad chickens to the public.

They were one of the first farms in Australia to raise Michael Sommer-

lad's chickens.

Milking Yard Farm began eight years ago when Bruce Burton, a former air force pilot, was determined to raise chickens ethically in the forest that backed onto his property.

"We needed to find a breed or type of chicken that would be amenable to living in its natural habitat, because that's what the forest is – its natural habitat," he said.

Bruce took inspiration from France, where the Bresse chicken lives for up to 12 months, giving the bird a rich and deep taste.

"It was sort of like being slapped in the face with flavour."

He was looking for birds to raise slowly, meaning they're processed at roughly 10 to 12 weeks, instead of four weeks like the commercial birds.

He was eventually put in touch with Michael Sommerlad.

"The first thing we noticed was how survivable they were in that very critical first four weeks," Bruce said.

When Bruce had tried to raise the commercial varieties, he'd lost almost half of his flock.

But he only lost 4 percent of the Sommerlad breed.

After running all the costs while operating at small-scale, he had to charge roughly 10 times more than a supermarket bird.

"We didn't even know if people would like the flavour or the taste," he said.

To Bruce's surprise, consumers were eagerly buying his chickens throughout Victoria.

Then, Bruce ran into a problem with his processing facility – they were scaling up.

"They said, 'Look, we're growing at such a rate, we simply can't let you use the boning room,'" Bruce said.

He would have to find a new facility to process his chickens.

Small-scale farmers from across Victoria say the lack of access to abattoirs is costing them their livelihood.

In the entire state of Victoria, only one abattoir will accept small-scale contracts and their automated chain doesn't cater to the variety of sizes in the Sommerlad breed.

So, Bruce was at a crossroads – shut up shop or build his own abattoir – which would cost about \$500,000.

Victorian regulator PrimeSafe would have oversight of the facility that would cost him a fortune.

Food safety regulation in Australia tightened in the early 2000s, following an e coli outbreak that led to the death of a four-year-old in South Australia and a hepatitis A outbreak that affected 400 people in NSW.

In Victoria, the Meat Authority was overhauled and, by 2003, had been completely replaced by a

continued P6



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SOUTHERN Meats Pty Ltd is a hi-tech sheep and lamb processing facility strategically located slightly south of Sydney, where the company has access to sheep grown in the healthy environment of the NSW Southern Highlands region.

Southern Meats provides quality meat to the local market and exports around the world, using hi-tech automated equipment in its slaughtering, boning, chilling, freezing and rendering facilities.

The problem

In line with its quality approach to processing, the plant did not want its operators spending needless time attending to

unreliable equipment in its wastewater treatment systems.

So, when Southern Meats went looking for a dependable and reliable wastewater pump to deliver 50LPS plus to its treatment area, the company looked no further than Gorman-Rupp.

The solution

Gorman-Rupp is the world leader in self-priming pump technology, particularly in wastewater pumping applications.

Being able to mount the pump at ground level – and not in the wet well – meant the pumps were safer and more conveniently accessible by operators.

Additional safety features built into the pump are designed to protect operators and the pump from damage.

By using self-priming pumps, asset owners don't need to buy rated lifting chains or have the yearly burden of inspection or replacement, as would be needed if submersible pumps were used.

And because wet well lids remain closed, the necessity of having fall protection equipment – such as anchorage points, body support, connectors and descent rescue equipment – is greatly reduced.

Keeping in mind that some of these items require annual trips to the manufacturer for inspection and service.

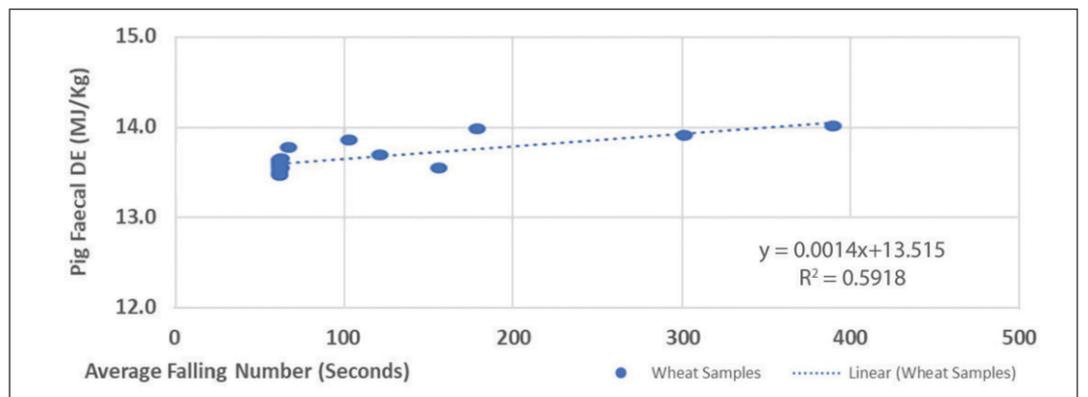
The results

Southern Meats plant engineer Mick Speering is very pleased with his purchase and more than happy to recommend Gorman-Rupp pumps to anyone wanting a quality wastewater pump.

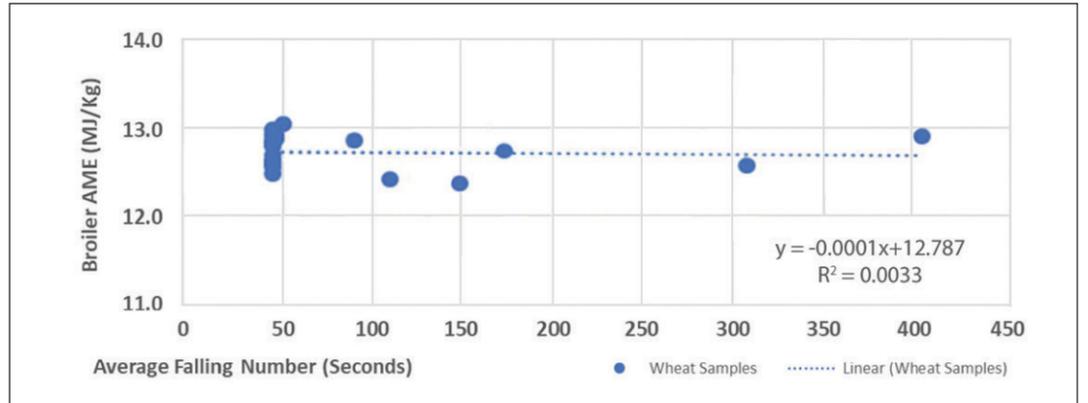
More information on Gorman-Rupp pumps can be obtained from Hydro Innovations at info@hydroinnovations.com.au



A Gorman-Rupp wastewater pump on site.



Graph 1. Pig faecal digestible energy content for 23 sprouted wheat samples with a range of falling number values in seconds.



Graph 2. Broiler apparent metabolisable energy content for 23 sprouted wheat samples with a range of falling number values in seconds.

Falling number has no impact to nutrient value of feed grain

THE 2021-22 harvest resulted in an estimated 40-45 percent of wheat grown in NSW being downgraded to feed wheat due to pre-harvest germination caused by an unusually wet summer.

Unfortunately, the feed grain quality data reported in the AusScan Early Harvest Reports were not able to compare sprouted and normal wheats.

Therefore, AusScan Online conducted a study in which 23 samples of sprouted grain from the 2021-22 harvest were analysed for falling number, test weight and digestible energy values.

The falling number value is used by industry to determine the degree of sprouting in suspected

wheat samples.

The objective was to determine whether the degree of sprouting as indicated by the falling number is relevant to the nutrient value of the feed grain.

This study was conducted at the NSW Department of Primary Industries AgEnviro Testing Services in Wagga Wagga, and the samples were supplied by the University of Sydney Plant Breeding Institute at Narrabri.

In the falling number test, the wheat sample is ground, mixed with water and heated to form a gelatinous suspension, and the falling number value is the time taken for a metal stirrer to fall through the gelatinous suspension.

Low values – less than

200 seconds – are indicative of sprouted grain that produces a less viscous suspension due to alpha-amylase activity, which hydrolyses the starch to sugars.

Alpha-amylase enzyme activity is activated when mature grain is rained on prior to harvest, hydrolysing the starch to sugars.

Wheat that has not been weather damaged has unhydrolysed – or high integrity – starch, which will form a more gelatinous suspension and record a falling number of 300-400 seconds.

The results showed acceptable energy values for pig faecal digestible – see Graph 1 – and broiler apparent metabolisable energy – see Graph 2 – ranging from 13.5 - 14.0MJ/kg and 12.5 - 13.0MJ/kg across the range of falling number values.

The falling number values showed that more than half the samples recorded 62 seconds, with 21 out of 23 samples being less than 200 seconds.

Only two samples were greater than 300 seconds.

The test weights – not presented – ranged between 72.6 - 80.4kg/hL and were considered good for feed-grade wheat.

A total of 21 samples were classified as sprouted grain and would have been downgraded to feed wheat, while all samples have acceptable pig faecal DE and broiler AME energy values.

The sprouted wheat samples in this study have an equivalent nutritional value to normal wheat and could be used as a stockfeed ingredient.

The results indicated that falling number is of no consequence when considering grain for livestock feed.

However, there are degrees of sprouted grain which indicate the extent of the germination process.

While the grain is just sprung – prior to the shoot emerging – all the starch and sugars are retained in the grain and the nutrient value will not have altered.

Once the shoot emerges, energy reserves begin to be drained and the test weight will begin to fall.

The test weights for these grain samples were not low and therefore the degree of sprouting was not advanced.

In 2008, Black found that germination periods from 16 - 48 hours significantly reduced the falling number.

However, the broiler AME content improved for barley and was unchanged for sorghum and triticale, though wheat broiler AME content was initially reduced after 20-hour germination but recovered after 48-hour germination.

Other broiler production indices – such as growth rate and feed conversion efficiency – were positively impacted by sprouted barley and unchanged for sprouted sorghum and triticale.

As noted in previous articles from APRIL in this publication, livestock studies provide good evidence that sprouted wheat in some cases can improve growth rate in young pigs and poultry when included in diets.

However, a study from Idaho State University indicated feed efficiency was slightly reduced with increasing inclusion rate of sprouted grain in weanling pigs but not finisher pigs.

In summary, this study dataset helps to emphasise that sprouted wheat in most instances has an equivalent nutritional value to normal wheat and that falling number is of no consequence when considering grain for livestock feed.

References are available on request from Dr Charles Rikard-Bell at c.rikardbell@april.org.au

Wake up to ABC Radio National

from P4

new body – PrimeSafe. PrimeSafe became the sole authority regulating the production of meat and seafood in the state.

In the eye of the regulator, small-scale producers became the biggest potential risk area because they often didn't understand the rules or couldn't afford to employ food-safety officers.

"We'd been hearing from a lot of people who'd started build-

ing abattoirs or boning rooms that the compliance requirement was terribly onerous," Bruce said.

"And that the regulator was draconian and heavy-handed and applied these regulations that were not appropriate to small-scale farms."

So, Bruce closed his business and Sommerlad chickens became inaccessible in Victoria.

And there you have it, straight from *Background Briefing* – bat-

ling bullying bureaucracies has become a sad way of life for small livestock producers and the consuming public is typically the loser.

And that's not right, because it's the public who pay the taxes to fund the bureaucrats.

A close look at the names that make up the boards of such influential bodies usually reveals a liberal dose of powerful 'big boys' and maybe a few 'big girls', but typically no 'little boys' or 'little girls'.

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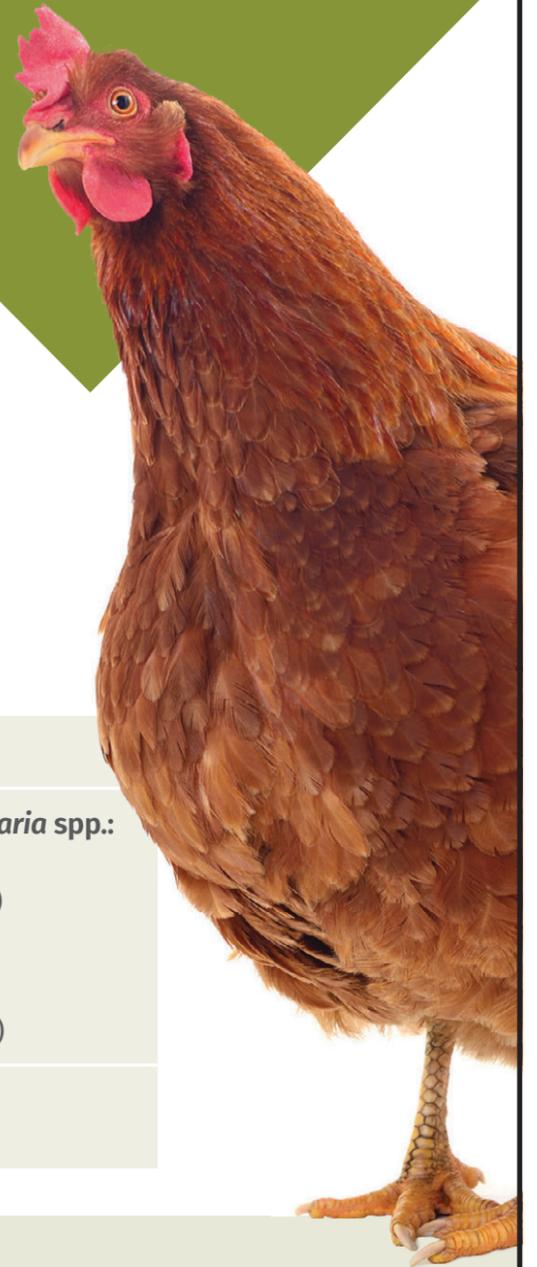
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Farm effluent is valuable

LIVESTOCK waste, including the liquid runoff from the shed wash-down process, is a valuable fertiliser resource.

This is especially so with the advent of not only efficient high-pressure wash kits but also the introduction of washing robots.

Capturing that liquid resource and using it on farm or offering it as a saleable product is an obvious opportunity.

Aussie Pumps has developed a range of self-priming centrifugal pumps suitable for handling liquid effluent.

The range of pumps – from 2" to big 6" – will handle flows of up to 4000LPM.

Aussie Pumps product manager Mood Ellahi said, "The secret of the system is very simple."

"Self-priming pumps mean no additional priming devices or problems with re-priming the line, as may be necessary with an end-suction pump."

The Aussie Pumps GMP range of self-priming centrifugal trash pumps prime themselves.

It is a simple process and based on the design of the pump.

These big cast-iron virtually unbreakable motor pumps have been designed with a priming tank built into the cast body.

Thus, for priming, all the operator has to do is fill the pump with water, hook up the suction lines and – ensuring there are no air leaks at the coupling – start the motor.

The water in the pump is expelled through the outlet, creating a vacuum inside the pump.

The vacuum opens the check valve mounted inside the suction port, drawing water up through the suction line and... bingo, the pump is in action.

Impellers are a big cast-iron open-vane design for handling spherical solids in suspension.

Silicon carbide seals are standard, and a stainless-steel wear plate is mounted inside the pump body to extend the body life – providing protection from any kind of abrasive slurries that may move through the pump.

"These pumps are used in concrete batch plants, piggeries and for all types of aggressive applications," Mood said.

"Handling a mixture of wash water – sometimes including caustics – and the remnants of poultry manure in a slurry form can be corrosive."

If there are particular issues where corrosion is a problem, Aussie Pumps offers a 316 stainless-steel impeller option at minimal extra cost.

"We are supplying more and more stainless impellers with our big cast-iron pumps because that virtually indestructible material is both corrosion and abrasion resistant," Mood said.

The pumps other major advantage for users is a built-in inspection and clean out port, mounted below the suction inlet of the pump body.

Thus, cleaning out the pump body without disconnecting pipework is an easy task, accomplished in a matter of minutes.

"We designed these pumps with farmers in mind and particularly thinking about the movement of liquid waste," Mood said.

Further information, including details of the complete product range, is readily available from Aussie Pumps at www.aussiepumps.com.au

These pumps are also a major success for dairy and piggery applications.



With an increase in shoppers choosing cage free and free range eggs, it's clear the welfare of egg-laying hens is of concern to many. Photo: Raiyan Zakaria

Cracking egg labelling

■ Myth-busting egg labels to help inform shoppers

AUSTRALIANS care about animals and their welfare.

As a nation, we as consumers are progressively seeking to be educated with the products we buy.

With the increase in shoppers choosing cage free and free range eggs, it's clear the welfare of egg-laying hens is of concern to many.

However, the abundance of different labels adorning egg cartons means choosing higher welfare eggs can be a confusing endeavour.

Currently, there are no nationally agreed definitions for product labelling in Australia – except for eggs sold in cartons where the label often reflects the housing system.

While this is a good step, there are still ambiguous and potentially misleading terms being used on egg cartons.

Good welfare for layer hens on RSPCA Approved farms

Egg-laying hens are natu-

rally social and inquisitive birds.

For good welfare, they need freedom to move around, spread and flap their wings, a nest in which to perch and areas to dust bathe in order to remain happy and healthy.

Choosing RSPCA Approved eggs is one way to make sure you are buying certified higher welfare eggs from either cage free or free range hens.

Hens on farms with the RSPCA Approved certification live in enriched environments that are either fully indoors or indoors with outdoor access and which are assessed regularly to make sure the RSPCA standard is met.

At the RSPCA, we know good welfare can be achieved in indoor barns with proper provisions for space, good lighting, secluded nest boxes and enrichment such as litter for dustbathing and perches for

roosting.

Where hens are given access to the outdoors – free range – that outdoor range needs to be a quality environment with shaded areas and vegetation to encourage the hens to venture outside and explore.

Whether your RSPCA Approved eggs have come from barn or free range hens, you can be sure that the farms have met the RSPCA's detailed animal welfare standard for hens and are regularly assessed.

Labelling terms cracked

There are many other labels found on egg cartons, here's how to recognise what they mean.

In Australia, eggs sold in the carton should be labelled according to the farming system that produced them – cage, barn, free range.

Free range eggs are required to include the outdoor stocking density or space allowance on their cartons – however, this

alone is not necessarily a conclusive indicator of good welfare.

Cage eggs

The vast majority of cage eggs come from layer hens confined to battery cages in which each hen has less space than the size of an A4 piece of paper.

The RSPCA considers the ongoing use of barren battery cages as the gravest animal welfare issue in Australia today, in terms of the number of animals affected and how severely their welfare is compromised.

Hens in battery cages suffer throughout their lives, unable to express their natural behaviours and enduring chronic health conditions such as osteoporosis due to their lack of exercise, all while standing on bare wire.

Labels you might see on egg cartons such as 'hen coops' and 'enriched colony reared' give the romanticised impression of

continued P9



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Egg labelling

from P8

an idyllic country life for hens.

However, they are simply alternative labels for cage eggs from conventional cage systems or furnished cage systems.

Furnished cages provide more space and some enrichment for layer hens, however no cage system can fully cater for a hen's physical and behavioural needs.

Cage free and barn laid eggs

'Cage-free' and 'barn-laid' are different labels for essentially the same type of farming system.

Cage free and barn laid eggs are from hens that are kept in large sheds with room to move around and nest boxes in which to lay their eggs.

In these large sheds, hens can move on the floor or venture up and down via different levels – aviary or multi-tier systems.

Not all sheds have enrichment or quality litter, which is why it's important to ask your favourite egg brand how the hens are kept inside the shed or look for a reputable third-party certification with detailed publicly available standards that describes the housing system – such as RSPCA Approved.

A well-managed shed system is a good alternative to a cage system and provides hens with added protection from the elements, predators and disease transmission.

Free range eggs

Hens in free range systems are provided with access to outdoor areas during daylight hours – weather permitting – and spend their nights in sheds with nest boxes in which to lay their eggs in the morning.

The free range label is often interpreted to be the best option for welfare, but it's important to note that having outdoor access alone is not a conclusive indicator of good welfare.

A good free range outdoor area should have vegetation for foraging and plenty of shelter to encourage hens to feel protected and venture outside, however there is no legal requirement for these to be provided.

Outdoor stocking densities of up to 10,000 birds per hectare are al-

lowed.

There is no requirement by law for free range farms to be audited to ensure they are adhering to the legal minimums.

Even on free range farms, hens may still spend most of their time indoors, therefore the quality of the indoor environment is as important if not more so, and this is often overlooked.

This is where asking the brand for more information about the housing system can be useful, or alternatively, looking for third party certification.

Other labels that you might see on free range eggs are certified organic – hens raised on an organic diet free from chemicals and antibiotics with access to outdoor areas, certified by an organic certification program.

And pasture raised – hens with access to pastures and living in small caravans that are moved about the paddock.

Finally, some common phrases are popping up on egg cartons such as 'natural living', 'farm fresh', 'no de-beaking' and 'Australian grown' – which give the illusion of eggs coming from a different type of farming system.

These are buzzwords and not indicative of how the hen lived or the conditions on farm.

All whole eggs sold in cartons in Australia are laid in Australia and layer hens are not de-beaked – that is, have their whole beak removed – in any system, though beak trimming or removing the tip of the beak to control severe feather pecking is allowed.

When it comes to good farm animal welfare, egg buyers are influential with the choices they make.

Each purchase of an animal product is a vote for the system that produced it.

Your choices matter and you have the power to speak up for layer hens when you purchase higher welfare eggs such as cage free, free range and RSPCA Approved and help support Aussie farmers in giving curious and clucky hens a good life. 🐔



Purchase higher welfare eggs such as cage free, free range and RSPCA Approved and help support Aussie farmers in giving curious and clucky hens a good life.

Harry Rumpler Lenard's new CEO

HARRY Rumpler has been appointed chief executive officer at Lenard's.

Formerly chief operating officer at the successful Australian poultry business, Mr Rumpler has replaced Lenard's founder and director, Lenard Poulter, who will continue to remain in the business looking at various opportunities.

Mr Rumpler joined the Lenard's team in January 2022, working previously in many roles including CEO of IGA Fresh (Metcash), business advisor to CSIRO, as well as other advisory board appointments.

Mr Poulter said, "This is certainly the next step for Lenard's, and we are extremely excited about Harry's appointment and commitment to his new role."

"Harry has demonstrated exceptional leadership and delivered strong results in the short time he has been onboard that have had an immediate positive impact on the business."

"We cannot be more excited to have Harry onboard in his new role."

Mr Rumpler said, "After several months in the business as COO, I have been working within the business, gaining an understanding of the different areas and implementing new strategies."

"I am excited about the opportunities ahead of us here at Lenard's, and with the team, we are all looking very positively, both within retail and franchise networks moving forward."

"We have a great mix of experience and new team members and with this, new ideas and prospect are being worked on."

Lenard's commenced operations as a food franchisor in 1987 in Sunnybank Hills, Brisbane.

Founded by owner Lenard Poulter, Lenard's handmade chicken products utilise premium, locally sourced and naturally delicious ingredients.

Made with 100 percent Australian healthy shed-raised chickens with no added hormones or steroids, Lenard's is proudly Australian-owned.

A leader in the fresh food marketplace, Lenard's can be found at 25 locally owned stores and 2000

independent supermarkets throughout Australia.

With a recently launched 'hub and spoke' model and range of pre-cooked meals, the business' reach continues to grow – providing customers with the classics they know and love.

For more information, visit lenards.com.au 🐔



Owner and former CEO Lenard Poulter will continue to remain in the business looking at various opportunities.



Lenard's new chief executive officer Harry Rumpler.

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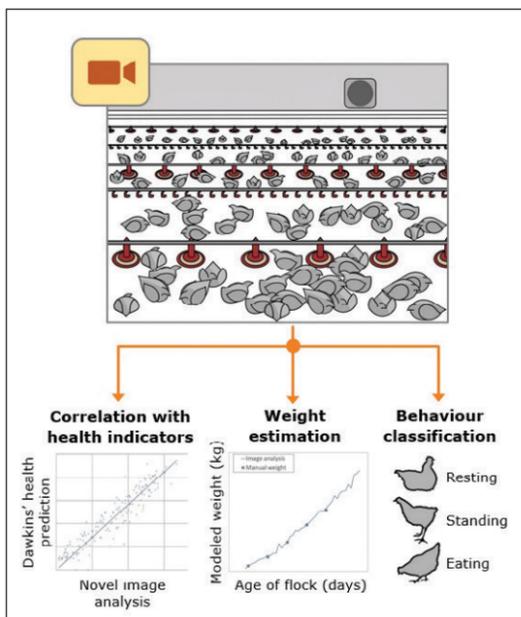
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Machine vision for flock monitoring



Summary image of machine vision techniques for performing automated monitoring of flock motion, weight estimation and behaviour classification.



Cheryl McCarthy and Derek Long of the University of Southern Queensland

WEIGHT measurement and health monitoring of flocks in commercial broiler sheds involve manual handling and inspection of birds, which is labour intensive and can be disruptive to the flock.

A recently completed project for the AgriFutures Chicken Meat program developed and evaluated proof-of-concept machine vision techniques for performing automated monitoring of flock motion, weight estimation and behaviour classification for the purpose of complementing human assessments of flock health and growth.

It is anticipated that machine vision monitoring will provide early alerts to chicken farmers of adverse conditions, thereby allowing management intervention, such as checking litter quality and temperature conditions or follow up veterinary inspection.

Flock motion

Previous literature techniques for video analysis of broiler flock motion have been reported to be

successful for predicting flocks with poor gait score and high incidence of hock burn and footpad dermatitis.

However, each new shed required calibration of the multiple flocks and the behavioural correlates of the video analysis were unknown – that is, flock motion was measured in terms of image pixel values rather than bird behaviours.

Newly developed video analysis algorithms have established flock behavioural attributes that are highly correlated – R2 0.7 to 0.9 – with previous pixel-based flock motion indicators of flock health.

It is expected that automated monitoring of flock behavioural attributes would enable prediction of health with reduced number of flocks required for calibration, potentially enabling greater ease of use for new sheds.

Weight estimation

Broiler weight monitoring typically involves a sample of birds from the flock being placed on weighing scales each week.

Novel machine vision algorithms have been developed using a low-cost monocular video camera with low camera setup and computational power requirements to non-intrusively relate image-based body measurements to weights from weighing scales.

A root mean square error within 5 percent of manual measurements provided by the farm was achieved.

In the research literature, numerous studies have demonstrated models for estimating broiler weight using machine vision that detects specific body size parameters from top view images of birds.

However, research was typically performed in pen experiments or semi-controlled shed environments, with different weight estimation models being developed for different studies.

Behaviour classification

Chicken behaviour provides indication of health and welfare, yet presently typically requires human visual inspection to classify and quantify.

A novel machine vision technique achieved automated behaviour classification for individual birds with an average of 78 percent accuracy for multiple behaviours including eating, pecking and resting.

No other examples of non-contact behaviour sensing for commercial environments were found in the research literature, with automated behaviour classification typically involving tagging animals with radio frequency identification tags or accelerometers for research purposes.

Potentially, the developed machine vision approach could be used for development of objective welfare metrics based on behaviour quantification or for input into a climate controller inside commercial shed-housing systems.

Conclusions and further work

Novel machine vision analysis of video streams from low-cost colour cameras was demonstrated to be capable of simultaneously performing real-time flock motion monitoring,

weight estimation and behaviour classification in commercial shed environments.

Commercialisation opportunities are currently being explored to pursue commercial development of the proof-of-concept machine vision technology and to perform additional on-farm evaluations.

Machine vision has application to monitoring tasks for other housing systems and this is presently being developed in projects for the chicken meat and egg industries.

Acknowledgements

The research reported in this paper was funded by the AgriFutures Chicken Meat Program – PRJ-010646.

The authors are grateful to the project steering committee and to the farms where video data was collected, and to the University of New England for access to experimental pens for initial camera tests.

Cheryl McCarthy and Derek Long
University of Southern Queensland



EFA egg farmer awards

NOMINATIONS are now open for the 2022 Egg Farmers of Australia industry recognition awards.

This year the awards are being sponsored by Specialised Breeders Australia.

The awards are open to anyone who works in the commercial egg farming sector – either directly on a farm or in any support industries, such as research, hatcheries, veterinary care, transport and the like.

The only criteria is that both the candidates and the people who nominate

them must be members of Egg Farmers of Australia.

The awards will be presented in two categories:

- Egg Farmers of Australia Young Egg Industry Achiever of the Year
- Egg Farmers of Australia Industry Leader Excellence Award – for service to the egg industry.

Egg Farmers of Australia chief executive officer Melinda Hashimoto urged EFA members to enter worthy nominations.

“Aussie egg farmers and the people they employ – such as farm staff, hatchery crews and vets

– all work very hard to maintain a consistent and clean supply of fresh eggs for Australian families, and the awards aim to recognise this work,” Ms Hashimoto said.

She said candidates who did not win from last year are also invited to be re-nominated.

Last year’s winners were Dr Jodi Courtice from Queensland and Franko Pirovic from NSW.

The judges this year are Franko Pirovic, Jodi Courtice and Eugene Viljoen of SBA, our sponsor of the awards and platinum sponsor.

Improved poultry production performance

Computer learning on animal health and welfare

MANY would be shocked to know that researchers analyse and gather insights from only 1 percent of the world’s data.

That 1 percent of analysed data has been the only driver of innovation and insights into what we now know as ‘big data’.

The other 99 percent of the one quintillion bytes of data that is collected every day – according to a recent study from International Data Corporation – remains untouched.

The poultry industry has come a long way over the past fifty years in terms of volumes, cost of production, affordability, food safety and welfare.

This has been a hugely successful period for the global industry and much has been achieved.

What does the next decade hold and how can we harness the power of data and new tools such as artificial intelligence to drive the next level of improvements and assist with the move towards net zero and sustainability?

Let’s look at where we have come from

Over the past 60 years, the global poultry industry – both meat and table egg sectors – volumes have grown massively, and the genetic potential of the broiler and the egg layer now bears no resemblance to what was achieved decades ago.

In fact, in the past 10 years we have seen considerable improvement in performance – not only in growth rate, FCR and egg numbers but also in welfare traits such as gait, mortality and feather cover.

Much of this is

achieved because of the genetics companies applying technology and powerful data systems in their breeding programmes.

This exponential growth has been achieved in no small part by the development of an industry extremely focussed on measurement.

Measurement of key performance indicators, a great focus on improving the genetics we are working with and a willingness to pass on some of the efficiency benefits to the consumer are making poultry products more affordable and in turn driving more volumes.

The data journey

From paper records and manual graphs to excel spreadsheets and AS400 capability, the journey is a long one.

However, there is still much of our industry today still using spreadsheets and manual records!

Now the industry has the opportunity, with correctly formatted data sets, to leverage the base data in many different ways to help drive the business and efficiencies.

Computing capacity is now cheaper and more available to everybody than ever before.

Artificial intelligence

In recent years there has been a new tool to add to our ongoing search for ways to crunch the mass amount of data the industry generates.

Step forward artificial intelligence.

The opportunity to move data into the cloud has unlocked considerable additional data processing capability and speed.

Facebook, Webex, Dropbox, Google Drive and iCloud were first made available in the early 2000s and we all became more comfortable with these types of solutions.

In 2010, the impact of recovery from the financial crisis was to drive businesses to seek software as a service solutions instead of the capital-intensive costs of running private infrastructure.

The pay as you go model was here to stay!

The COVID-19 pandemic gave this extra impetus and reinforced the use of SaaS solutions, with the need to connect people from remote locations in order for them to continue to do their jobs.

Coinciding with this timeline has been the commercial development and use of artificial intelligence tools such as machine learning and deep reinforcement learning.

Machine learning is a branch of artificial intelligence and computer science which focusses on the use of data and algorithms to imitate the way that humans learn, gradually improving its accuracy.

Machine learning is an important component of the growing field of data science using algorithms to build a model based on sample data – known as training data – in order to make predictions or decisions without being explicitly programmed to do so.

This is the main difference compared to the mathematical models that can easily get stuck without giving any answer if not tuned and balanced properly.

Reinforcement learning is the training of machine learning models to make a sequence of decisions.

To get the machine to do what the programmer wants, the artificial intelligence gets either rewards or penalties for the actions it performs.

Its goal is to maximise the total reward.

These tools can be applied to big data sets to rapidly analyse data and forecast trends and consequences.

As this has been developed, it is now being used in the poultry industry to improve the accuracy of production performance.

One such example is the improvement in animal liveweight predictions to the processing plant using in-house platform weight scales.

Previously, weights were assessed to be valid if each weight met a threshold programmed into the scale based on an expected weight for age or standard.

With machine learning, the threshold is now based on the real weights of the current birds.

As weights are recorded, they are then assessed, analysed and used to create a rolling set of average weights.

Not only does this make the weights recorded more accurate as the thresholds can be smaller ranges but we can also use this constant rolling number to accurately predict the coming weights of these birds creating more confident weights for the plants.

Animal health and welfare examples of positive use

Great strides have

continued P11

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Improved Production

from P10

been made in the use of data and indeed the volumes of data that can be collected and utilised.

Take the Internet of Things revolution, where we are now connecting in real time to sensors, silo weigh systems, bird scales, water meters, cameras and noise in poultry houses.

This data not only provides real time alerts of the conditions in the house, it also prompts actions if outside agreed tolerances.

It does however provide tremendous opportunity to use artificial intelligence tools to interpret the data and support improved management of the birds with regards to health and welfare.

Examples of such use include biometrics sensors, which can help predict disease within the flock by measuring changes in physical parameters – such as body temperature, cameras and microphones to alert to changes in flock movements, feed and body weight scales alerting to changes in expected feeding intakes and many more currently being researched with the primary focus of improving animal health and welfare through early detection and prevention.

AI and machine learning quickly and accurately process and analyse the data, tracking any changes in patterns faster than we would notice with our regular welfare checks to the houses.

As an example, a drop in feed or water intake could be flagged within the hour, depending on how often the readings were taken, then alert personnel to investigate more urgently rather than waiting for the next shed walk through.

The future

There is an opportunity for poultry businesses to drive the use of big data for the benefit of commercial performance but also, and as importantly, to proactively manage bird health and welfare.

As commented in the opening remarks, there is still much to do to drive the improved use of all the data across all industry and this is true of the poultry sector.

The key is to have data discipline and a credible well-structured database – this is the first step to providing a foundation for good analytics but is essential if artificial intelligence tools are to help us drive better animal health and welfare outcomes.

Jim Johnston
MTEch Systems USA LLC

Australian Poultry Science Symposium 2023

IT'S official, APSS 2023 will be held at the Sheraton Grand Sydney Hyde Park again from Monday to Wednesday February 6-8, 2023.

The Australian Poultry Science Symposium is the premier avian science conference in Australia, attracting delegates from right across the country and around the world.

The 2023 conference will focus on an overarching theme of 'Global volatility and poultry industry sustainability'.

Though plans for a hybrid conference did not come to fruition for APSS 2022, the decision has been made that APSS 2023 will move back to

the Sheraton Grand Sydney and revert to the usual face-to-face format.

The 2021 and 2022 virtual conferences were very well received, with around 300 delegates tuning in over the event dates, but with national and global travel restrictions being eased, it's time we all came together again in Sydney.

As always, APSS will continue to include an array of excellent invited speakers to feature at the event, as well provide delegates plenty of time to network and socialise by offering a lively social program.

The 2023 event will be a 2.5-day program with

the Australian Veterinary Poultry Association scientific meeting to follow on the Wednesday afternoon.

Save the dates – Monday to Wednesday February 6-8, 2023 – and start writing your papers.

Online paper submissions opened Friday July

8, 2022 and will close September 30, 2022 – visit www.apss2023.com.au

If you want to be involved in APSS 2023, you will need to complete your papers very soon and submit them.

We will have up to 10 invited presentations for

next year's event and, as always, all are invited to submit current research outcomes to be included in the program.

Stay up to date with announcements by following us on Facebook – www.facebook.com/poultryresearchfoundation/

34th Annual Australian Poultry Science Symposium

www.apss2023.com.au

6 - 8 February, 2023



Standards raised for both Australia and New Zealand

RESTAURANTS across Australia and New Zealand are being encouraged to sign on to a new set of standards that aims to provide better welfare for chickens raised for meat.

The New Zealand Society for the Prevention of Cruelty to Animals has established the Better Chicken Commitment – a set of welfare standards prohibiting the use of abnormally fast-growing poultry breeds killed at six weeks old in favour of

healthier breeds that grow naturally.

It also ensures that the chickens have more space, natural lights, enrichments, and "less suffering" at slaughter.

SPCE consulted the non-profit global organisation World Animal Protection in developing the new chicken welfare standards, together with Animals Aotearoa and The Humane League, and is supported by nine national and global animal welfare organisations.

WAP Australia and New Zealand campaigns

manager Rochelle Flood said this was a huge opportunity for the region to step up and raise the bar for chicken welfare.

"Right now, millions of chickens are suffering from chronic pain and organ failure, often unable to move freely, collapsing under the weight of their unnaturally large bodies," Ms Flood said.

"Compassionate consumers deserve a higher welfare choice at the checkout, and it's time for the industry to align with consumer expectations."



Australian restaurants encouraged to sign on to a new set of standards that aims to provide better welfare for chickens raised for meat. Photo: Collin Leynau

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Pathways to reduce carbon footprint in poultry farming

CLIMATE change action is a global priority for governments, business, lenders and industries.

Poultry farming is highly efficient and produces high-quality food products with a relatively low environmental footprint but, along with every sector, there is an imperative to reduce impacts over time.

To understand and manage the Australian egg industry's environmental credentials, a life cycle assessment was conducted to baseline greenhouse gas – including land use and direct land use change.

Primary data were collected from producers in all major production regions and impacts were reported per kilogram of table eggs for cage, cage-free and free range production.

With the federal and state governments and major customers having set net zero and emission reduction targets, the industry is under increasing pressure to implement new strategies and adopt technologies which reduce environmental impacts.

This study reviewed a comprehensive list of potential emission reduction strategies and technologies, identifying those which were technically and generally economically viable.

Pathways to emission reduction and net zero were then modelled for different production systems using the baseline emissions and viable emission reduction strategies.

Methods

This life cycle assessment was conducted in accordance with the international standard and assessed greenhouse gas emissions using the IPCC AR5 global warming potentials of 28 for methane and 265 for nitrous oxide, as applied in the National Greenhouse Accounts.

Inventory data were collected from seven major producers operating in six states, covering cage, cage-free and free range production.

GHG emissions per kilogram of eggs are presented graphically – see Figure 1 – broken down into Scope 1, Scope 2 and Scope 3 emission sources.

The Greenhouse Gas Protocol 2015 defines the three scopes of emissions:

- Scope 1 – *Direct GHG emissions occur from sources that are owned or controlled by the company*, as an example, emissions from manure and emissions associated with fossil energy, excluding purchased electricity
- Scope 2 – *Accounts for GHG emissions from the generation of purchased electricity consumed by the company*
- Scope 3 – *Are a con-*

sequence of the activities of the company but occur from sources not owned or controlled by the company – some examples of Scope 3 activities are extraction and production of purchased materials, transportation of purchased fuels and use of sold products and services.

Emissions from land use and direct land use change – a type of Scope 3 emission – and reported separately – reflect soil carbon losses associated with the production of soybean meal in South America, particularly Argentina, a staple plant protein in meat chicken feed.

Fossil energy consumption per kilogram of chicken meat is reported separately, as it is both an environmental performance metric of significance and a key driver of the carbon footprint of chicken meat.

A review was completed of a wide range of potential mitigation options that could be suitable for the industry based on the emission profile of eggs.

Screening was then performed by identifying the emission source to be reduced – on-farm energy use, as an example – the mitigation strategy – solar, for example – the mitigation potential, adoption rate based on an assessment of feasibility and including a subjective

consideration of economic feasibility, likelihood of productivity benefits, availability, compatibility with other mitigation strategies, research, development and engineering requirements and any other considerations such as disbenefits or caveats around the strategy.

Based on these criteria, options were either screened 'in' or 'out'.

A total of 18 technologies and strategies were screened, of which seven were suitable for integrating into emission reduction pathways.

The difference between the number of strategies screened and those found to be prospective reflects that, while each strategy could theoretically reduce emissions, those screened out either resulted in a negligible reduction or were cost-prohibitive and required further research to be viable.

In some cases, mitigation strategies targeted the same emission source – for example, solar and anaerobic digestion both replaced grid electricity – meaning these technologies were competitors and were generally not suitable to implement concurrently on the model farm.

Strategies deemed prospective for the industry were incorporated into emission reduction path-

continued P13

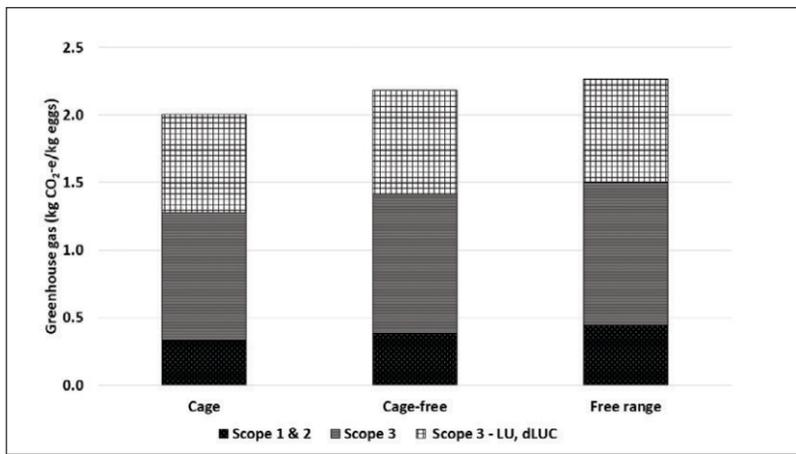


Figure 1. Greenhouse gas emissions per kilogram of cage, cage-free and free range eggs, reported as Scope 1 and 2, Scope 3 and Scope 3 including land use and direct land use change.

| | Fossil energy (MJ/kg eggs) | Greenhouse gas (kg CO ₂ -e/kg eggs) | LU and dLUC (kg CO ₂ -e/kg eggs) | Total (kg CO ₂ -e/kg eggs) |
|------------|----------------------------|--|---|---------------------------------------|
| Cage | 10.7 | 1.2 | 0.7 | 2.0 |
| Cage-free | 12.1 | 1.4 | 0.8 | 2.1 |
| Free range | 12.2 | 1.5 | 0.8 | 2.2 |

Table 1. Selected environmental impacts per kilogram of cage, cage-free and free range eggs.

| | Business-as-usual | Module 1 | Module 2 | Module 3 (Low carbon) | Module 4 (Carbon neutral) |
|--|-------------------|----------|----------|-----------------------|---------------------------|
| Decarbonisation of energy grid | | | | | |
| Soil carbon storage on ranges / land application | | | | | |
| Low GHG diets | | | | | |
| Renewable energy (on-site solar) | | | | | |
| Vegetation carbon storage | | | | | |
| Purchased offsets | | | | | |

Table 2. Emission reduction pathways.

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Pathways to reduce carbon footprint in poultry farming

from P12

ways, which included a timeline for implementation leading to the delivery of low carbon or carbon neutral eggs for free range and cage-free farms.

Complementary technologies or strategies were grouped into 'modules' to be implemented consecutively over a period from 2020 to 2035 – see Table 2.

The pathways also included the incremental, ongoing emissions reduction, which has been and will continue to be brought about by the decarbonisation of the electricity grid.

An important distinction to make is between carbon neutral and net zero.

Carbon neutral is typically used to describe products and is based on the carbon footprint – Scopes 1, 2 and 3 – of that product.

Carbon neutral therefore requires emissions from all sources to be reduced or offset.

On the other hand, net zero is typically used to refer to a business and often only refers to Scope 1 and 2 emissions – meaning a business could be net zero if it reduced or offset its Scope 1 and 2 emissions only.

According to the Science Based Targets Initiative Net Zero Standard, targets must be set around Scope 3 emissions where these represent 40 percent or more of all emissions.

The SBTI is currently developing guidelines for

targeting setting around Scope 3 - LU and dLUC emissions.

Baseline results

The baseline results for Australian egg production – presented in Table 1 – demonstrate that environmental impacts differ between cage, cage-free and free range production.

Cage eggs had the lowest environmental impacts and free range the highest.

Feed production was the greatest source of emissions impacts, ranging from 65-69 percent of greenhouse gas emissions or 77-81 percent when LU and dLUC impacts were included.

For all indicators except LU and dLUC, cereal grains were the most significant driver of impacts within feed production.

The significance of feed production to the carbon footprint of eggs is reflected in the far smaller contributions from other stages of the supply chain – the layer farm represented 14-16 percent, pullet production excluding feed 5-7 percent, grading 4-5 percent and breeding, excluding feed was 1 percent of the total greenhouse gas emissions per kilogram of eggs, including LU and dLUC.

Figure 1 breaks down the carbon footprint of cage, cage-free and free range eggs by Scope 1, Scope 2 and Scope 3 emissions, clearly demonstrating the major contribution of feed production to the carbon footprint of eggs – as Scope 3 and Scope 3 - LU and

dLUC emissions.

Scope 1 and 2 emissions represented 17-20 percent of the total, Scope 3 emissions 46 percent and Scope 3 - LU and dLUC emissions accounted for the remaining 34-37 percent.

Scope 1 and 2 emissions were greatest for free range system eggs, in addition to higher energy use at each stage of production, emissions from manure were greatest in this housing system.

Though the per kilogram contribution of Scope 3 - LU and dLUC emissions were greatest in cage-free and free range production, these emissions represented a greater proportion of the total in cage production, due to that system being the most efficient, which was reflected in the per kilogram contributions from Scope 1 and 2 and other Scope 3 sources.

Insights into the contribution of Scope 1 and 2 emissions – emissions which arise within the farm boundary – were a major focus for the emission reduction and net zero pathways.

After feed production, fossil energy consumption was the next greatest contributor to emissions from egg production, accounting for approximately 25 percent of emissions.

Reducing inclusion rates of high impact soy meal or improving feed conversion ratio are key to reducing the carbon footprint of eggs.

FCR was the single greatest influence on the

contribution of feed.

If FCR improved, fossil energy consumption and the carbon footprint of chicken meat were reduced.

A higher FCR – more feed required per kg eggs produced – resulted in comparatively higher impacts across these indicators.

In this study, cage production – lowest FCR – had the lowest impacts and free range – highest FCR – the highest.

This is a significant finding, as the industry increasingly transitions from cage production to cage-free or free range in response to customer and consumer preferences and perceptions for these systems.

The Australian egg industry is comparatively low impact when compared with international egg production and with other animal proteins – emissions for shell and protein-corrected eggs when compared with other Australian production were substantially – five to six times – lower than for boneless protein-corrected beef and lamb, lower than boneless protein-corrected pork and were similar to boneless protein-corrected chicken meat.

Interestingly, when compared with our 2010 study, there was no significant change in results over the decade.

While this study had a smaller sample size, it none-the-less suggested that performance has not changed substantially over

time at some facilities, indicating that practice change will be required to reduce the carbon footprint of eggs.

Emission reduction pathways

Reductions of 47-51 percent of emissions were observed in the model pathways.

Through a reduction in on-farm Scope 1 and 2 emissions of 48 percent – largely energy driven – this came close to achieving net zero emissions within the farm boundary – not including emissions from purchased inputs, Scope 3 emissions.

By including strategies targeting reductions in emissions from feed production – Scope 3 - LU and dLUC – the total carbon footprint of eggs was reduced by 47-51 percent.

Though significant reductions, it was found that unless low carbon or carbon neutral grain becomes available, substantial volumes of carbon offsets will be required to deliver carbon neutral eggs.

While breakthrough technologies, particularly waste-to-energy technologies, are regularly pitched to producers as 'silver bullet' options, there are major barriers to adoption, including high costs, incompatibility with the high moisture, high nitrogen characteristics of layer manure and reliance on technology that is unproven in the Australian egg industry.

Conclusions

Australian egg production has strong environ-

mental credentials and a very low carbon footprint in comparison to other animal proteins.

The majority of impacts arise from feed production, making this a key exposure area.

Emission reduction opportunities indicate on-farm emissions – Scope 1 and 2 – can be reduced by up to 48 percent with adoption of a suite of technologies and management practices and through the decarbonisation of the energy grid.

Coupling on-farm emission reduction with strategies targeting feed-related impacts – Scope 3 - LU and dLUC – the carbon footprint of eggs can be reduced by around 50 percent.

However, access to low emission or carbon neutral grain, or accepting the need for large volumes of offset credits, will be a requirement for the industry to achieve carbon neutrality for eggs.

A challenge for the industry is that the most environmentally efficient production system, the cage, is generally being phased out in favour of production systems that tend to deliver slightly higher environmental impacts.

Trade-offs of this nature – such as between perceived animal welfare improvements and environmental efficiency or emission reduction and higher costs or burden-shifting to other environmental indicators – are important considerations

in any long-term sustainability planning.

Though carbon footprint reduction is not simple and at this stage reaching net zero will require considerable investment, there are a number of economically viable strategies that are readily available for implementation, such as solar.

Similarly, even a marginal substitution of imported soybean meal for alternative proteins would lead to significant emission reductions.

Though net zero production would likely increase cost of production – and these costs are difficult to absorb for low-margin industries – this is a shared challenge across the agriculture sector and the economy more broadly.

Considering the egg industry has strong environmental credentials, demonstrating proactive adoption of renewable energy and a transition to meet consumer preferences will make the industry well-positioned to initiate a dialogue with customers and lenders around the potential for cost-sharing in the supply chain to deliver net zero and carbon neutral egg production.

If you are interested in services in this area or further information, please contact Mary-Frances or Steve at Integrity Ag and Environment on 07 4615 4690.

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Malaysia facing supply issues

A REPORT by Malaysia Global Business Forum has found that the combination of the pandemic and regional conflicts has had a significant impact on food and energy security.

In Malaysia, this has come to the surface with the emergence of several issues with poultry production, primarily chicken supply.

The report was compiled using data from 3724 registered business entities with self-declared business activities in poultry.

But to gain deeper insights, the report focuses on 627 companies.

Out of 402 companies that filed financial data in the past 12 months, 55.12 percent were profitable during this period.

The MGBF report also identified 30 companies that filed losses greater than slightly over \$A325,000.

MGBF founding chairman Nordin Abdullah said, "Domestic and foreign investors are increasingly making data-driven investment decisions."

"For Malaysia to be competitive in the context of the global economy, reliable and up-to-date business intelligence needs to be accessible.

"The largest stakeholder and custodian of business data is the government of Malaysia.

"There is an identified requirement to consolidate business data and improve data governance in the poultry sector.

"To achieve that, data should be searchable at the data custodian level." Effectively tagged data will ensure that business and economic data can be correctly derived on an industry-wide basis, which will empower policymakers, regulators, the providers of private funding and any allocation of public funding through grants or subsidies with a data-driven approach.

"There's an opportunity to design a desirable future through data resilience," Mr Abdullah said.

"Consumers remain the most important stakeholder in the overall equation."

Philippines takes action to increase poultry production and stabilise price and supply

WITH the increasing price of poultry brought on by high demand and low poultry production, the Philippines Department of Agriculture through the Bureau of Animal Industry has put in place interventions following regular consultations with industry stakeholders.

According to BAI officer in charge and director Dr Reildrin Morales, BAI has lined up interventions with the aim to increase production and to stabilise supply and market price.

Among the measures being undertaken is allowing inter-island movement from mainland Luzon of day-old chicks, hatching eggs and ready to lay pullets.

For day-old chicks and hatching eggs, movement is allowed provided they test negative for avian influenza 28 days

from the date of sample collection.

For ready-to-lay pullets, movement is allowed provided they test negative for avian influenza 14 days from the date of sample collection.

Aside from this, BAI determines the actual supply scenario by working closely with partners from the private sector in regularly validating the broiler life cycle model.

To address the high cost of agri-inputs, Dr Morales added that DA executives will be conducting dialogues with other countries on possible alternative sources of cheaper feed ingredients.

On other disease concerns, the BAI has already issued special import permits for needed vaccines in order to support disease prevention on other poultry dis-

eases such as infectious body hepatitis.

And, the DA has lifted the temporary ban for poultry products coming from Spain, Denmark and the Czech Republic.

According to Dr Morales, the increase in demand was caused by the opening of markets – including hotels and restaurants – now that pandemic restrictions are more relaxed.

Moreover, with the economy slowly opening up and creating job opportunities, more consumers have purchasing power to buy meat for their families.

"The uneven demand-supply situation may also be attributed to the restrictions in movement of live birds, poultry products and by-products due to avian influenza cases in some areas," Dr Morales said.

The BAI has also monitored a decrease in the

volume of production due to high cost of feed inputs along with challenges on other hepatitis.

These could also be attributed to stunted growth of poultry birds.

Recently, President Ferdinand Marcos Jr announced that his administration's priority was the increase of production of the country's major staples, including corn, which is consumed as food and animal feed.

Corn became especially important as feed wheat supplies were cut off.

"This season, the corn growers were able to come together and provide sufficient feed for the broiler production," President Marcos said. As such, support will be given to industry stakeholders to ensure steady production of poultry and supply of chicken.



Malaysia Global Business Forum founding chairman Nordin Abdullah.

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