AUSTRALIAN Pork

Pigs to Pork

Issue 8 Spring 2018 Research and Innovation

Inside this issue:

APL Membership
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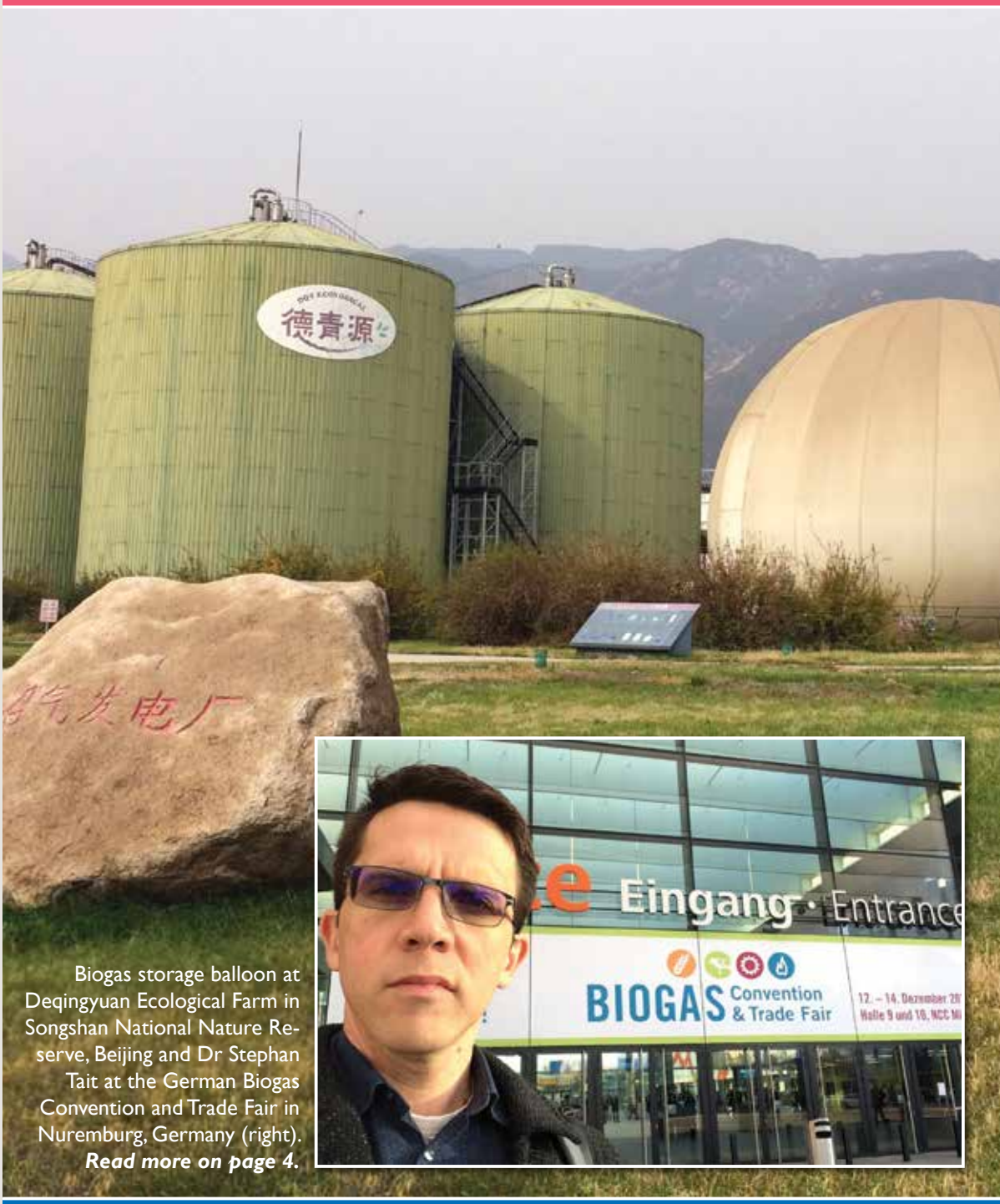


Biogas storage balloon at Deqingyuan Ecological Farm in Songshan National Nature Reserve, Beijing and Dr Stephan Tait at the German Biogas Convention and Trade Fair in Nuremburg, Germany (right). ***Read more on page 4.***

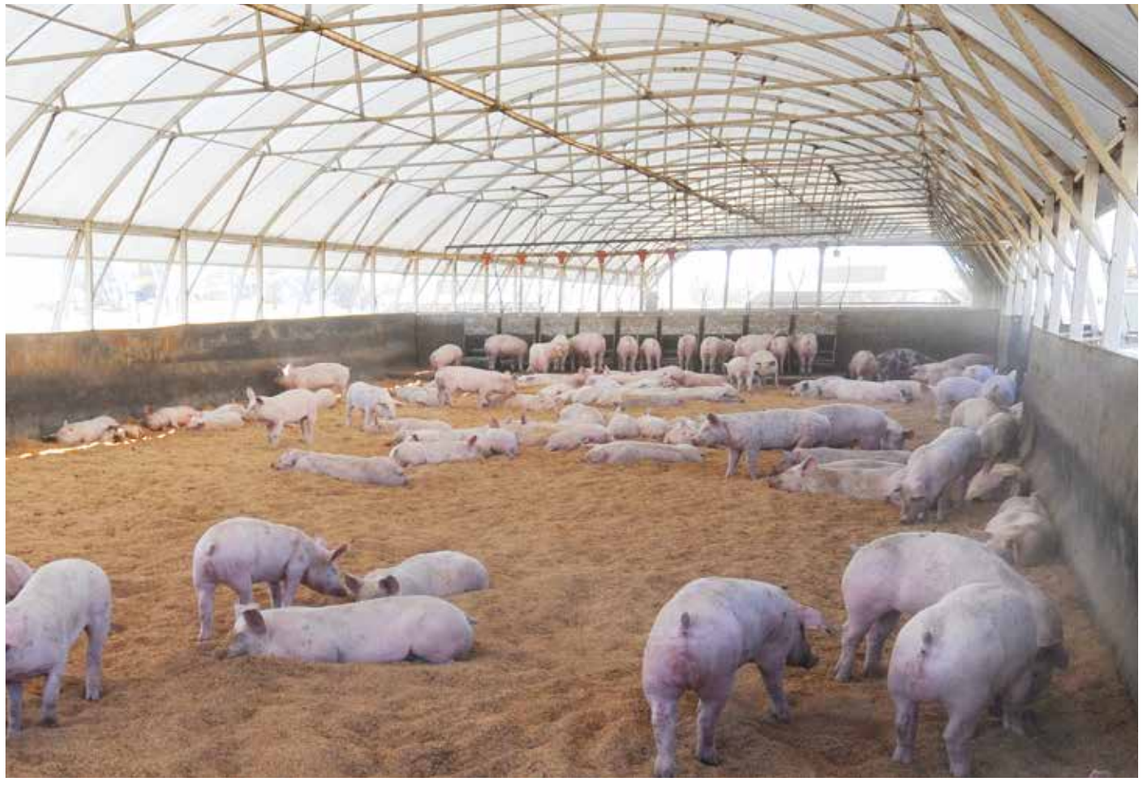
The Spring 2018 edition of Pigs to Pork highlights new research into bitter compounds in feed to improve finisher efficiency, how genetics affects victims of tail biting, the launch of two new published resources, a reminder about the transition of Pork CRC's benchmarking program to APL, and outcomes from the winner of the 2017 Science and Innovation pork award.

Bitter compounds in pig diet improve efficiency in finishers

Finisher pigs are known to consume feed well above their requirement for optimal growth and lean tissue deposition, resulting in excess carcass fat and losses in feed efficiency. Some commercially available feed additives, such as ractopamine, act as energy repartitioning agents and have been shown to be very effective in producing leaner carcases and increasing efficient growth. However, alternatives are needed to ensure that other options are available to producers when their use is limited, or not allowed for use, in certain supply arrangements. Eugeni Roura and his team at the University of Queensland investigated whether naturally occurring bitter compounds added to diets of finisher pigs would be effective in reducing feed intake, and provide a suitable alternative to repartitioning agents such as ractopamine. Some of the investigated compounds were caffeine, and the plant extracts of rhubarb, brassica, gentian, quassia and Artemisia (which are known to be bitter to humans).

Both short and long-term effects were found when including bitter compounds into finisher diets. Short-term effects were characterised by temporary decreases in feed intake which pigs quickly overcame when the bitter compounds were not linked to toxicity. More interestingly, the long-term effects showed that bitter compounds rhubarb, gentian and quassia extracts affected the growth performance – particularly average daily gain and feed conversion ratio. Feeding bitter compounds also resulted in leaner carcases than pigs fed a standard finisher diet. This suggests that relatively more energy was used for protein gain rather than for fat gain – in a similar manner to beta agonists.

Furthermore, the research team also developed a double-choice method test to screen the intensity of certain bitterants. They found several compounds that elicited an extreme bitterness response in pigs. These extremely bitter compounds will form the basis of ongoing work in this area to develop dietary additives that reduce voluntary feed intake whilst also acting as a repartitioning agent either in isolation or in combination with other bitter compounds. If this is successful, it is expected that producers will have access to alternative methods to reduce feed costs, improve feed efficiency and reduce fat content of finisher pigs.



Evidence of Absence Surveillance Project

APL is pleased to launch the APL Evidence of Absence Surveillance Project.

Australia's pork trading partners regularly enquire on the status of disease in the Australian pig herd. This project addresses a need for more surveillance evidence to ensure that unnecessary import conditions are not applied to Australian pork exports and that Australian import policy (conditions applied to imported products) is science based.

This project allows pig specialist veterinarians who have identified a small number of cases with syndromes of interest to collect samples and send them for testing at no cost to the producer.

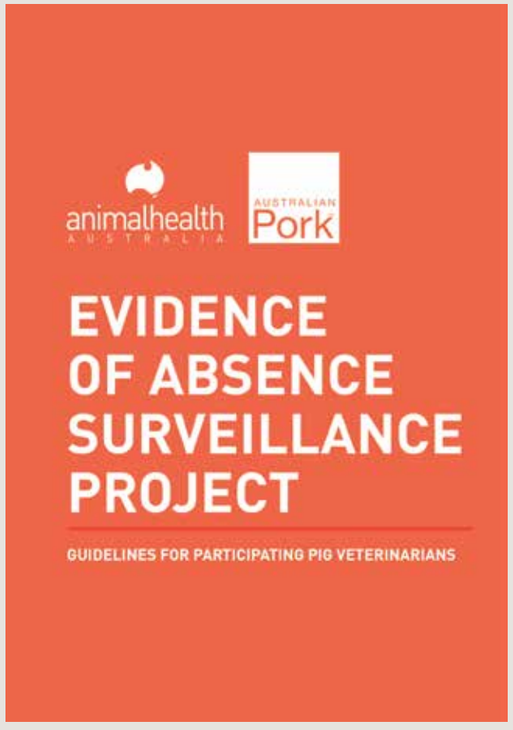
Syndromes of interest include:

- Porcine reproductive and respiratory syndrome (PRRS)
- Aujeszky's disease
- Porcine teschovirus encephalomyelitis (formerly porcine enterovirus encephalomyelitis)
- Classical swine fever (CSF)
- African swine fever (ASF) and
- Swine coronaviruses
  - Transmissible gastroenteritis (TGE)
  - Porcine epidemic diarrhoea (PED).

Further details are outlined in the Evidence of Absence Surveillance project – Guidelines for Participating Pig Veterinarians. All pig vets have been provided with a copy.

Veterinarians have been requested to please advise producers that samples from their pig herd are being sent to the relevant state government laboratory for exotic disease exclusion testing as part of this project as 'proof of freedom'. To take advantage of the Evidence of Absence surveillance project please contact your state government to notify the laboratory of sample dispatch. Specimen/sample submission forms are available at Department web pages.

For further information including a list of participating labratories contact Lechelle van Breda on 02 6270 8816 or at lechelle.vanbreda@australianpork.com.au.



APL Benchmarking program

As previously advised, the Pork CRC Benchmarking program is transitioning to APL and work continues to set this up from an IT perspective so that participation by producers is easy (in relation to data entry) as well as ensure rigour in data management, through the implementation of business rules, to guarantee privacy of data submitted by each participant. Broadly, the program involves:

- Data collection via your already existing PigPass portal (using your PigPass login), submitted monthly
- All data will be primary (i.e. Key Performance Indicators directly downloadable from any herd recording program)
- There is no minimum farm size or specific production type
- There is no cost for involvement
- Meetings will be held every six months where those involved in the program are encouraged to attend – it is hoped that in time these will be regional meetings (dependant on the size of the group). The next benchmarking meeting will be held in late November.

For further information or to become involved in the project, please contact Ashley Norval at ashley.norval@australianpork.com.au.

Outcomes from the 2017 Science and Innovation pork award winner

The Science and Innovation Awards for Young People in Agriculture, Fisheries and Forestry recognise big ideas from young rural innovators that contribute to the success of the Australia's agriculture sector.

Recipients are granted funding to undertake a project on an emerging scientific issue or innovative activity over a twelve-month period. Dr Stephan Tait won the award in 2017 for his work on biogas as a potential energy source for Australian piggeries.

On-farm manure management at Australian piggeries produces a natural product, biogas, an energy source for Australian piggeries. Biogas is currently underutilised due to a lack of high-value uses for the biogas energy. This project involved travel to Finland, Sweden, Portugal, Germany, the Netherlands and China to identify potential high-value uses for piggery biogas and suitable technology to prepare the biogas for such uses.

Currently, biogas is captured from manure of about 13.5 per cent of the Australian pig herd. Most of this biogas is used to warm piglets on-farm to improve welfare and survival rate or used to generate electricity.

Previously, Alan Skerman from DAF QLD examined a range of alternative uses for piggery biogas, with the aim to further reduce on-farm energy costs and to make piggeries more profitable. The uses for biogas reviewed included:

1. warming of piglets on-farm;
2. generating electricity;
3. heating of feed ingredients, such as tallow;
4. cooling of larger pigs and their drinking water to improve productivity; and
5. removing carbon dioxide from the biogas and compressing the pure methane to prepare it for use as a vehicle fuel in cars, trucks or buses, known as biogas upgrading.

Biogas cleaning and compression equipment and filling stations at Deqingyuan Ecological Farm in Songshan National Nature Reserve, Beijing.

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For the benefits of point 5 to be realised, the biogas needs to be transported off-farm to other external markets, which can include

1. injection into the existing extensive network of natural gas pipelines in Australia, providing a renewable or "green" natural gas to existing domestic and industrial users; and/or
2. selling on to users of compressed natural gas as a vehicle fuel, such as the network of buses already operating in Sydney, Perth and Brisbane.

Therefore, biogas upgrading has the potential to open new markets not previously accessible to Australian pork producers, for increased profitability. Stephan sought to identify whether viable technology options have now become available to support further biogas adoption by Australian piggeries.

Stephan attended the 15th World Congress on Anaerobic Digestion, Beijing, China and conference workshop (17 to 20 October 2017). This provided opportunities to learn of research being undertaken, present his results, and exposure to and network with world experts. One of the post-conference industrial site tours was to a poultry layer farm in China producing manure biogas where biogas was being upgraded for alternative uses.

Biogas upgrading facilities were visited in Sweden, Germany, the Netherlands, Portugal, and Finland. The fabrication facilities of technology providers involved in biogas upgrading equipment were also visited where available, to determine capability to deliver future projects in Australia. An ecological pig farm in Switzerland (Bern) was also visited. Wood chips were being used from their own forests as a heat source on-farm to warm piglets. This was of interest for pork production in areas of Australia with a ready supply of forestry residues, as well as for those farms that are currently too small for biogas production to be economically feasible.

Lastly, three university groups were visited who were conducting novel research on biogas upgrading or wastewater treatment systems that also produce biogas, with the visits aiming to foster future collaboration opportunities. The university groups visited were; the Technical University of Munich (TUM, the group of Konrad Koch); Denmark Technical University (DTU Environment

Compressed biomethane filling station at Kalmari Farm, Leppävesi, Finland.

group, the group of Professor Irini Angelidaki); and Lund University, Sweden (the Industrial Electrical Engineering and Automation group of Ulf Jeppsson). As a result, TUM arranged attendance for Stephan of the world renowned German Biogas Convention and Trade Fair, held in Nuremberg Germany from 12–14 December 2017, where many of the main European biogas technology providers were featuring their technology.

The information collected from site visits, inspections, and discussions with technology providers were linked back to the Australian piggery context.

Observed uses for biomethane in Europe include:

1. vehicle fuel for cars, tractors and buses, with observed prices ranging from AUD2 (Finland, Netherlands) to AUD2.6 (Sweden) per kg of compressed biomethane at 200 bar(g).
2. injection into national gas grids for supply to industrial and domestic users.

This trip highlighted the potential for upgrading technology to open new energy markets for Australian pork producers. Further information is needed to confirm real costs and benefits, involving a representative showcase project at an Australian piggery to conceptualise, develop, cost and refine the process. APL is supporting a project as part of the 2018/19 funding round to evaluate alignment with Australian regulatory requirements and standards and confirm real feasibility within the Australian piggery context. This work will mitigate the risk of exploration of biogas upgrading options.

To further discuss, please contact Denise Woods at denise.woods@australianpork.com.au or on 0418 697 595.

Genetics affects victims of tail biting

Susanne Hermesch from the Animal Genetics and Breeding Unit (AGBU) in Armidale has recently completed a project aimed to identify both genetic and non-genetic factors that affect the risk of a pig becoming a victim of tail biting. Currently, most producers do not routinely monitor the incidence of tail biting on farms, although it is recorded as a need for medication or a cause of removal. Susanne used this recorded information, which was available from three different pig farms, to identify both genetic and non-genetic factors affecting incidence of tail biting in pigs.

Pigs were classed using a simple medication score (score 1 for pigs that required medication due to being a victim of tail biting, and score 0 for pigs that did not need medication due to tail biting) and it was found that being a victim of tail biting was heritable. Furthermore, breed differences were observed in one population providing evidence for genetic influences on victims of tail biting. No heritability estimate has previously been published about the medication score of tail-biting victims and this first heritability estimate provides opportunities for breeding programs to select pigs that are less likely to become victims of tail biting.

In a recent study conducted in France, the incidence of injuries due to tail biting had a similar heritability to the heritability of being medicated due to tail biting. Injury due to tail biting can be easily noted when pigs are recorded for weight and backfat. This simple score should be implemented by breeding companies in order to facilitate selection of pigs that are better able to ward off tail biters.

Furthermore, the incidence of tail biting victims was higher in autumn and winter for two populations in this study. Indoor climate factors such as cold temperatures, chill factors and even the placement of fans have been shown to affect tail biting outbreaks which may have contributed to the higher incidence of tail biting in autumn and winter in these populations.

This study has shown that medication records for tail biting should be incorporated into electronic databases to facilitate the selection of pig genotypes with a reduced risk of becoming a victim of tail biting. In addition, producers should evaluate the micro-climate of individual pens within sheds in order to reduce the incidence of tail biting for specific pens.

National Environmental Guidelines for Indoor Piggeries now available

The National Environmental Guidelines for Indoor Piggeries is now available on the APL website or in hard copy by request. Previously referred to as the National Environmental Guidelines for Piggeries (NEGP) (2010), the guidelines have been revised to incorporate recent research outcomes to be current, valued and recognised industry resource.

The third edition of this publication is a reference document for producers, planners, regulators, consultants and stakeholders concerning the environmental management of indoor piggeries.

It has been renamed the National Environmental Guidelines for Indoor Piggeries (NEGIP).

The NEGIP includes updates and expanded sections, with the removal of most of the outdoor production information. This information is provided in the National Environmental Guidelines for Rotational Outdoor Piggeries (NEGROP), also available on the APL website.

To request a hard copy or to discuss further, please contact Denise Woods on 0418 697 595 or at denise.woods@australianpork.com.au.