



PigTALES



Is sorting weaners by size worth the effort?

Allocating pigs into weight groups (light, medium and heavy) is a common way of sorting pigs at weaning. This practice is largely based on the assumption that lighter pigs will perform better without the potential bullying threat of heavier pigs. However, this practice may simply increase labour costs without improving production, welfare and health outcomes.

Does sorting pigs by body weight improve post-weaning performance and reduce aggression?

Pigs in a commercial facility were sorted by sex at weaning and divided into groups of 40. They were visually sorted into weight groups of light, medium or heavy, or divided into mixed groups where pigs were allocated to pens in the order they entered the shed (so different sized in each pen).

Over a six-week period pigs were weighed, feed disappearance measured and the feed conversion ratio determined. In addition, measures of stress, *E. coli* shedding and levels of aggression were examined.

Mean body weights for pigs sorted into pens by size (data from light, medium and heavy pens combined) and pigs unsorted into pens (mixed)

	Sorted by weight	Mixed	Significance
Number of pens	24	8	
Number of pigs	962	320	
Weight at weaning			
3 weeks of age (kg)	6.1 ± 0.25	6.5 ± 0.43	NS
Weight 4 weeks (kg)	6.8 ± 0.24	7.1 ± 0.42	NS
Weight 5 weeks (kg)	9.0 ± 0.30	9.5 ± 0.51	NS
Weight 10 weeks (kg)	25.3 ± 0.54	26.0 ± 0.93	NS

Sorting pigs by body weight resulted in reduced aggression in light pigs, but increased aggression in heavy pigs. Pigs in mixed groups had a lower removal rate, but there was no effect of sorting on body weight (see table).

Ultimately there was no improvement in post-weaning performance when pigs were sorted by size. Not sorting by size also saved 11.5 minutes per pen to fill compared to sorting pigs by size.

Sorting pigs by body weight at weaning does not result in long term benefits for the nursery phase and increases labour costs.

This was the first part of a two-part project led by Dr Diana Turpin and funded by the APC Pork Producers Committee looking at maximising weaner performance through the effects of variable weight within groups and space allowance.

A copy of the full report can be downloaded from www.piwa.com.au/our-research

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We thank you for your continued interest and welcome your feedback.

For those readers receiving a hard copy of Pig Tales, please let us know if you'd prefer to receive the newsletter via email. If you would like to be added to or removed from the mailing list, please contact Emalyn Loudon at contact@piwa.com.au.

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Free range focus

PIWA has completed two projects funded by the Grower Group Research and Development grants program administered through the State Government's Agribusiness Innovation Fund.

The first project, *Establishing WA as the Australian centre for the production of high quality free range pork*, focussed on supporting WA's growing free range industry which accounts for 27% of WA's 40,000 sows.

The project involved five components with a combined focus on reducing the impacts of summer on reproductive performance and identifying current pork quality attributes, with the longer term goal of the industry providing a consistent supply and quality of free range pork. This could help secure existing markets and encourage investigation of new market opportunities, particularly in export.

The first component was a desktop study which aimed to gain a greater understanding of product characteristics and market demand for Australian free range pork. A key finding was that WA consumers appeared willing to pay a premium of between 10 and 27% for free range pork (in 2017).

The second component aimed to i) establish the seasonal variation in supply of free range systems by collecting abattoir data on the number of free range pigs slaughtered in 2016 and 2017 and ii) compare carcass and objective pork quality between a conventional and free range system over a 12 month period. Seasonal impacts on the carcass (weight and P2) were greater than the effects of production system, however carcasses from free range systems appeared more variable. Pork quality was similar between production systems, however there were subtle differences in pH and colour.

The pH was higher in free range than conventional carcasses at both 1 and 24 hours after slaughter. This has potential benefits for pork quality and eating quality attributes.

The third component aimed to improve sow reproductive performance and piglet growth performance during summer months through the supplementation of betaine and essential fatty acids (EFA). This was an on-farm study and unfortunately there were a number of unexpected issues which impacted on the outcome and so no conclusions could be drawn from this experiment. However, it was a valuable learning experience for conducting future on-farm commercial experiments.

The fourth component involved the development of a novel cooling system for lactating sows to improve pig welfare and pre-weaning performance during summer. Solar-powered snout coolers were used to provide a zone of cooled air inside the hut that could be accessed voluntarily by sows to improve their own thermal comfort, whilst avoiding the risk of chilling the piglets.

Providing snout cooling increased the percentage of piglets born alive. Sows with snout cooling chose to spend more time in their huts during early lactation which could potentially improve survivability and growth rate of piglets through more suckling opportunities.

The cooling units were experimental and more work is needed to develop a commercially viable cooling device to further evaluate the potential of providing cooled air for lactating sows in free range systems.

The cooling study also provided an opportunity to develop a remote monitoring system for sows in free range farrowing huts, including temperature and humidity loggers,



Envious sows watch their paddock mate in her cooled farrowing hut



Dr Karen Moore and Dr Diana Turpin collected samples to analyse essential fatty acid levels in piglets

entry and exit sensors to determine hut occupancy, and cameras to observe sow behaviour during daylight hours. This provided unique information not previously published on sow behaviour in farrowing huts.

The final component of the project involved the bioeconomic modelling of the application of these technologies in free range production systems. While the model used a number of assumptions the recommendation was that producers should consider methods to alleviate heat stress in sows.

The outcomes of the project were collated in an infonote and presented at a producer evening in Mount Barker last February. Thirty seven producers and staff attended, representing 11 farms and nearly 85% of the free range industry in WA.

The infonote can be downloaded from <https://www.piwa.com.au/our-research>

The funding and assistance provided by the Department of Primary Industries and Regional Development, CM Farms, Linley Valley Pork and Murdoch University is gratefully acknowledged.

Pork raised without antibiotics, a niche market for WA?

The second Grower Group Research and Development grant was on *Pork raised without antibiotics: new opportunities for WA's pork industry*.

Given our reputation for delivering safe, high quality produce, particularly to export markets, the WA pork industry is well positioned to explore further demand for its products. Pork raised without antibiotics (RWA) occupies a small niche in countries in Europe and North America but it's expected that this market will expand to other countries, including Australia. The project examined the feasibility of producing pork RWA in WA by looking at the literature, examining current examples of production in international systems, facilitating a survey and focus group to determine consumer attitudes, and case studies on antibiotic use and antimicrobial resistance on WA farms.

The literature review looked at descriptions of pork RWA systems, 'best practice' production, especially the limitations, costs and price premiums, and consumers' willingness to pay in other parts of the world. Production challenges include adequate nutrition and use of feed additives, breeding stock quality, buildings and equipment, farm management, health and biosecurity, and development of human resources. The review noted that WA can prepare for the inevitable introduction of pork RWA into our markets by learning from North America and Europe in terms of agreeing on a product definition and being ready to adjust production systems. Pork RWA will most likely be a niche market in WA and transparent product information would need to be available to the supply chain.

One of the most significant factors in RWA systems is managing the welfare of compromised pigs if no antibiotics are to be used, or properly segregating antibiotic-treated pigs from those to be marketed as pork RWA.

The desktop component was followed by a review of pork RWA operations in France, Denmark, Spain, Canada and the USA. Value chains for pork RWA in these countries range from simple to quite complex. Premiums for pork RWA products are common in Europe and North America, but the exact amount that can be attributed to pork RWA is variable as most products also contain other valued attributes such as "vegetarian diet" and "GMO-free".

The third component included a consumer survey and focus group with WA industry stakeholders to determine attitudes to pork RWA in WA. This emphasised that overall knowledge of pork RWA is low in all sectors of the supply chain.

The survey indicated that respondents would be willing to pay for pork RWA, while in the focus group producers requested that modelling be completed to determine what level of premium would be required to counter an increase in costs.



Tyson branded Hillshire Farm ham products sold side-by-side in USA supermarkets

The PIGS bioeconomic simulation tool was used to simulate a production enterprise to provide an indication of the economic implications of changing management practices associated with producing pork RWA. Based on a farrow-to-finish enterprise producing pork RWA, an increase in costs of 10% would require a small price premium for pork RWA of less than 2% in order for a producer to be no worse off than that for the status quo.

The final component included a small-scale case study which measured antimicrobial use over a six month period on three different production systems in WA: small scale (<500 sows), large scale (>1,000 sows) and outdoor production.

There was large variation in antimicrobial use which is likely due to a myriad of factors including, but not limited to, population size, stocking rates, hygiene, biosecurity measures, endemic disease, and vaccination strategies. The level of resistance of bacteria (*E. coli* and *Enterococcus* spp.) to a small selection of antimicrobials was compared across the three farms and it was found that levels varied considerably. Interestingly, the level of resistance wasn't necessarily associated with the level of antimicrobial use.

While a benefit of RWA is reduced antibiotic use, more research is needed to determine the relationship between antimicrobial resistance, the environment, management practices and antimicrobial use.

The whole pork supply chain would need to work together to successfully establish pork RWA as a labelled product in WA. The project concluded that members of the WA industry were interested in the prospect of pork RWA being made available to consumers, however they were resolute that introducing such a product into the marketplace should be done in such a way so as not to disrupt the current markets for pork.

The outcomes of the project are summarised in an infonote available from <https://www.piwa.com.au/our-research>. The funding and assistance provided by the Department of Primary Industries and Regional Development and Murdoch University is gratefully acknowledged.

Our activities

A considerable amount of background work goes into obtaining the funding for our projects and ensuring that PIWA maintains a presence in national research activities relevant to the WA pork industry.

We recently submitted five applications to the Agricultural Produce Commission – Pork Producers Committee looking at a range of topics from improving weaner and finisher pig performance, reducing transport stress of finisher pigs and understanding Western Australian pork quality across production systems.

An opportunity was identified in the National Careers Institute Partnership Grants Round One where PIWA is the lead applicant on a proposal involving developing a contemporary interactive careers resource for Australian pork. We are awaiting the outcomes of these submissions.

PIWA also submitted two tenders in response to Australian Pork Limited's call for tenders on 1) creating and validating best practice truck biosecurity and disinfection guidelines with practical application at export abattoirs, and 2) a literature review of memorable eating quality research. These involved collaboration with other industry stakeholders but unfortunately our tenders were unsuccessful.

While COVID-19 has brought many unexpected challenges, a positive has been the foray of many companies into webinars and online opportunities. Some international conferences are now virtual conferences giving us the opportunity to 'attend' from home. We hope to bring you some practical information from these conferences in the next issue of Pig Tales.

Increasing space for weaners has positive impacts

Optimising the weaner pig's environment through appropriate stocking density as a strategy to eliminate unnecessary stress and minimise disease is becoming increasingly important, especially as pork industries worldwide move towards reducing antimicrobial usage.

The *Model Code of Practice for the Welfare of Animals: Pigs (Third Edition, 2008)* stipulates that a space allowance of 0.3 m² is required in weaner housing assuming the pigs reach an average weight of 30 kg at the end of the weaner period (10 weeks of age). Research from Canada demonstrates that that even a small difference of 0.04 m² (i.e. 0.26 m² versus 0.3 m²) can positively influence growth as well

as pig posture, feeding and drinking behaviour during the first five weeks after weaning.

Does increasing the space allowance above what is stipulated in the *Model Code* improve post-weaning performance and health?

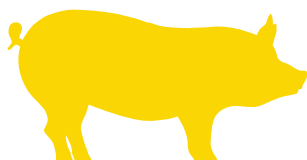
At weaning (3 weeks of age), pigs were allocated to three different space allowance groups which was achieved by varying the numbers of pigs per pen. The three space allowances were i) 0.3 m², 40 pigs/pen; ii) 0.35 m², 35 pigs/pen; and iii) 0.4 m², 30 pigs/pen. Growth performance, feed consumption and removals due to death or hospital treatment were recorded over a six-week period. Pigs with 0.4 m² were 1.4 kg heavier at the end of the experiment than those stocked at 0.3 m². There was also a trend for pigs with 0.35 m²

to be 0.8 kg heavier than those stocked at 0.3 m². There was an unexpected disease challenge during the experiment resulting in more removals than expected. Removals in the 0.3 m² pens were nearly double that of the 0.35 m² and 0.4 m² pens. Overall, increasing space allowance by 16.6% in the nursery phase resulted in improvements in growth performance and health.

Pig flow strategies which increase space allowance above that required by the *Model Code* result in improvements in performance and health.

This was the second part of the APC Pork Producers Committee-funded project led by Dr Diana Turpin, as detailed in the previous article *Is sorting weaners by size worth the effort?*

The full report can be downloaded from www.piwa.com.au/our-research



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PIWA gratefully acknowledges the Department of Primary Industries and Regional Development's support and contributions to completed projects.

