

Pork CRC Initiatives December 2017

Melbourne marathon matters

Let me take the initiative in this Initiatives column by getting in early to wish you all a safe and enjoyable Christmas and may the harvest be kind and prices remain at least static through the Christmas and New Year periods.

Also, I want to remind you that our summer course, 'Science and Practice of Pig Production', runs from January 29 to February 9 at University of Adelaide, Roseworthy Campus, South Australia.

The course is open to anyone in the industry, with Pork CRC covering the travel and other costs of the first 15 production based personnel to register for the course, so discuss it with those you need to in your organisation and register ASAP.

All details, including the registration form and social events, are up on our website (porkcrc.com.au) or can be obtained from Rebecca Smith, email rebecca.smith@porkcrc.com.au or Dr William van Wettere, email william.vanwetttere@adelaide.edu.au, who will be running the course again this year.

Inspirational students

I spent nine days in Melbourne in late November, attending APL delegates meeting and annual conference, Pork CRC Board meeting and Pork CRC Stakeholders day and then APSA. I learned a lot during the stay, albeit quite a marathon, made some valuable new contacts and particularly enjoyed the contributions of our Pork CRC students and graduates, who have really come into their own and are showing employers why they need them to boost their businesses. It has been truly inspirational to witness their progress and satisfying to know that Pork CRC has been a major provider of opportunities for this talented pool of young people.

APSA highlights

There were a couple of highlights from the APSA meeting. One was an excellent symposium on genetics where some extremely smart people, including Dr Dorian Garrick from Massey University, New Zealand, Dr Matthew Cuthbertson from Genus PIC, Tennessee, USA and our very own Dr Kim Bunter from AGBU, Armidale, NSW, told us what was happening globally and locally in a language even I could understand.

The news was all good, with advanced genetic selection techniques, including genomics, expected to markedly enhance the rate of genetic progress in what might be termed traditional traits such as reproduction and growth and carcass characteristics, but also in traits such as birth weight (even with high and increasing litter sizes) and in disease resilience and maybe even disease resistance. This progress has required massive investment by breeding companies such as PIC, but you would have been impressed by the technologies and methodologies developed and it seems they can be extended to breeding programs globally.

Genetic progress

We also heard that genetic progress has been improved by 'new' AI technologies such as post cervical AI (PCAI) and set time AI in weaned sows. The latter enables a single dose of semen to be used and the former allows for the number of sperm per dose to be reduced. I have been discussing each of these with you for some time since both can be used commercially. You could genuinely increase genetic progress in your herds, providing there are elite boars for the traits you are most interested in or most need in your herd in the AI centre you use. The impact was best described by

Dr Matthew Cuthbertson from PIC. Ten years ago one sire could cover 18 sows. Now one sire can cover 400 sows. This is a big deal and it's probably time for us all to go back and look at how to implement set time AI on-farm, as there was also evidence presented at APSA that it might reduce summer infertility. PCAI is simply a matter of some training.

Dr Kim Bunter from AGBU told us that the Australian herd has the same potential as herds across the globe to make the same rate of genetic progress. The question is why for reproduction, we have not seen much, if any, progress in the past? Looking at number weaned/sow/year, we are at least four piglets behind NZ, maybe five to six behind the US and Canada and at least eight behind the Netherlands and Denmark. Our environment and housing might be a constraint, but there are few herds across Australia that can match the average of the NZ industry (26 pigs weaned/sow/year), so it's unlikely to be environment per se. This leaves the genetic companies. Maybe they have had the most selection pressure on growth and carcass traits in both sire and dam line selection indexes. The continuing demand by retailers to reduce P2 and the impact of P2 on price received maybe lends some credence to this.

APRIL target

More recently, we've seen greater progress in born alive and number weaned, suggesting something has changed and we can expect progress to continue. However, we are so far behind the eight ball in reproduction that unless we come up with a unique technology for markedly advancing the rate of genetic progress we will never catch up with our global competitors. In the short to medium term, we need an alternative technology to increase number weaned. APRIL is all about this. The target is 12 weaned/litter and 27-28 pigs weaned/sow/year. We will be hellishly competitive if this is achieved.

Better pork

We heard from Pork CRC Program Three Leader, Heather Channon of APL, that great progress has been made in improving the eating quality of Australian pork. I believe this has largely been due to the good efforts of Heather and the willingness of the various supply chains to get involved in Pork CRC R&D in the area. There's a bit to go, but we heard at the Pork CRC Stakeholders' Day, prior to APSA, that many of the outcomes from the program have been adopted. Heather and our other researchers in the area have transformed research on eating quality by taking the research out of the lab to supply chains and the consumer and we are reaping the rewards. The latter is obvious from the pork products available in store and in the eating experience with pork produced and processed using some of the Pork CRC outcomes.

Satisfying sows

We enjoyed an interesting presentation ('Feeding the sow to enhance progeny performance and health') from Irishman Prof John O' Doherty on the use of seaweed extracts to stimulate gut health and performance in weaned pigs. There was a bit more science to it than the title suggested. It investigated various compounds from seaweed as replacements for antibiotics and ZnO. Most interesting was that some of the materials had the same positive effects on weaner and grower-finisher health and performance when fed to the sow during gestation and lactation only as when applied to progeny per se.

Essential oils

We've seen similar results with essential oils in a project conducted by Dr Eugene Roura. Eugeni and his team at University of Queensland have been investigating the use of essential oils to control

post-weaning diarrhoea in weaned piglets and as a means of linking the sow diet and the weaner diet to enhance health and performance after weaning.

They screened a large number of essential oils for their ability to transfer from the sow's diet to colostrum and milk and for their antibacterial properties.

Bottom line is they selected a number of the essential oils and conducted a semi commercial study in which the combination of oils were fed to sows (or not) in the last week of gestation and through lactation and then in (or not in) the weaner diet on piglet performance after weaning.

The results showed that piglets reared on sows which received the essential oils in their diet ate 14% more feed, grew 11.2% faster after weaning and were 8% heavier at day 28 post weaning than their counterparts reared on sows which did not receive the essential oils. The effects of including the essential oils in the weaner diet were not significant.

These are interesting outcomes with economically important commercial implications and we are following up under true commercial conditions.

Reducing confinement

Australian producers have reduced the confinement of gestating sows by moving to group housing. About 82% have made the transition, which reduces sow confinement by some 78% and we should be proud of this. However, pressure from animal welfare organisations and others remains on reducing confinement during farrowing and lactation.

SPP test

Pork CRC has invested considerable research funds and effort in the area. Unlike gestating sows, there are three factors to be considered in viewing outcomes from research in the area. These are the impact on the sow, impact on the piglet and impact on the producer – the SPP test.

For the various farrowing/lactation pens investigated (such as swing sided pens and PigSAFE pens) the impact on sow welfare, if allowed to farrow open, is questionable, but might be positive. The impact on the piglet is generally quite negative and reflected in increased mortality if sows are allowed to farrow open or the pen is open before day seven. There is little value for the producer because of the very high costs involved and without considerable compensation it would reduce the competitiveness of businesses and industry.

As an alternative, we've investigated reducing confinement by moving sows and their litters from farrowing crates (and PigSAFE pens) into group pens at different stages of lactation.

Penning lines

The results of two studies have been reported recently. The first (Pork CRC Project 1B-105) was conducted by Dr David Lines and colleagues at SunPork South Australia.

Sows and their litters were either moved to group pens at 13 days before weaning or remained in farrowing crates through to weaning at 28 days.

Only gilt litters were used in the study and for the group treatment, with sows and litters housed in groups of three. There were 49 replicates for each treatment.

Details and photos of the group pens are in the final report, which is on our website (porkcrc.com.au). Bottom line was sow welfare was reduced in the group treatment due to

aggression resulting in more injuries compared to the farrowing crate. A similar situation existed for piglets grouped during lactation, although this reversed following weaning when scratches and injury scores were higher at day seven post weaning for piglets weaned from farrowing crates.

Piglet mortality and removals (due largely to ill thrift) was higher for those grouped in lactation, while weaning weight was also significantly reduced and the difference persisted to day 30 post weaning. The latter effects are shown in Table 1. Subsequent reproduction was not affected by treatment.

Table 1: Pre-weaning and post-weaning weight of piglets from sows housed individually or in groups from 13 days prior to weaning LSM±SEM.

Day (relative to weaning)	Control	Grouped	Prob>t
-14	4.23 ± 0.08	4.23 ± 0.06	0.9999
-12	4.74 ± 0.02	4.56 ± 0.01	<0.0001
-1	7.17 ± 0.08	6.61 ± 0.05	<0.0001
1	7.28 ± 0.09	6.78 ± 0.06	<0.0001
7	8.29 ± 0.11	7.88 ± 0.07	0.0006
14	10.2 ± 0.39	9.89 ± 0.21	0.3785
30	18.57 ± 0.55	17.8 ± 0.31	0.3071

Group grappings

The second study (Pork CRC Project 1A-113) was conducted by Dr Jean-Loup Rault and colleagues from Melbourne University and Dr Rebecca Morrison and her colleagues from Rivalea Australia.

Sows and their litters were moved from farrowing crates to group pens at 7, 10 and 14 days after birth. Sows and their litters were housed in groups of five or seven and provided 7-8 M² of space/sow. Pens were fitted with creep areas and had sawdust bedding. Details and photographs are also in the final report on our website. Pigs in all treatments were weaned at 26 days.

Outcomes were similar to those reported by David Lines.

Sow aggression in-group pens increased with time after grouping and resulted in higher injury scores.

The same situation existed for piglets in group pens and this was reversed after weaning.

In group pens there was higher piglet mortality in the Rivalea study and the seven day treatment had to be abandoned and movement to pens was increased to 10 days for this treatment. Averaged between day six and weaning, piglet mortality was 17%, 12% and 8% for the 7, 10 and 14 day group treatments respectively. For the farrowing crates, the corresponding mortality was 3%.

As with the results reported by David Lines, piglet performance was also reduced by group lactation.

Effects of the different treatments on weaning weight are shown in Table 2.

Table 2: Effects of moving sows and litters from farrowing crates (FC) to groups at 7 (GL7), 10 (GL10) or 14 (GL14 days) on piglet weight at weaning at 26 days.

Treatment	FC	GL7	GL10	GL14	P
Weaning weight (kg)	6.98	5.92	6.35	6.26	0.010

The lactation treatment had no significant effect on post weaning growth performance or mortality.

Similarly, the lactation treatment had no significant effect on subsequent reproduction.

Almost all indicators of stress, including cortisol, were increased in sows and piglets by group lactation.

When the SPP test is applied, it appears moving sows and piglets to group housing during lactation adversely affects the welfare of sows and piglets. For the producer group, penning may be a lower cost alternative, but requires considerable space and, on the evidence to date, has few, if any, production advantages.

We know the 'problems' reported in both studies are less if sows and litters are moved to group housing at 21 days, but there may be reproductive advantages which are being investigated at the moment. Moving sows and litters from crates to groups at day 21, however, has little effect on reducing confinement. Outcomes are also likely to be affected by the design of the group housing pens, which is indicated by the difference in mortality between the two studies reported here.

Research continues on alternative farrowing systems, but we are concentrating more on defining and improving the welfare of sows and piglets in conventional farrowing and lactation systems.

Once again, have a happy and safe Christmas and best wishes from all at Pork CRC.

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