Pork CRC Specials

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From the Top Shelf

by Dr Roger Campbell, CEO, Pork CRC

As we head into the second half of the current Pork CRC I sincerely thank all researchers and participants for what has been an outstanding first half.

I couldn't have predicted the amount of research that has been started and, in many cases, successfully completed and the outcomes achieved to date and the exciting prospects that are waiting in the Pork CRC pipeline. Well done everyone.

Rave Review

The Pork CRC third year review was conducted by an independent panel in early December 2008 and the report presented to the Board in February this year. The report was extremely complimentary of our research and commercialisation efforts and how research proposals are evaluated for their impact on the bottom line of producers and the competitiveness of the industry.

Pork CRC research was judged as high class and innovative and the review panel was most impressed with the degree of integration between industry participants and researchers and the value placed on research outcomes by participants and the industry in general. Once again, thanks to all involved with the Pork CRC and to those who participated in the review. It was a challenging but informative process and certainly made us aware of the need to continually evaluate research directions and outcomes.

Nice Figures

Based on global benchmarking figures for 2007 (see Table) we are catching up with our competitors, but everyone else is improving too, so there's no room for complacency. We apparently have higher cost of production and HFC values than some countries and the differences reflect higher feed costs in some cases (USA and Canada) and a considerably lower throughput (carcass weight/sow/year) compared to most other countries.

With the exception of Denmark and the Netherlands which both excel in the number of pigs weaned/sold/sow/year, most of the difference is due to the light carcass weight demanded by the Australian market. The latter increases HFC and overhead costs and potentially reduces revenue, although at present Australian producers are receiving good to excellent prices for their pigs.

Nevertheless, every 1 kg reduction in live weight at sale increases cost of production by approximately 1 cent/kg carcass weight and results in inefficiency throughout the supply chain. At the research or technical level, our challenge is to increase the number of pigs sold/sow/year.

Feeding Secrets

We've always questioned the feed efficiency of the genetics available in Australia, however recent results from Karen Moore of the Department of Agriculture and Food WA show that between 20 and 100 kg live weight we have pigs capable of growing as efficiently as anything available in the world. The latter is demonstrated in the second part of Karen's report on her phase feeding project. The bottom line, however, was that between 22 and 101 kg she found that female pigs housed in groups achieved a feed: gain of only 2.2 or 30 MJ DE/kg live weight gain.

The latter is outstanding and would result in an overall HFC of only 3.3. This is the potential with only 20.5 pigs sold/sow per year at 72 kg carcass weight, so the overall efficiency available for pork production is fast approaching that of the broiler industry.

The secret is to now identify and rank the various factors at the commercial level that contribute to the much lower levels of efficiency achieved in practice. It was also interesting from Karen's results that despite the excellent overall feed efficiency achieved to 101 kg, feed: gain began to deteriorate at about 85 kg, suggesting there remains an upper limit to protein deposition, at least in female pigs.

You'll also note from the global competitiveness table that the Canadians are achieving an extremely low whole herd feed conversion ratio. The challenges are clear and we look forward to our researchers responding to these and further enhancing our competitive position over the next three years.

Revealing Model

Pork CRC researchers and associates may be aware that evaluating and approving research proposals has slowed down a little in the past few months. While I apologise for the delay, it occurred because we've been working with APL to investigate and develop a base funding research model to ensure facilities and support staff will be available to the industry longer term.

The model has been developed and approved by the Pork CRC and APL boards and things should return to 'normal' very soon.

The changes will have little effect on the type of research conducted by the Pork CRC or the researchers involved (anyone who wants to be), but will affect where research with grower-finisher pigs, weaners and sows will be done and potentially how the Pork CRC will seek new ideas in these and other areas.

The objective is to make R&D in Australia more sustainable, to reduce research costs and involve a more diverse range of people in developing new ideas.

All will be revealed in the near future and I can say that the new, improved system will remain inclusive and no researcher will be disadvantaged.

Table Business and key performance indicators for selected countries for 2007

Country/KPI	Australia	Canada	USA	Denmark	Netherlands	Brazil	GB
COP($/kg CW)	2.46	1.93	1.70	2.28	2.40	1.79	2.90
Feed cost ($/t)	375	339	267	336	348	350	383
HFC	3.90	3.56	3.80	3.75	3.62	3.80	3.79
HFC (DE/kg)	53.5	43.8	55.1	50.3	49.3	52.1	49.7
Carcass weight (kg)	72	94	93	82	89	79	76
Pigs weaned (per sow/y)	21.2	22.3	22.9	26.4	25.8	20.0	21.6
Pigs sold (per sow/y)	20.0	20.6	20.9	24.5	24.7	18.5	20.1
Carcass weight kg (per sow/y)	1428	1935	1945	2003	2200	1406	1536

Battling Birth Weights and Priming Piglets

by Rob Smits, Leader, Pork CRC sub-program 2D

Reproduction is well represented within the Pork CRC, with approximately $2.6 million worth of funding to date.

Key project areas are addressing shortfalls in litter size, numbers weaned or sow lifetime performance and productive efficiency.

These Pork CRC projects have been instrumental in raising our understanding of where our potential capacity is and what limits more pigs being weaned and sold.

The completed project by Drs Trish Holyoake and Yvette Miller on why gilt progeny are more at risk of poor growth and loss than sow progeny concluded that the combination of lower birth weight, piglet colostrum and milk intake and the ability to transfer immunoglobulins in gilts were the major risk factors associated with a 4 kg shortfall in sale weight. Ways to increase birth weight and segregation of gilt progeny to better manage post-weaning health are production outcomes.

Commercial Evaluation

The research and commercial evaluation from the sow longevity project continues, with Dr Rob van Barneveld and Robert Hewitt of CHM Alliance reporting that reducing the suckling demands on first litter sows improves weaning weight and subsequent sow fertility by more than 0.5 piglet and an extra 10 sows retained to parity 2 per 100 gilts farrowed.

Further studies at QAF are evaluating the amino acid requirements for maximum lactation and subsequent sow productivity in gilts to complement the energy requirements previously studied.

Fruitful Projects

Several seasonal infertility projects are coming to fruition for the Pork CRC and industry. Using dietary betaine during gestation is being commercially evaluated at Australian Pork Farms at Wasley's and QAF Huntly over summer to improve farrowing rates and litter size, supervised by Dr Will van Wettere, University of Adelaide.

CHM Farms are also evaluating a technology implemented just before embryo implantation as another method to reduce the impact of seasonal infertility, supervised by Sean O'Leary, University of Adelaide. Both projects have finished their pilot studies, with clear benefits to producers if the results can be repeated under field conditions.

New Direction

While these projects will continue to deliver commercial outcomes, new research direction in reproduction will focus on improving neonatal piglet health and sow milk production to produce more piglets to weaning.

For more information and recommendations on these projects and others in our sub-program 2D ('Extend and enhance the productive life of the breeding female through novel management and system design'), please refer to the following reports available through the Pork CRC's website:

http://www.porkcrc.com.au/2D-101_Project_Summary.pdf

http://www.porkcrc.com.au/2D-104_Progress_Report_Expt_3.pdf

http://www.porkcrc.com.au/2D-110_Research_Summary_August_08.pdf

http://www.porkcrc.com.au/2G-102_Project_summary.pdf

Forking Selenium: you can almost swear by it

Getting some selenium into the pork on your fork is the challenge facing Pork CRC funded post graduate researcher Dhammika Jayasooriya as she researches ways to enrich pork with selenium to make it available in the diet.

This vital trace element is a crucial part of the human diet, protecting cells from oxidation.

Australia, New Zealand and Europe have selenium-deprived soils, which can lead to selenium deficiency in the diets in these areas.

Selenium is usually present in animal foods, such as the organs and other meat from poultry and seafoods, but is also available in cereals and grains, dairy products, fruit and vegetables.

The amount of selenium in food depends on the selenium in the soil where animals are raised and plants grown.

But just because selenium is present in food, doesn't mean that it's going to be absorbed and used by the body.

Nutritionists know that its availability to the body depends on its chemical form, the food source, the composition of the total diet and the individual's nutritional status, though these factors are poorly understood.

However they do know that pork is a very good source of readily available selenium.

Dhammika's task is to shed some light on the subject by investigating the availability of selenium from cooked selenium-enriched pork for selenium-deficient laboratory rats.

This will be followed by a study of rat colon cancer that will investigate selenium's possible role in the early defence against colon cancer.

Her study will take place at the Department of Primary Industry, Victoria, in Werribee and Murdoch University, WA.

The work will help develop the most cost efficient way to increase selenium and iron in pork and potentially generate new products for Australian and overseas markets for healthy selenium and iron-enriched pork.

With a background in agricultural science and a Masters in Food Science from the UK, where she worked for three years, she's well qualified for the task.

Progress is well underway on her Pork CRC funded research project, "Bioavailability of Selenium in enriched pork and pork products and health implications".

According to Pork CRC CEO, Dr Roger Campbell, preliminary results are very promising and indicate that the selenium level of pork can be enriched and might be more available than organic selenium. There is also some evidence that feeding cooked selenium-enriched pork reduces the incidence of colon cancer in rats.

Interested people can contact Dhammika by email dhammika.jayasooriya@dpi.vic.gov.au

AUSPIG: Expert Advice At Your Fingertips

AUSPIG is one of the world's most advanced decision support systems for pig producers, modelling your herd's unique performance characteristics to give you expert advice and more profitable pig management strategies.

Yet it's easy to use with its familiar Windows based software.

The system couples on-farm performance and resources from your piggery with sophisticated computer decision support software.

It can tighten up your feeding operations, improve productivity of pig resources and increase your returns per pig.

AUSPIG integrates the latest R & D from around the world into four components:

- AUSPIG growth and production simulation model
- Feedmania optimal-cost diet formulation system
- Pigmax pig enterprise model
- Expert systems to analyse and interpret the model outputs

This valuable management tool for piggery managers promises to:

- Predict the performance of your pigs (AUSPIG)

continued page 4

Breakthrough APP Vaccine Available

A breakthrough vaccine and vaccine procedures, developed with funding from the Pork CRC, to control the endemic pig disease *Actinobacillus pleuropneumoniae* (APP) is now available and is expected to reduce industry costs by $3-6 million a year.

It makes vaccination against APP easier, cheaper and more effective, according to Pork CRC CEO, Dr Roger Campbell.

"For herds with APP, the vaccine technology is highly effective, worth as much as $15 per pig, is easier to administer than current vaccines and will reduce the use and cost of antibiotics within the industry," he explained.

"The technology has global market implications and research continues to refine the product for the international market."

The Australian Pork Farms Group, Victoria Department of Primary Industries and QAF Meat Industries have been the key collaborators in this Pork CRC project. The technology has been adopted by two commercial participants of the Pork CRC through a manufacturing license agreement with ACE Laboratories in Bendigo, Victoria. Other end users can now access the technology through ACE laboratories.

Dr Campbell explained that the new vaccine requires one dose and is not an injectable. He suggested those producers with APP in their herds should contact their preferred veterinarian as he or she most probably attended a Pork CRC organised APP vaccine adoption forum in late January in South Australia.

If you can spot your vet in this picture and you have APP in your herd, contact them now! They'll be a 'full bottle' on the new APP vaccine after attending this Pork CRC adoption forum in January.

Because the vaccine is a live product, it requires careful handling and administration and is only available on prescription under a special use permit through veterinarians. This will ensure producers can be instructed how to use the vaccine safely and effectively.

According to adoption forum co-ordinator, Dr Ross Cutler, veterinarian and Manager of Pork CRC Subprogram 2C, producers can make real inroads against APP by using this new vaccine.

"The vaccine is special because it can be given to baby pigs before weaning in a single dose and a single handling, meaning less time is spent vaccinating young pigs," he said. "It uses the concept that the pigs are given a small challenge dose with live bacteria while they're protected by maternally derived colostral immunity. The vaccine is different because it doesn't create disease, but an immunological response when given to the piglets of sows immune to the disease. Its use in piglets of sows that have not been exposed to the disease is contraindicated," Dr Cutler said.

Vaccination against APP was previously by injection at six weeks, with a follow-up injection about four weeks later. "Now, with the Pork CRC developed vaccine, you can vaccinate via a single dose, knowing you're providing your growing herd significant protection against APP," Dr Cutler said.

Embryo Mortality Research Alive and Well

Embryo mortality remains a significant problem for the pork industry, with estimates ranging from 10-40%.

Solving it holds the promise of considerably improved litter size and bigger profits.

While the accepted wisdom is not to feed gilts and sows too much on their first farrowing during early pregnancy, there's remarkably little evidence that 'overfeeding' actually contributes to embryo mortality and the evidence that does exist is conflicting.

Into this clouded area steps post graduate student Rebecca Athorn, with her Pork CRC supported research project 'Post-mating nutritional strategies to improve establishment of pregnancy and litter size'.

Rebecca gained her Bachelor of Applied Science (Hons) in Animal Studies from the University of Queensland in 2007 and then threw her considerable academic abilities straight into post graduate research. She intends building a career in the pork industry.

Her research project aims to determine the effect of feeding and energy sources on the ovarian secretion of progesterone and embryo development.

She thinks the key to understanding the conflicting evidence of the past can be found in the uterus and ovary.

"It's important research for Australia's pork industry, establishing an accurate theoretical grounding for recommended feed allowances during early pregnancy," Rebecca said.

"It will also create recommendations to prevent luteal failure through inappropriate feeding with a subsequent loss of pregnancy."

With that sort of detailed knowledge, diets can be designed to improve luteal function embryo development and pregnancy rates.

The research started in 2008 at the University of Adelaide's Roseworthy Campus, the head-quarters of the Pork CRC, under the supervision of Dr Pieter Langendijk (SARDI) and Dr Philip Stott (University of Adelaide).

Dr Langendijk is recognised for his work in pig reproduction and, along with Dr Stott, has a strong record of supervising post graduate research.

Rebecca said the work is going well and on track to be completed by January 2011.

Interested people can contact Rebecca by email rebecca.athorn@adelaide.edu.au

Pork CRC scholarship holder Rebecca Athorn collects blood from the vena cava (draining the uterus) of a gilt. The blood is then analysed for progesterone content.

A New England for Geneticist

It would be no surprise if Dr Craig Lewis started counting pigs to get to sleep at night.

After all, they've been a very big part of his life.

The English geneticist grew up on a pig farm, so it was only natural he should go on to study for a Diploma of Agriculture at Bishop Burton College, Beverley, then a B.Sc. at The Royal Agricultural College, Cirencester, where he did an honours thesis on strategies to combat PMWS in selected pig herds.

From there it was a Masters thesis on the transportation and handling of swine in commercial operations, completed in the somewhat warmer surrounds of Texas Tech University in the USA.

Still somewhat pig-obsessed, he went on to complete his PhD in Quantitative Genetics at the University of Edinburgh and the Roslin Institute, dissecting the genetic control of host resistance to PRRS.

Today the challenge of further research in pig genetics, the prospect of working with globally renowned animal scientists within the Armidale area and the promise of warmer weather have lured him to NSW and the University of New England's Animal Genetics and Breeding Unit (AGBU), where he's working as a Research Fellow for the Pork CRC.

Dr Lewis' task, working with Dr Kim Bunter and the team at AGBU, is to analyse the genetic associations between voluntary feed intake of females, finisher performance and sow longevity as part of the Pork CRC's Program Two to improve herd feed conversion efficiency.

The project, set up by Dr Bunter, will establish genetic and phenotypic relationships between sow traits such as lactational feed intake, sow IGF-I, sow weight and fat depths, and other economically important performance and reproductive traits. The information will help develop breeding programs to target efficient production and improved sow lifetime reproductive performance.

"It's important work for the Australian pork industry because it's absolutely crucial for cost reduction. It will give pork producers more bang for their buck - better pigs and higher profitability," Dr Lewis said.

For further information on this project, contact Dr Craig Lewis (Tel 02 6773 2945 or email clewis21@une.edu.au) or Dr Kim Bunter (Tel 02 6773 3788 or email kbunter2@une.edu.au) at the University of New England.

EDITOR'S NOTE: Other recent Pork CRC appointments include agricultural scientist Professor John Pluske to the Board and Dr Rob Wilson as Manager of Commercialisation and Adoption.

Professor Pluske is Director of the Animal Research Institute at one of the CRC's core participants, Murdoch University, WA and will represent Murdoch on the board.

Dr Lewis I Presume! Spotting Dr Craig Lewis on safari in Africa is no surprise when you learn that he is so well travelled, but now he's settled in Australia as the Pork CRC's latest Research Fellow.

Dr Wilson has spent the past 30 years managing Wandalup Farms, a 4000 sow WA piggery now owned by the Craig Mostyn Group.

Diary Dates 2009

March 17-18: Commercialisation Boot-camp, contact Patrick for more information, Tel 08 8303 7684

March 24: NIRS Forum on assessing grain quality, contact Patrick for more information, Tel 08 8303 7684

April 28: Pork CRC Board Meeting

May 15: APSA papers due with Pork CRC

AUSPIG: Expert Advice...*continued from page 2*

- Improve your feed purchase and diet formulation decisions (Feedmania)
- Identify opportunities to increase profits through better resource use (Pigmax)
- Provide expert analysis and advice for pig production (Expert Systems)

For further information, please contact Graeme Crook, AUSPIG Project Manager based at Pork CRC headquarters at the University of Adelaide's Roseworthy campus, email graeme.crook@porkcrc.com.au , Tel 08 83037973, or Mob 0417 805 422.

Mr Crook is particularly keen to hear from smaller pig producers.

"While I now have regional benchmarks to work with, what I really need is to be able to run through some actual figures from farms, especially smaller ones," he noted.

As part of the ongoing development of AUSPIG, Mr Crook has created a 'team of champions' and an 'expert panel', comprising some leading producers and researchers.

Pork CRC Toolbox Technologies

Relatively high pig prices being enjoyed at the moment tend to 'trump' everything else and make pork production very profitable, even for the inefficient.

However, longer term success will depend on how efficiently and at what cost pork can be produced and in this issue we have summarised the impacts of three of the Pork CRC's older technologies on net margin, with pig price at $3.00/kg and feed ranging from $250 to $400/tonne.

It's obvious that improving the efficiency of growth in the last four weeks of production improves net margin and, as you'd expect, the degree of improvement increases with feed costs.

Improving reproduction (Betaine) affects overhead costs more than feed costs alone, but also increases revenue on an enterprise or per sow basis, which is not shown in the Table.

Next issue of ***Pork CRC Specials*** will show you why you need these tools out of the Pork CRC toolbox:

- Phase feeding
- Amino acid requirements of modern genotypes
- Getting your genetics and health right
- NIRS - knowing your grains
- New means of increasing litter size

Impacts on net margin (cents/kg carcass weight) at different average feed costs

Technology and average feed costs ($/tonne)	*250*	*300*	*350*	*400*
Paylean last 4 weeks of growth	4.5	4.9	5.1	5.7
Paylean last 4 weeks of growth and Reporcin last 2 weeks	6.8	8.3	10.0	11.8
Betaine added at 2 kg/tonne to gestation diet	5.2	5.5	5.7	6.0

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