



Specials

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From the Top Shelf by Dr Roger Campbell, CEO, Pork CRC

We are in the middle of transitioning from the CRC for an Internationally Competitive Pork Industry to the CRC for High Integrity Australian Pork.

Commonwealth Government support of the first Pork CRC officially concluded September 30 and to ensure payments were made for projects commissioned during the past two to three years, we needed final reports and expenditure reports on all projects. I'm pleased to advise that researchers and their organisations responded magnificently to my pleas.

In the past couple of months we received about 20 final reports and all necessary financial information, essentially completing all but one project from the first Pork CRC, so well done and thanks to all concerned. The remaining project has no money owing and I expect the final report shortly.

Delivery Day

It will now be up to myself, plus Pork CRC Research Manager, Graeme Crook and the program managers to review all final reports and deliver some extensive and impressive outcomes to industry.

We have a number of carry-over projects from the first Pork CRC that will be completed within the first year of the new Pork CRC, with the required cash also carried across and approved by The Department of Innovation, Industry, Science and Research (DIISR).

Overall, the first Pork CRC was a resounding success, thanks largely to the innovative nature and enthusiasm of the research community, so to all the researchers, well done and thank you sincerely on behalf of the industry and all beneficiaries of your smart, resourceful work.

The outcomes and value of the first Pork CRC will be reviewed by our Chairman Dr John Keniry in his A.C. Dunkin memorial lecture at the 2011 Australasian Pig Science Association (APSA) Conference in Adelaide at the end of November.

His lecture is titled "Investing in Cooperative Research Centres – Was the CRC for an Internationally Competitive Australian Pork Industry worth the investment?".

Outcomes from at least 50 Pork CRC projects will be presented as papers at APSA 2011, which means an impressive 120 or so Pork CRC papers have been published at the 2009 and 2011 APSA conferences.

New CRC

The new Pork CRC is about to begin its R&D program. We had a great response to the first call for tenders and commissioned proposals, with the innovation awards also enthusiastically supported by researchers. Our feedback suggests they are a real innovation in the Australian research space. We received 98 proposals worth \$19 million, which was well over the available budget (by about \$16 million), hence it was a difficult but interesting task reviewing and selecting. Of the 39 innovation proposals, some were very innovative and hopefully will deliver some system changing information/technologies.

All proposals went through the new review system and a list based on innovativeness and the extent they addressed Pork CRC priorities across the four programs went to the R&D Committee on September 19. Few of the R&D programs recommended to the R&D Committee got through unscathed and a number of proposals went back to the respective Expert Scientific Groups, program managers and researchers for further modification. Some were rejected by the R&D Committee.

The final list of proposals supported by the R&D Committee will go to the board on October 20 for ratification. Soon after that we begin research in the CRC for High Integrity Australian Pork.

Happy Days

I am happy with the overall program and think we will be off to a good start. The new R&D process will be further streamlined and in future all researchers wanting to lodge funding applications



Dr Roger Campbell, CEO, Pork CRC

will need to contact the relevant Pork CRC Program Manager to discuss and clarify the needs and objectives of the Pork CRC and its call for proposals. This will help proponents get a better feel for the budgets available for research. There were too many applications with unrealistically high budgets in the first round, which was not the fault of researchers, especially those new to CRCs.

However, CRCs operate differently from other research bodies and it is all about leveraging the cash available, rather than spending it all in one year. It is also all about outcomes and maximising the effectiveness of available funds.

So, we are about to start and I thank you all for your contributions to date.

Research Roundup

Meanwhile, in the next few pages, to close the books so to 'speak', we've summarised research outcomes of the original Pork CRC.



Pork CRC Chairman, Dr John Keniry, will deliver the prestigious A.C. Dunkin memorial lecture at the 2011 APSA Conference in Adelaide.

Program One Highlights



Dr Ray King, Manager, Pork CRC Program One: 'Securing more reliable and consistent supplies of protein and energy for pig diets'.

One of the major outcomes for the CRC for an Internationally Competitive Pork Industry was reduced production costs for high quality pork through more reliable and consistent protein and energy supplies via innovative grain production, co-product utilisation and quality assessment.

This has been achieved by the following outputs:

Output 1.1: New and adapted cereal varieties with outstanding yield, excellent disease resistance, wide adaptation and improved feed quality characteristics.

Delivery targets: Three to five cereal cultivars with favourable yield, disease resistance, growing range and nutritional attributes for pigs.

Two new cereal varieties have been commercially released.

- The barley variety *Shepherd* was released by AWB Seeds in 2009 and is well adapted to south-

ern Queensland where it competes well with other well established barley varieties.

- Waratah Seeds had a limited release in 2009 of the higher energy triticale, *Berkshire*, which was a product of the Pork CRC plant breeding program. *Berkshire* has often provided better and more consistent growth performance in pigs and poultry than wheats, despite the slightly lower energy content. *Berkshire* has been popular with pork producers and associated grain growers because of its high yield, relatively high energy and good adaptation to triticale growing regions.

Output 1.2: Publication of practical guidelines for the production and supply chain arrangements for new and existing legumes for the pig industry.

Delivery targets: Improved varieties of legume available. Agronomic practices suited to effecting yield and feed quality improvements.

Two new field pea varieties have been released.

- *Maki*, released by AGT Seeds in 2009 and *CRC Walana*, released in 2011, are well adapted to northern Australia and detailed agronomic packages support their marketing.

- Bean Growers Australia is encouraging their growers to grow these new field peas and will purchase and market them on behalf of their growers.

Output 1.3: Enhanced and updated near infra-red spectroscopy (NIRS) calibrations for predicting nutritional quality of feed ingredients for pigs.

Delivery targets: Initial NIRS calibrations for pig ileal digestible energy, faecal digestible energy, chemical and physical characteristics of feed ingredients.

An accurate and rapid method for measuring the energy value of grains is essential for improving

the formulation of rations for pigs of all ages. A difference of 1 MJ/kg can be worth up to \$20/tonne, depending on type of diet and relative prices of alternative grains, fibre sources and high energy ingredients.

- The NIR calibrations established in the Premium Grains for Livestock Program for predicting the digestible energy (DE) content of cereal grains for pigs have been markedly enhanced in the Pork CRC. The population of grains that make up the calibration is now above 250.

- The precision with which the DE values of unknown samples can be predicted with a confidence of 95% probability has improved from ± 0.38 MJ/kg for the PGLP calibration to ± 0.27 MJ/kg for the new calibration.

Output 1.4: Novel methods for improving the utilisation of feed ingredients by pigs.

Delivery targets: Novel or improved methods of processing feed ingredients to increase economically their nutritional value for pigs.

The size of grain particles incorporated into pig feeds has a marked effect on the rate of *in vitro* starch digestion and feed efficiency.

- Results of initial *in vitro* studies showed that if grain particles in the feed did not exceed 1.0 mm for barley and 0.75 mm for sorghum, all starch should be digested in the small intestines and feed use efficiency should improve.

- In commercial feed milling, an option to reduce grain particle size is to regrind. Results from pig growth studies revealed that re-grinding resulted in 22% and 10.5% improvement in feed use efficiency for sorghum diets offered to weaner and grower pigs. Re-grinding barley fed as a mash resulted in 15% and 8.3% improvement in feed use efficiency for weaners and growers, respectively.

Program Two Highlights

Subprogram 2D, 'Improving sow reproduction and longevity', led by Rob Smits of Rivalea, arguably had the most new and innovative research projects in the Pork CRC, with 33 projects commissioned since 2005-06, with some continuing into the new CRC.

The main research areas were:

- Improving sow longevity and lifetime sow performance
- Investigating the cause and impact of differences between gilt and sow progeny
- Investigating the potential for a new approach to breeding management through inducing lactational oestrus

- Alleviating the costly impacts of summer/seasonal infertility

Project 2D-104, 'Management strategies to maximise sow longevity and lifetime performance', a completed collaboration between CHM, SARDI and Rivalea, has considerably improved understanding of what contributes to poor longevity and why certain sows are at risk of early exit from the breeding herd. Modern sow genotypes are larger and leaner and we have now established that sows of a certain size and body condition are more likely to be removed from the herd for low productivity and increased mortality.

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Professor Frank Dunshea, Manager, Pork CRC Program Two: 'Improving herd feed conversion efficiency'.

Program Two Highlights ...continued from page 2

The project found that mating weight of gilts and parity 1 sows are well correlated to body protein mass and body fatness increases with parity.

Further, in modern genotypes rate of body fat deposition proceeds with parity at only a slighter higher rate than protein deposition.

Therefore, feeding sows to increase fatness and body condition mostly increases sow size, without considerably increasing P2 backfat.

Sow productive lifetime is maximised when gilts and sows have a certain amount of body protein mass and a minimum level of body fatness.

Exceeding or failing to achieve these thresholds causes productivity and longevity to decline.

The project provides the information and predictive equations for producers to monitor their own genotypes and identify sows at risk of culling.

Adjusting lactational demands on the sow is another outcome resulting in improvements in litter size and sow productivity.

As the industry moves further into group housing and new lactation-mating management systems,

2D-104 will help determine how sows are appropriately fed and managed.

Project 2D-120 and 2D-129, 'Inducing ovulation during lactation', examined the potential of a system for inducing oestrus in lactation, allowing the flexibility of independent weaning and mating.

The outcomes have confirmed that oestrus can be induced in more than 90% of sows while lactating and that, when mated, their reproductive performance compares favourably with control sows weaned and mated at first oestrus post-weaning.

A series of experiments examined the effect of litter separation, boar contact and hormone use to promote follicle growth. Litter separation improved induction success, but can negatively impact litter weight gain, so experiments were conducted to determine how litter separation could be reduced. Interestingly, a large proportion of sows had a spontaneous oestrus without litter separation and boar stimulation.

Projects 2D-107 to 2D-110, 'Addressing summer/seasonal infertility', investigated seasonal

infertility, which remains a complex and costly limitation to consistent pig production flows.

University of Sydney and University of Adelaide research showed that poor oocyte quality and insufficient progesterone support for the conceptus was associated with summer mated sows.

Nutritional strategies to improve oocyte quality and embryo survival have included betaine and omega-3 fatty acids.

Energy responses at the ovarian-utero level have also been investigated for effect on progesterone, embryo survival and litter size and conception rate outcomes.

A producers' guide, 'Seasonal Infertility in Pigs', was published in December, 2010, to describe how best to manage gilts and sows during summer and autumn to reduce infertility.

During the funding period, the impact of the breeding herd on HFC has been estimated at about 0.2-0.25 units or 16-20c/kg COP when improvements to breeder herd productivity lead to an attainable replacement rate of 40%.

Program Three Highlights



Heather Channon, Manager, Pork CRC Program Three: *'Enhancing capacity to deliver nutrients that promote health and well being through pork.'*

Establishing the natural human health advantages of pork, verifying them and then using the information in the marketing of fresh pork was always going to be a big ask.

However, Pork CRC Program Three has managed to make some positive inroads into showing that 'there's something about pork'.

Outcomes and highlights included:

- First human research by the Australian pork industry to understand the benefits of consuming pork as part of a meal for weight loss, satiety, thia-

mine status control in overweight/obese type 2 diabetics and iron status of young women.

- Three published papers in highly cited international human nutrition journals arising from projects in Program 3A.

- Strengthened links with human nutritionists.

- Evidence obtained that regular consumption of lean fresh Australian pork may improve body composition without adversely affecting risk factors for diabetes and cardiovascular disease after only three months of eating pork (compared with habitual diets), without restricting energy intake or changing total protein and total meat intake.

- Pork in a healthy diet is equally effective to lean beef or chicken for its effect on satiety and release of appetite-related intestinal hormones and insulin.

- Demonstrated that lean pork is a valuable alternative protein source within higher protein dietary patterns that can be used effectively for weight and diabetes management. Relative to a high carbohydrate diet, a high protein, high pork diet had a significantly greater thiamine intake and improvement in thiamine status of overweight/obese type 2 diabetics.

- Consuming a higher protein, high pork diet, together with resistance exercise for 16 weeks, was most effective for weight loss, fat loss, improvements in body composition and insulin sensitivity in overweight/obese type 2 diabetics, compared to a high protein diet without resistance exercise, or with a high carbohydrate diet without resistance exercise.

- Consumption of pork meat by young women maintains haemoglobin levels to the same extent as low-dose iron supplementation and enhances the feeling of wellbeing.

Feeding Formulas

Determining appropriate feed formulations and feeding protocols for cost-effective production of a range of consumer preferred trace mineral enriched fresh pork products was also a challenge faced by Program Three.

Its delivery targets included demonstrating bioavailability and bio-efficacy of trace mineral enriched pork products produced using cost effective trace mineral enrichment with organic dietary trace minerals.

Outcomes and highlights included:

- Feeding pigs an organic selenium supplement increased muscle selenium content of pork in a linear manner compared to pigs fed a control or non selenium diet, without affecting growth performance, carcass composition or meat quality.

- The bioavailability and efficacy of muscle bound selenium resulted in reduced incidence of early stage bowel cancer compared with supplementing rats with inorganic or organic selenium.

- Selenium enriched pork was found to be effective in preventing pre-neoplastic lesions in rats, an early biomarker of colorectal cancer.

- Iron content in pork has been shown to be moderately correlated to haemoglobin measures on live pigs, indicating potential use as a selection criterion for increasing iron levels in pork.

On The Road Again

Pork CRC CEO, Dr Roger Campbell, was the first 'cab off the rank' at the APL/Pork CRC Roadshow in Perth on Friday, October 7.

After explaining directions for the new CRC for High Integrity Australian Pork, he noted that producer involvement in the new Pork CRC was critical and although uptake and interest was already good, it could still be enhanced.

"One way to do this is to get more producers involved in the R&D and decision making processes of the Pork CRC and the new R&D model adopted by the Pork CRC is set up to achieve this," Dr Campbell said

"Be assured, the new Pork CRC intends to take Australia and our producers ahead of the rest of the world by differentiating Australian pork on the basis of how it is produced and by hopefully enjoying such obvious benefits of an extra two piglets per sow from our research into inducing ovulation during lactation," he told the largely producer-based audience.

After his presentation and while speaking with a handful of producers and researchers about the new Pork CRC and what it would likely mean for the Australian pork industry, Dr Campbell made the following points:

- To compete globally, producers and researchers needed to think globally.
- Even those producers supplying only into the

domestic market had to implement world's best practice in everything they did on-farm.

- Producers needed to be aware of changing community expectations, in terms of pig welfare and should seek out, via bodies such as the Pork CRC, the best available science to help them economically meet and preferably exceed, those consumer expectations.

- Producers should look to the Pork CRC and the intellectual firepower of the researchers it supports, to help them remain sustainable and profitable.

- Producers should be assured that the new CRC for High Integrity Australian Pork would be proactive, wherever possible, rather than simply reactive, to industry challenges and needs.

- Evidence of the Pork CRC's increasingly proactive response is its globally ground breaking research into the management and mating of sows during lactation, while working towards confinement free sow and piglet management, now entrenched as Program One in the new Pork CRC.

- The functional and well established Pork CRC and APL relationship remained a key driver in the new Pork CRC and this proven model encouraged producers and levy payers to have input into science that will make a difference to their bottom lines.

Other speakers at the Perth APL/Pork CRC

Roadshow, which followed similar events in Queensland and SA and preceded those in Victoria and Tasmania, included: Professor Paul Hughes of SARDI on enhancing reproduction performance of female pigs; Rob Hewitt of CHM Alliance on value chain mapping and boar taint; Dr Darryl D'Souza of APL on the effects on sow welfare and reproduction of group housing during gestation; Dr Rob Wilson of Pork CRC on nutrient management; Karen Moore of DAFWA on improving whole feed conversion, in particular by using Improvac; Hyatt Frobose of University of Melbourne on lecithin supplementation and pork quality.

Hyatt, a visiting Fulbright scholar from Kansas State University, USA, was supported in his visit to WA by the WA Agricultural Produce Commission.

Diary Dates

Nov 26: Pork CRC Annual Conference, Adelaide. Contact Suzanne Merry, Tel 08 8303 7685

Nov 27: Pork CRC/APL Student Workshop, Adelaide. Contact Suzanne Merry, Tel 08 8303 7685

Nov 27-30: APSA Conference, Adelaide. Contact Karen Moore, Tel 08 9368 3636

Jan 16 - 27: Science & Practice of Pig Production, Roseworthy, SA. Contact Paul Hughes, Tel 08 8303 7603



Paul Ridgeway and Richard Evison, both of Westpork, with Pork CRC CEO Dr Roger Campbell and Professor Paul Hughes of SARDI had a chat after the Perth Roadshow. Please note places are filling fast for Pork CRC sponsored production course at Roseworthy run by Professor Hughes. Book your place with him by October 31.



Three generations of Howards, prominent pork producers from Wannamal, WA, attended the APL/Pork CRC Roadshow, with 11 month old Emmett seemingly wondering what all the fuss is about, as he's nursed by grand-father Errol, while dad Brenden and mum Ashlee look on.

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