KNOWLEDGE TRANSFER ACTIVITY

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BPEX KT TEAM IN ACTION

Identifying shortfalls in performance and bringing knowledge and applying practical solutions to resolve them has been central to the work of the BPEX KT Team. Working in partnership with pig veterinary groups, including Frank Tobin Holmefield Farm Services, Garth Partnership, Larkmead Veterinary Group and George Veterinary Group, BPEX KT Managers have targeted sow productivity, piglet mortality and growth performance on individual units where there is real scope for improvement. Clearly the opportunities are there to be had as demonstrated by the difference in physical performance between average, top third and top 10% of producers ***(Table 6)*** and it is the job of BPEX KT Managers to ensure that knowledge and workable solutions reach those that can benefit.

The following are a few of the case examples where KT input has been successful in delivering performance benefits to commercial pig units.

Table 6 Overall physical performance

	Average	Top third	Top 10%
Pigs reared / sow / year	21.64	24.25	25.89
Pre-weaning mortality (%)	12.61	11.10	10.31
DLWG rearing herd (g)	453	465	404
DLWG finishing herd (g)	673	753	746

Source: Agrosoft Ltd.

Sow productivity

Problem:	On a number of units, gilt AI and reproductive performance were considerably below the national average.
Background:	The majority of units were synchronising their gilts and on some units feeding methods were altered to try to ensure equal and adequate uptake.
Action:	AI audits were completed on the units; this included close monitoring of AI storage and handling from delivery to the service area, to the point of insemination. Boar contact and heat detection were reviewed to improve gilt conception. Using the 1-3 pregnancy detecting scoring system, a high correlation between score and conception was revealed (89% of the gilts that scored a 3 were in-pig, 83% of those scoring below 3 subsequently returned to service).
Result:	Following the audits the units now: • Provide a suitable environment for the AI doses, from delivery through to insemination, to maintain viability • Have service areas designed to ensure ease of operation, minimise stress and control sow/gilt exposure to boars • Only use active and aroused 'chatty' boars to stimulate gilts and sows • Do not feed the boars as they are moved into the service area or immediately prior to use • Provide better physical stimulation of the sows and gilts while serving • Allow 'extra' time and patience with gilts, ensure accurate heat detection and do not serve in pairs Overall conception and farrowing rates have improved. One example is a unit where conception rates have increased from under 70% to over 86%.

Boar stimulation

Sow productivity *(continued)*

Problem:	**The farrowing rate on 16 units was below the national average.**
Background:	By working in co-operation with veterinary practices and marketing groups, producers from the 16 units have looked at ways of improving their farrowing rates.
Action:	An independent review of oestrus detection skills, insemination procedures and AI facilities was undertaken on all the units to highlight areas where improvements were needed.
Result:	AI facilities have been re-designed to provide an effective environment for AI, as well as efficiency of operation, saving valuable time. Farrowing rates have improved by 8% and litter size by 0.5 pig/litter.

Problem:	**A number of units were experiencing erratic farrowing rates, ranging from 65-85%.**
Background:	The availability of good farm computer records enabled the units to uncover a number of trends including increased incidence of irregular returns, higher than average sow mortality and inconsistent and protracted weaning-to-oestrus intervals.
Action:	On review, irregular returns were linked with autumn infertility and the inconsistent and protracted wean to oestrus intervals were related to weight loss and P2 depletion during lactation. The dry sow area was checked to ensure sufficient space was available for lying and dunging, adequate feed delivery and water access and lighting. Post-service management of sows was improved so moving or mixing was not required during the critical period of implantation and additional feed provided during autumn and winter to compensate for increased energy demands.
Result:	Lighting now provides the appropriate day length and light intensity ie greater than 40 lux. Feeding protocols and diet specifications are being prepared, including the addition of a mycotoxin binder, with the aim of encouraging higher voluntary feed intake.

Lights fitted in a service tent

Sow productivity *(continued)*

Problem:	A breeder/feeder unit was performing poorly but the cause of this was not obvious.
Background:	The unit, of normal UK health status, had seen its conception rate drop to an average of 65-70% over the last two years.
Action:	Following bile sampling, the mycotoxin Zearalanone was found to be present in sows at high levels. A leaking feed bin in the dry sow feed system was thought to be the source of the problem, as moisture was entering the bin leading to fungal growth. A mycotoxin binder was included in the dry sow feed for a period and the bin has been repaired.
Result:	Recent bile tests show that there is now no evidence of the mycotoxin being present in sows and the conception rate has increased to an average of 85-90%.

Reducing mortality

Problem:	Farrowing house production figures were stagnating and at best only reaching the national average.
Background:	With the condition of crates and floors deteriorating, the 290-sow breeder/feeder producer decided to update facilities.
Action:	16 new fully slatted farrowing crates with heat mats were installed. Each farrowing house had eight new crates fitted alongside the old crates to monitor performance for six months.
Result:	Mortality was 20% in the old crates and fell to 8% with the new crates, resulting in more than one extra piglet/litter weaned.

	National average	Before new crates	After new crates
Born alive	10.9	10.9	10.9
Weaned	9.7	8.7	10.0
Mortality (%)	10.9	20.0	8.0

As a result of these improvements the producer now has the confidence to fully refurbish both farrowing houses. The improved performance will allow this investment to pay for itself in five years. There is also the bonus of improved energy efficiency and reduced labour requirement (around 3 hours per week) for maintenance and power washing.

Reducing mortality *(continued)*

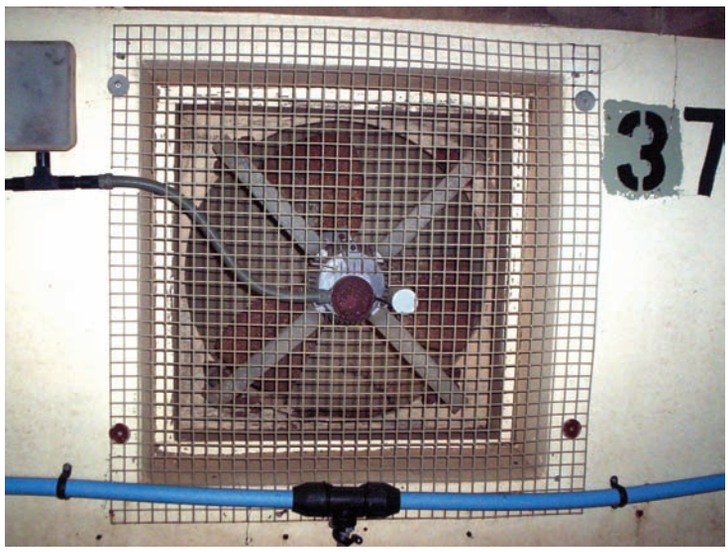
Problem:	**Despite excellent results for conception rate, litters/sow/year and total live born(averaging 14.2 piglets) pre-weaning mortality was high (16.8%).**
Background:	The 450-sow unit has 2 systems: part-slatted farrowing crates with enclosed creep areas and fully slatted crates with plastic floors and heat mats. Pre-weaning mortality was 18.4% on the part slatted floor, 15.3% on full slats.
Action:	Overlays and low viability were the most common causes of piglet death. The creep area was assessed and altered to reduce draughts. To improve viability, split suckling was introduced and piglets were creep-trained. Paper is now used behind the sow to help piglets dry off quickly. A watering system was fitted for the piglets and the unit has trialled a sugar-rich drink and yogurt to help boost the energy levels for smaller piglets.
Result:	As a result of the changes mortality has improved by 2 to 4 percentage units. The unit has also re-valued good stockman skills at this important time.

Split suckling

Problem:	**How does genotype and season affect pre-weaning mortality?**
Background:	Two outdoor units reviewed their data relating to pre-weaning mortality and are looking to see if any management changes can be made to improve the figures.
Action:	The weight of the dead piglets exceeded 1-1.2 kg; birth weight was therefore not thought to be the cause of mortality. Death rate in male was higher than in female piglets. Those born alive were checked to see if they had sucked and whether or not they had been crushed. This showed that despite having good birth weights, 63% of those born to a gilt did not manage to feed; this pattern was not seen in older sows. The implications of hut size on mortality are also being investigated.
Result:	This project is ongoing; so far advice being considered includes: • Reducing group sizes to allow better management of sows • Depth of hut: relatively shallow depth may negatively affect sow movement leading to overlaying • Improvements to strawing up to reduce the risk of chilling • Fender management to reduce the number of piglets being chilled and 'lost'

Reducing mortality *(continued)*

Problem:	**A unit was experiencing fluctuating EP scores, identified by BPHS, (high score of 11.25), and problems with pleurisy (38% acute incidence).**
Background:	The current performance was: 6.7% mortality, FCR 2.67 and a growth rate of 739 g/day from 40 kg to finish at 115 kg liveweight. Pigs were brought in from a variety of sources.
Action:	Data recording was changed from individual batches to specific buildings. Internal and external temperature was monitored. Following a simple check, the required ventilation rate was 65,000 m^3/hr. However the fans were only capable of 42,000 m^3/hr; this issue was addressed. In addition, the pigs now come from a single source.
Result:	Pig health status improved with EP levels decreasing to 3.4% and pleurisy dropping to 6% as a result of the single sourcing protocol. Recommendations for altering the building have been taken on board and the health status will continue to be monitored when the adaptations have been completed.



Improvements to fans delivered target ventilation rates

Outdoor production

Problem:	**Exposure of outdoor pigs to extreme temperatures.**
Background:	The temperature within a hut can rise significantly in hot weather and have a negative impact on performance.
Action:	Half the huts on a unit were painted white. The internal temperature of these conventional huts (semi-circular huts, corrugated sheets, plywood front and backs, offset door, rear vents, un-insulated) was recorded throughout July and August. During August/September, insulated huts were included in the study.

Result:

	Painted white	**Unpainted**	**Insulated**
Jul/Aug – Average temperature above 30°C	9 days	27 days	Not tested
Jul/Aug – Maximum temperature	37°C	47°C	Not tested
Aug/Sep – Average temperature above 30°C	4 days	14 days	10 days
Aug/Sep – Maximum temperature	34°C	39°C	37°C

The internal temperatures were found to be lower in the painted huts than in both the unpainted and insulated huts. Keeping the internal temperatures down is important as heat stress can cause unnecessary suffering and reduced productivity; pigs subjected to high temperatures will have reduced growth rates (by up to 50 g/d) and in the breeding herd farrowing rates could decline by as much as 25%, with litter size showing a small drop as well.

By painting huts white, internal hut temperatures, and thus heat stress, were reduced

Outdoor production *(continued)*

Problem:	**Iron deficiency was limiting outdoor piglet performance.**
Background:	The limited reserve of iron a piglet is born with is insufficient for the animal to thrive and may lead to anaemia. Although it is thought that outdoor piglets may source iron from the soil, this may not always be the case.
Action:	A trial was set up to inject half the batches of piglets on a unit with iron and to treat the other half as normal (no supplement).
Result:	Weaning weights were recorded. Results showed a 0.35 kg increase in weaning weights by the piglets injected with iron. The trial will be continued to see if the 5% increase in weaning weight is a consistent advantage.

Half the batches of piglets were injected with iron

IMPROVING BREEDING HERD PERFORMANCE

A key objective for the British pig industry is to improve breeding herd performance. Improvements in sow productivity can be achieved by a combination of measures, which include reductions in non-productive days through better management of insemination, adoption of higher standards for AI, timely introduction of gilts and culling of barren sows, combating seasonal infertility, reducing piglet losses before weaning, protecting high health status, and having in place trained, skilled, rewarded and motivated stockpersons.

Critical to success are:

- Fit, fertile and fecund sows and gilts in heat
- Delivery of fertile sperm in the right number, at the right time and in the right place, to guarantee conception and the maximum number of viable piglets born alive
- Minimum number of non-productive or empty days
- Maximum number weaned and ultimately finished

The collective contribution and responsibility of farm staff, veterinarians, geneticists, and nutritionists is to ensure that these components are in place. The full potential for reproductive performance can only be exploited when disease control, health and welfare management, genetics, nutrition and feeding and staff training are taken into account.

The BPEX AI Standard

Investment in the gilt and sow is wasted if the quality of the semen is substandard because the boar is insufficiently fertile, or in the case of artificial insemination (AI), protocol standards have not been followed between collection of the ejaculate and insemination of the sow.

The AI stud is responsible for the selection and training of boars, and for maintaining boar nutrition, health, husbandry, housing, age and work load. The BPEX Standard for semen quality in Pig Artificial Insemination (AI) Centres was launched in 2006. The Standard provides for assurance audits, and a reference laboratory provides an independent assessment of performance against strict production standards. The standards cover semen collection and extender protocols, quality assessment,

temperature control, recording and traceability. The breeding companies that operate to the BPEX Standard are ACMC, Hermitage Seaborough, JSR, PIC and Rattlerow.

In the first full year of the BPEX Standard, the participating studs operated to the principles of the standards. The reference laboratory tested semen doses from all studs, every month, and the specified targets for semen doses in terms of counts, motility and morphology were achieved. Auditing was delayed by the outbreak of Foot and Mouth Disease in 2007 but the audit visits have since been satisfactorily completed.

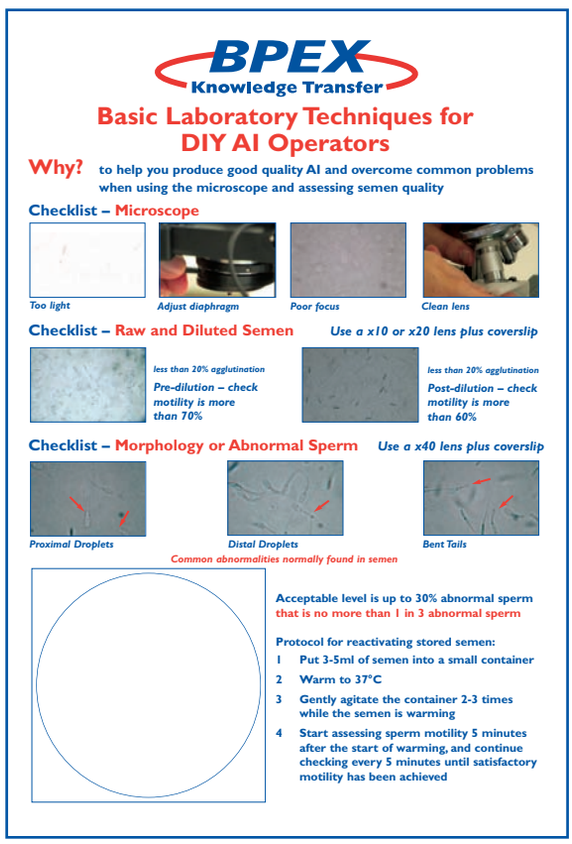
The final contribution of a boar stud is to deliver the semen order within a reasonable time, keeping the semen at or near 17°C. From the point of delivery, maintaining quality is the responsibility of the unit manager. Boar sperm are extremely sensitive to fluctuating temperature changes, both warm and cold. A temperature-controlled storage cabinet is essential for high AI success rates. Minimising temperature fluctuations and maintaining good hygiene through to insemination are critical to successful AI and sow reproductive performance.

Promoting best practice on-farm

Effective heat detection, accurate recording of oestrous cycles, and subsequent, well-timed matings or inseminations are critical to achieving high reproductive rates in the breeding herd. Farrowing rate and litter size are most closely related to the numbers of fertile sperm inseminated and the number and timing of inseminations. At least one AI must occur within 24 hours before the time of ovulation to maximise litter size and farrowing rates. Detection of standing heat is the key principle for the timing of insemination and conception rates.

The BPEX Knowledge Transfer team ran a number of successful workshops on improving reproductive performance in 2007. A set of Best Practice wall charts and advisory notes are available on request (01908 844734). The wall charts provide advice and highlight key areas for maximising reproductive performance when using AI. A DIY AI poster and short DVD have also been produced; they show basic laboratory techniques for assessing the quality of the boar's ejaculate prior to dilution and use, as well as a simple assessment of sperm morphology. This encourages the introduction of just some of the quality controls employed by the professional AI centres.

For further information, advice or assistance on improving the reproductive performance of pig herds or the AI Standards contact Angela Cliff: angela.cliff@bpex.org.uk or 01908 844744.



DEMONSTRATION GRANT / INNOVATION FUND

In 2007 BPEX launched the Demonstration Grant Scheme. The scheme offers pump-priming support to producers for projects that will help new ideas get off the ground and demonstrate clear business benefits to other producers. It is hoped that this will then benefit the whole industry and encourage much-needed investment which will help the British pig industry regain its status as a world leader.

The scheme is ideal for ideas where there is confidence in the potential of a new system, but practical development work is needed to prove its potential on working pig units. Each of the successful projects will provide performance comparisons with regard to old and new systems and will be used as case studies.

In 2007 six grants were awarded, to the total sum of £44,700.

- The true economics of heavier pig production
- The practical application of reduced and alternative creep feeding in the first two weeks post weaning
- Testing the feasibility of using water-based medication instead of in-feed medication
- The development of a handling and weighing system, incorporating the Pharmweigh auto drafter, to select slaughter weight pigs more easily in an outdoor finishing situation
- The development of an outdoor wet feeding system for individual farrowing paddocks and comparison with existing dry feeding
- Making optimum use of the management information provided through the installation of the Q Scan visual imaging system for monitoring growth rates

The BPEX KT Team will report the findings from these projects as results become available.

The scope of the scheme was extended in 2008 and is now known as the Innovation Fund. This allows a wider remit, opening up the possibility of funding to more people. The budget for the scheme is £200,000 and a number of application periods will be spread over the year. Producers are encouraged to speak with their local KT manager to discuss ideas. Applications for funding will be judged on innovativeness, industry need, value for money and industry impact.

NETWORKING

Workshops

The KT Team have continued their workshop programme during 2007/08, providing farm staff with the opportunity to update their knowledge on specific issues and discuss improvements that could be implemented on their units. The workshops aim to combine practical observations and experience with recent research to identify some of the simplest, but most effective ways to improve performance.

The spring workshops (farrowing house management) attracted over 400 stock people in total, representing around 105,000 sows. The autumn workshops (establishing the weaned pig) did not attract as many stockmen; however, the number of sows represented increased to just below 124,000

sows, representing over 25% of the British herd.

Feedback suggests that there is value not just in the knowledge transfer and pooling of ideas, but also in meeting other stock people, who can often become isolated on their units. Those who missed a workshop in their area may obtain information packs specific to each workshop through the BPEX website, or by contacting the KT Team.

The workshops delivered over the past year cover a broad range of topics. Some highlights and take home messages from them are covered below.

Autumnal reproductive problems facing outdoor producers

Ideas for how to manage autumnal reproductive failure were presented, leading to discussions on health, late abortions, pest control and gilt replacements. As a result some units have now introduced:

- Portable rechargeable lights in the service tents
- Reproductive tract checks on cull sows
- Bacterial swabbing to check for leptospirosis

Optimising conception throughout the seasons workshop

The sow's physiology at weaning, the oestrus cycle, establishment of pregnancy and AI management were explained. A debate on good and poor service area design and function followed. Real problems were brought to the table, so that the group could offer practical solutions. These included: high temperatures, long day length, bright light and sunburn, and humidity in the summer. Fluctuating day and night temperatures, rapid rate of decline in day length, and lower light intensity were noted as autumnal problems.

Establishing the weaned piglet

These workshops focused on the factors that arise at weaning and included discussions about how to minimise losses. Some of the key take home messages were about preparing the piglet for weaning and what to do in the first week afterwards, including:

- Produce a heavy and healthy piglet
- Minimise the challenges and maintain health
- Provide the correct environment
- Maximise feed intake and growth as soon as possible
- Measure growth rate to ensure pigs are achieving their potential

Farrowing house management / piglet survival outdoors

These workshops focused on the following areas:

- How do you reduce stillbirths and facilitate the birth of strong piglets?
- How do you establish the newborn litter?
- How do you achieve good weaning weights?

The physiology of the sow and the farrowing process were discussed before the group debated best practice and management in the farrowing house. For the outdoor producers, the workshop reflected the very different practicalities of managing piglets to optimise survival. The key take home messages from these workshops were on how to increase piglet survival by ensuring that the sow and unborn piglets are well-prepared for farrowing and that the farrowing house environment is correct.

Improving the efficiency of the grower / finisher herd

The principles of growth efficiency were presented at these workshops, followed by simple checks and changes that could be implemented on farm. Although the topic is about increasing efficiency overall, the main topic of discussion revolved around improving feed efficiency on-farm. Producers left the meeting prepared to carry out a number of checks on their units, including:

- Feeder space and design
- Feed quality
- Storage/spillage of feed
- Availability and quality of water
- Fighting amongst animals
- Unit hygiene and building temperatures

Producer groups

The KT Team increased its activity with producer groups during 2007/08, establishing a number of groups around the country. The groups provide a forum for sharing ideas and networking. Whether they are referred to as self-help groups, pig discussion groups, benchmarking groups, or pig clubs, the principles are the same:

- Members get to find out what other farmers are doing
- Members can learn from each other's experiences - good and bad
- Members have the benefit 'of a pair of fresh eyes' looking at their performance

By bringing together a group of producers, the KT Team can help all members of the group access years of practical experience, in addition to bringing in industry experts. The Team have noted that the need and enthusiasm for these groups has become even greater during the challenging times of the last year as they provide producers with the opportunity to gain support and advice from each other.

The groups that the KT Team have been involved with have been established around veterinary practices or groups of like-minded people in a region. The KT Team are happy to co-ordinate and support these groups but it is important that each group takes responsibility for the content. With all the groups the focus is on what can really make a difference to performance; such as practical changes, as opposed to simply benchmarking. However, general figures do help group members to identify their own strengths and weaknesses. ***Table 7*** illustrates just one area where improvements have been seen since the groups were established and changes were implemented.

Table 7 Improvements since workshop groups established

Group	Month (annual figures to date)	Pigs/sow/year	Improvement
1	March 2007 November 2007	19.95 21.18	+1.23 pigs/sow/year
2	December 2006 June 2007	20.63 21.83	+ 1.20 pigs/sow/year
3	January 2007 June 2007	22.86 24.62	+1.76 pigs/sow/year

Lis Ravn has set up two pig clubs with the Garth Partnership, Yorkshire. Both consist of a small group of farmers with similar aims and needs. The groups rotate the sessions around the farrowing house, service house and feeding herd management, to ensure a range of production areas are covered and so that the meetings remain interesting and worthwhile for those attending.

In the South Helen Thoday is working with George Veterinary Group, Larkmead Veterinary Group, St Davids Vets and Thames Valley Cambac. These groups discuss their production systems and share information about Key Performance Indicators.

Despite being relatively small in terms of pig numbers, Angela Cliff has started two groups in the central region, Hodnet and Nottinghamshire. Both groups started with farm case studies and set their own agenda for future meetings by focusing on their key areas of concern which include; understanding costs, land, gilt management, staff and mortality.

In the East, Kayt Johnson is involved with a number of established groups, including the Essex benchmarking group and various pig discussion groups. She is also working with many of the large integrated businesses in the region.

Training groups

Several groups have been established to look specifically at staff training. It is widely accepted that training groups have a number of benefits including access to:

- More economical training
- More relevant training
- Funding

They are also of benefit by providing regular training opportunities to staff in a region so that people can become more involved with staff development on a routine and continuous basis.

There are a number of training groups across the country, eg Hampshire, Cornwall and East Anglia. 2007 saw these groups pull together to provide relevant and structured training to their members. As an example, the East of England Pig Training Group (EEPTG) ran a series of workshops including veterinary medicine certificates of competence and various modules that are part of the Stage 2 Pig Husbandry Skills certificate. Completing the veterinary medicine qualification is a prerequisite of Pig Husbandry Skills and as result of their hard work, EPPTG now have over 60 people with this first qualification and are keen to move onto the next module. Their work in this area has not only resulted in staff achieving qualifications, many which are the first they have had, but has left them with a taste for more and increased confidence. As with many people working on-farm there is often a severe underestimation of their own abilities and skills. However, members of EEPTG that have sent staff to the workshops are finding that their staff have increased confidence and self-belief, all of which have helped them become more productive in their daily routines.

Following on from this success, staff in the southwest are also realising the benefits of a structured routine. Each month, pig producers in the region can send their staff to a workshop that will help improve awareness and knowledge on specific pig husbandry topics. Workshops are based around a module in the pig husbandry skills Certificate of Competence.

PIG DEVELOPMENT CENTRE

The BPEX Pig Development Centre is a collaboration between the University of Leeds, University of Newcastle and Veterinary Laboratories Agency (Thirsk).

Its purpose is:

- To act as a knowledge hub for BPEX R&D and for the KT Team
- To assist development of R&D strategy
- To conduct and coordinate applied research and development work of direct relevance to the British pig industry
- To support the KT Team in dissemination of research results and best practice to industry

The Pig Development Centre meets monthly to discuss development of R&D and KT strategy and exchange information with the KT Team. It has input into the BPEX R&D Strategy for Pig Health and Welfare, and is developing a research strategy for environmental issues. Research projects are in progress on evaluation of new genotypes and effects of growth rate and health on meat quality (see separate specific reports). Following approval by the BPEX Pig Technical Committee, new projects are planned for 2008 on the evaluation of PCV2 vaccines, on the effect of production environment on prevalence of zoonotic agents and on cost-benefit analysis of health management procedures on farm.
www.pigdevelopmentcentre.co.uk

BPEX
Pig Development Centre

PORK CHAIN UNIT / PROCESSING SECTOR KT

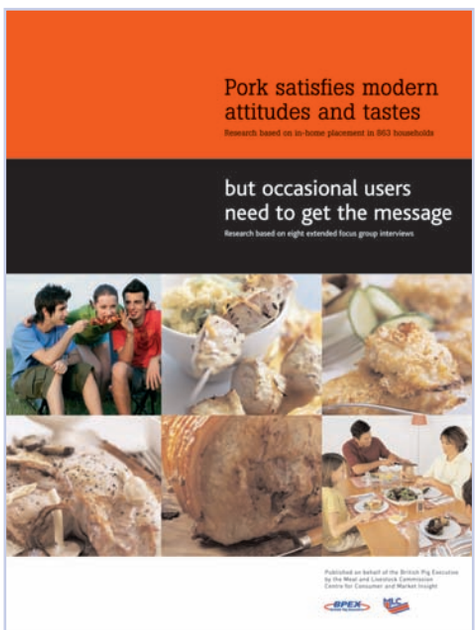
The Pork Chain Unit (PCU) is based at the University of Bristol's Veterinary School, and is the centre for BPEX KT R&D activity in pork and bacon quality. Improving the overall level of quality and reducing variation are vital for future sales of pork and to ensure that British products qualify for premium quality status wherever they are sold. Pork quality traits such as tenderness and flavour are affected by many factors during production and processing so understanding how they can be controlled requires research and then effective transfer of research results to industry.
The establishment of the PCU in October 2006 recognises meat quality as a top priority for BPEX.

Research priorities of the PCU are directed by the Pork Chain Advisory Group made up of representatives from the main pig processing companies, a breeding company and a feed company. This industry involvement ensures that commissioned research is focused on key issues and results can quickly be adopted.

BPEX funds the post of PCU Manager (Silvia Nicolau-Solano) whose main roles are knowledge transfer to processors and producers and coordination of projects. The PCU Manager works in conjunction with other BPEX and university staff to deliver the PCU objectives. Factsheets are used to communicate information on key topics and subjects and have so far been written on the following subjects:

- Opportunities for improving the quality of pork
- Factors affecting killing-out percentage
- Importance of muscle pH to meat quality and equipment for measuring it
- Carcase chilling systems
- Pork maturation to improve tenderness

The PCU team has also been involved in visits to processing companies to identify issues where technical support would be useful. Key areas in the processing plant which affect quality are lairage and chilling/maturation. Another role of the post is to make the industry aware of the facilities and expertise at Bristol which can benefit their businesses eg the abattoir, taste panel suite and microbiology laboratories.



Research projects initiated by the PCU include a large consumer project, which surveyed the attitudes to pork of regular users and occasional users.

Other research projects initiated during the year have examined the role of pig growth rate as a factor underlying variation in tenderness and flavour; and the dietary control of boar taint, an odour/flavour found in a proportion of entire male pork carcases.