

## ***NEW PIG INFORMATION from BSAS***

### **PIG RESEARCH FEATURES**

**April 2008**

Please find attached a series of features that have been prepared to assist the understanding of scientific papers presented at the recent BSAS Annual Meeting; they have been prepared from the summary papers submitted by authors.

These features have not been checked by the author.

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## **Later weaning not linked to improved piglet health**

**BSAS Paper 10**

Later weaning can significantly boost piglet performance during the immediate post-weaning period, but it will not improve clinical health status. That was the finding of a study – the AGEWEAN programme – to investigate the effects of weaning age in both an indoor- and outdoor-lactation environment on the biological and economic efficiency of production where diets contain no antibiotic growth promoters (AGPs) and include lower levels of copper and zinc.

The immediate post-weaning period in pigs is often characterised by a reduced and variable food intake, digestive disorders and poor growth and development. Weaning pigs at a later age has been suggested as an approach to reduce the potentially negative effects of the AGP ban on the national herd.

The results of the research were presented to delegates at the British Society of Animal Science's annual conference by Newcastle University's Helen Edge.

Involving piglets at six separate experimental sites in the UK, the three weaning age treatments were four weeks, six weeks and eight weeks. All progeny were monitored to weaning, at least 50% were monitored to 30kg live weight and at least 25% were monitored through to slaughter weight.

“And there were significant differences between the three weaning age treatments in terms of daily live weight gain (DLWG), feed intake and feed conversion efficiency (FCR) during the immediate post-weaning period. Pigs weaned at eight weeks of age had significantly higher DLWG and feed intakes. But their FCR was poorer, possibly due to them being offered a lower quality diet appropriate to their age,” explained Dr Edge.

Conversely, from 30kg to the point of slaughter, pigs weaned at four weeks of age had significantly higher DLWG and feed intake than pigs weaned at either six or eight weeks of age. There was no significant difference in FCR.

There were significant effects of weaning age on the back-fat thickness of the pigs at the point of slaughter. And in terms of overall lifetime performance, pigs weaned at four weeks of age had a significantly higher DLWG when calculated from birth to slaughter.

“While there was no effect of weaning age on the number of pigs requiring veterinary treatments from weaning to slaughter, there was a significant increase in the number of four week weaned pigs being removed from trial during this period,” added Dr Edge.

“Overall, when physical performance was considered over the period from birth to slaughter, there were no benefits of later weaning.”

Presented to the British Society of Animal Science Annual Meeting, March 31 to April 2, 2008, Scarborough, UK.

Full details: Edge H, Breuer K, Hillman K, Morgan C, Stewart A, Strachan D, Taylor L, Theobald C, Edwards S: “AGEWEAN – The effect of weaning age on growing pig health and performance in the absence of antibiotic growth promoters.”

For further information visit [http://bsas.org.uk/Meetings\\_&\\_Workshops/](http://bsas.org.uk/Meetings_&_Workshops/) or contact BSAS on 01314 454508

## **It's possible to breed for improved piglet pre-weaning survival**

**BSAS Paper 11**

Breeding could be the key to improved piglet pre-weaning survival in alternative farrowing systems to the crate. A recent study, carried out by the SAC, Newcastle University and Grampian Country Food Group, has shown that there is potential to breed for high survival in alternative farrowing systems.

“Recent estimates of total pre-weaning piglet mortality range between 16% and 19%,” the SAC’s Emma Baxter told delegates at this year’s British Society of Animal Science annual conference. “A different approach to effectively address piglet survival is needed. Genetic breeding programmes implemented in alternative farrowing systems could prove a viable option,” she said.

To test this theory, behavioural and physiological indicators of pre-weaning piglet survival were measured on both gilts and their piglets in a genetic selection group bred for high (postnatal) survival (HS) and a control group (C) farrowing in indoor loose-housed and outdoor farrowing systems in a two-by-two design. The gilts were offspring from a previous generation selected for survival traits and bred under outdoor conditions.

In the outdoor environment total mortality tended to be higher in the control litters than the high survival litters – 18% compared to 12% – and this tendency was even lower in live-born mortality at 13% compared to 10%. In the indoor environment there were no significant differences in either total mortality or live born mortality.

Regardless of environment or genotype, important indicators of prenatal survival were body shape and size, farrowing birth order, and placental efficiency. Birth weight and behavioural development were the most important indicators of postnatal survival and, although indicators were independent of environment, there were genotype interactions with temperature and time to udder as survival determinants.

Gilt behaviour affected piglet postnatal survival. Piglets that died had mothers that were

more careless with their posture changes, crushed more and were more aggressive. When comparing survival indicators at a litter level, regardless of environment, the control gilts showed more crushing incidents – both fatal and non fatal. In the indoor environment, high survival gilts were more aggressive towards their offspring and were the only genotype to show savaging – 40% of the high survival indoor gilts mouthed or bit piglets.

“The mortality results in the indoor environment illustrate the genotype by environment interactions and the potential to further improve survival,” explained Miss Baxter.

“Indicators of prenatal survival were generic across systems, with piglet shape being the most important survival indicator.

“Postnatal survival indicators included birth weight and behavioural development,” she added. “In both systems, control gilts showed more crushing behaviour than high survival gilts. However, there are potential undesirable side-effects of selecting for high survival gilts in the indoor system, as they showed heightened aggression towards their piglets.”

Presented to the British Society of Animal Science Annual Meeting, March 31 to April 2, 2008, Scarborough, UK.

Full details: Baxter E, Jarvis S, Sherwood L, Farish M, Robson S, Smurthwaithe K, Roehe R and Edwards S: “The influence of genetics and environment on indicators of piglet pre-weaning survival.”

For further information visit [http://bsas.org.uk/Meetings\\_&\\_Workshops/](http://bsas.org.uk/Meetings_&_Workshops/) or contact BSAS on 01314 454508

**'Active' and calm sows are  
less prone to crush their piglets**

**BSAS Paper 12**

Less 'active' sows were more prone to crushing their piglets in a recent trial that looked at the link between sow behaviour and their history of piglet crushing. That was just one of the unexpected findings of a study, carried out at Writtle College in Essex, that compared the behaviour immediately post-farrowing of sows with a history of piglet crushing and those without a single recorded mortality due to crushing.

The crushing of piglets by the sow is the main cause of pre-weaning mortality and has been reported to be responsible for up to 80% of piglet deaths. Studies have identified that sows maintain some stable behavioural traits over parities, for example response to a piglet scream test, and sows with a history of crushing piglets are more likely to stay inside a farrowing hut while housed outdoors.

"However, there is little information available regarding previous piglet-crushing history and its association with the behaviour of sows housed in farrowing crates," said Writtle College's Jonathan Amory, when he presented the findings of the trial to delegates at this year's British Society of Animal Science's annual conference.

"Sows with a history of piglet crushing showed different behaviour patterns to those that had never crushed a piglet," he explained. "And contrary to expectations, the latter group of sows made more transitions between sitting/lying and standing than the sows with a history of piglet crushing."

He said that this had previously been suggested to be the point at which piglets were most at risk from crushing. "But we now know that this may depend on other factors, such as how calm the sow is. In our study, sows with a history of crushing were more restless while lying compared with sows without a 'crushing' history. In fact, sitting up from a lying position was responsible for 24% of piglet trappings, which is higher than recorded by other researchers."

Although the sow's reactions to her piglets has previously been suggested to be an

important factor in piglet survival there was very little attention paid by ‘crushing’ and ‘non-crushing’ sows to their litter before or after posture changes, regardless of whether a piglet had been trapped.

“This might suggest that piglet behaviour might play a more important role in influencing the incidence of piglet crushing,” added Dr Amory.

Presented to the British Society of Animal Science Annual Meeting, March 31 to April 2, 2008, Scarborough, UK.

Full details: Ovink F and Amory J: “The relationship between the behaviour of sows and their histories of piglet crushing.”

For further information visit [http://bsas.org.uk/Meetings\\_&\\_Workshops/](http://bsas.org.uk/Meetings_&_Workshops/) or contact BSAS on 01314 454508

**‘Stressed’ pigs must be fed top  
quality feed to maximise efficiency**

**BSAS Paper 14**

When pigs are ‘socially’ stressed, feeding according to the requirement for maximum protein growth produces the best biological performance and carcass composition. That was the finding of a trial, carried out by researchers at South Africa’s University of KwaZulu-Natal, to assess the efficiency of lysine utilisation by pigs subjected to different degrees of environmental stress.

Nutritionists formulate feeds based on the genetic potential of the pigs being fed. However, animals may not achieve this potential due to environmental constraints such as: disease challenges, environmental temperatures, feeder space, social stresses and stocking density challenges leading to a reduction in the potential growth rate.

“So we designed an experiment in which the potential growth of pigs was reduced to determine whether their nutrient specifications could be reduced concomitantly. Group size and floor-space allowance were used to reduce potential growth rate as it is well established that social stress is one of the most potent factors responsible for the inability of an animal to achieve its inherent growth potential,” trial leader Bianca Theeruth told delegates at this year’s British Society of Animal Science annual conference.

A total of 280 entire male Large White × Landrace pigs were used during the experiment, which was divided into two growth periods – from 40kg to 60 kg and from 60kg to 85 kg. In each period, pigs were given feed containing one of four dietary lysine concentrations.

The three stressors used in this trial as possible modifiers of the efficiency of lysine utilisation, were group size, feeding regime and floor-space allowance.

“For all group sizes, feed intake increased linearly as the dietary lysine content increased,” said Ms Theeruth. “And the linear increase in feed conversion efficiency with dietary lysine content was similar for all group sizes. However, at any dietary

lysine concentration, pigs housed in groups of eight had higher feed conversion efficiencies than pigs housed individually or in groups of four.”

Average daily gain increased linearly as lysine intake increased, this increase being the same for all group sizes. However, pigs housed in groups of four and eight grew slower than those housed individually for any lysine intake. Protein and lysine retentions were unaffected by group size, increasing linearly as lysine intake increased.

The efficiency of lysine utilisation was not impaired by group size and in all three treatments feed conversion efficiency increased linearly with dietary lysine content.

“The pigs with floor-space allowances of 1.72m<sup>2</sup>/pig consumed more and grew faster than pigs with floor-space allowances of 0.86 m<sup>2</sup>/pig and 1.94m<sup>2</sup>/pig at all dietary lysine contents and lysine intakes. Feed conversion efficiency was unaffected by floor-space allowance and increased linearly with dietary lysine content,” added Ms Theeruth.

“Similarly, protein and lysine retentions were unaffected by floor-space allowance and increased linearly as lysine intake increased. The efficiency of lysine utilisation remained unaffected by floor-space allowance.

“We concluded that, if profitability and biological efficiency is to be maximised, pigs housed in stressful conditions, or those whose future performance is predicted to be below potential because of external stressors, should not be given feed of an inferior quality.”

Presented to the British Society of Animal Science Annual Meeting, March 31 to April 2, 2008, Scarborough, UK.

Full details: Theeruth B and Gous R: “The effect of group size and floor space allowance on the efficiency of lysine utilisation by growing pigs.”

For further information visit [http://bsas.org.uk/Meetings\\_&\\_Workshops/](http://bsas.org.uk/Meetings_&_Workshops/) or contact BSAS on 01314 454508

How water is supplied to growing pigs has no effect on their performance, but it can make a difference when it comes to waste and slurry volume – up to an additional 32 tanker loads, according to a trial recently completed at Hillsborough’s Agri-Food and Biosciences Institute and led by Elizabeth Magowan.

“Neither drinker design or position had any effect on pig performance. However, significantly more water was used with the Halfman Bite and Jalmarsen Bite Ball drinkers compared to the Drik-O-Mat Bowl and Verba Nipple drinkers we used in the trial,” she told delegates at this year’s British Society of Animal Science annual conference.

Inadequate water intake is associated with reduced feed intake, poor daily gain, poor feed conversion, scour problems and lower digestibility of feed in pigs. And factors that can reduce water intake include contamination, high mineral content of water, low temperature, low flow rate from drinker, too few drinkers or poor drinker/nipple position. “But there is a lack of information on the effect of drinker design on water intake and performance,” said Dr Magowan.

“Three designs of drinker commonly used are nipple drinkers, bite drinkers and bowl drinkers. And the aim of our study was to investigate the effect of drinker design and position on performance and water usage of growing pigs,” she added.

A total of 720 pigs were split into groups of 20 and randomly allocated to one of six treatments. Two drinkers were placed in each pen of 20 pigs. Pigs were offered water from four drinker designs, two of which were in different positions. Daily feed intake, daily live weight gain, feed conversion ratio and water usage were determined from weaning to seven and 10 weeks of age.

“And we found that the design or position of drinker had no effect on growth performance, feed intake or feed conversion efficiency of pigs,” said Dr Magowan.

Flow rates were measured as 250ml/minute, 600ml/minute, 700ml/minute and 1,200ml/minute for the Drik-O-Mat bowl, Verba Nipple, Halfman Bite and Jalmarsen Bite Ball drinkers respectively. Compared to the Drik-O-Mat bowl and Verba nipple drinkers, water usage tended to increase from four to 10 weeks of age, when the Halfman bite drinker was used and was significantly greater when the Bite Ball drinker was used.

“It is likely that the majority of the extra water used was wasted and, therefore, potentially increased slurry volume, resulting in an additional 17 and 32 tanker loads (6.82 m<sup>3</sup>) of slurry produced per year on a 200-sow unit using either the Halfman Bite or Jalmarsen Bite Ball drinkers respectively,” added Dr Magowan. “And this would have major implications on the dry matter of slurry and slurry storage requirements on pig farms.”

Presented to the British Society of Animal Science Annual Meeting, March 31 to April 2, 2008, Scarborough, UK.

Full details: Magowan E and McCann MEE: “The effect of drinker design and position on water usage and performance of growing pigs.”

For further information visit [http://bsas.org.uk/Meetings\\_&\\_Workshops/](http://bsas.org.uk/Meetings_&_Workshops/) or contact BSAS on 01314 454508

Varying lysine and energy concentrations in pig diets – and the resulting variable growth – had no effect on meat quality, according to the results of a recent trial carried out at Hillsborough’s Agri-Food and Biosciences Institute.

The growth rate of pigs is highly variable both within and between herds and there is limited research focusing on the effect of variable growth on meat and eating quality.

“And the majority of recent studies investigating the effect of diet on meat quality have focussed on manipulating the fatty acid profile of the meat,” trial leader Elizabeth Magowan told delegates at the British Society of Animal Science’s annual conference.

“So the aim of our study was to assess pig meat quality from gilts and boars offered diets with varying energy and lysine concentrations over a range of average daily gains.”

A total of 120 pigs were commercially housed from 10 weeks of age to slaughter and two diets were offered to pigs during the finishing period. The digestible energy and total lysine content of these diets were 13.5MJ/kg, 9.5g/kg and 14.5MJ/kg, 1.1g/kg respectively. Pigs were selected to represent a range of average daily gains (ADG) which were assessed between 10 and 20 weeks of age.

On the day before slaughter, pigs were weighed and slap marked. On the day of slaughter pigs were transported for one hour and in lairage for a further hour before they were slaughtered.

The *Longissimus dorsi* muscle was dissected from the left loin of each pig 24 hours after slaughter. Shear Force was measured seven days post slaughter, using a Warner-Bratzler shear device, and drip loss over a 48-hour period at two days post slaughter on chops of 2.5cm thick was also measured.

“And we found that shear force, drip loss and cooking loss were not significantly

affected by either dietary treatment or gender,” said Dr Magowan.

The small differences in ultimate pH (pHu) value and sarcomere length between boars and gilts are unlikely to have significant effect in relation to meat quality. The diet and gender interaction for pHu values may be explained by a small number of boars showing higher pHu values due to their aggressive nature or attempts at mounting during the pre-slaughter period.

“The variable growth rate of pigs in this study was not reflected in meat quality. However it should be noted that although pigs were slaughtered at an average weight of 105kg, the results may have been confounded by the finish age of pigs which varied by approximately 14 days,” added Dr Magowan.

Presented to the British Society of Animal Science Annual Meeting, March 31 to April 2, 2008, Scarborough, UK.

Full details: Magowan E, Moss BW and McCann MEE: “Effect of diet, gender and growth rate on pig meat quality.”

For further information visit [http://bsas.org.uk/Meetings\\_&\\_Workshops/](http://bsas.org.uk/Meetings_&_Workshops/) or contact BSAS on 01314 454508

Supplementing cassava peel-based diets with an enzyme-based feed additive produced performance results comparable to pigs fed a maize-based diet. That was the exciting result of a study, which set out to determine the effect of the total replacement of maize with cassava peel, supplemented with or without Farmazyme® 3000 Proenx, on – among other parameters – diet quality, growth performance, and feed conversion efficiency.

In view of severe constraints of high cost and, sometimes, outright scarcity of maize – the conventional energy source for pig feeding in Nigeria – the use of some agro-industrial by-products (AIBPs), such as cassava peel is inevitable, according to trial leader Dr Akinyele Adesehinwa, who shared the results of his team’s work with delegates at this year’s British Society of Animal Science annual conference.

“But the fibrous nature of most of the AIBPs has been a major limitation to their utilisation by pigs and has become imperative to incorporate exogenous enzymes into pig diets containing AIBPs, in order to enhance its efficient utilisation by bringing about the breakdown of the limiting non-starch polysaccharides,” he explained.

The utilization of cassava (*Manihot esculenta*) peel-based diets supplemented with or without Farmazyme® 3000 Proenx – a multi-enzyme – was investigated using 36 growing pigs. They were allotted to three dietary treatment groups: a 30% maize-based control diet; a 30% cassava peel-based diet without enzyme supplementation; and a 30% cassava peel-based diet supplemented with the enzyme. The pigs were allowed ad-lib access to the diets and water throughout the 42-day trial.

“The replacement of the 30% maize in the control diet with cassava peel resulted in increased bulk and crude fibre contents of the cassava peel-based diets and this lowered energy content and reduced the dry matter intake of the pigs fed the cassava peel-based diet both with and without enzyme supplementation,” said Dr Adesehinwa.

“We concluded from the results of this study that Farmazyme® 3000 Proenx enhanced utilisation of the cassava peel-based diet, resulting in performance results comparable to pigs fed the maize-based control diet. The enzyme is, therefore, recommended as a probable feed additive for efficient utilisation of cassava peel-based diets by growing pigs,” he added.

Presented to the British Society of Animal Science Annual Meeting, March 31 to April 2, 2008, Scarborough, UK.

Full details: Adesehinwa AOK, Obi OO, Makanjuola B and Afolabi O: “Utilisation of cassava (*Manihot esculenta*) peel based diet supplemented with or without Farmazyme® 3000 Proenx by growing pigs.”

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**Zinc-oxide supplemented feed is less palatable to piglets, despite health benefits**

**BSAS Paper 89**

Weaner piglets prefer zinc oxide-free feed because the palatability of feed is reduced by adding the mineral. These were just two of the findings of a trial, carried out by scientists at the University of Leeds, to test the hypothesis that weaned piglets would avoid a diet high in zinc oxide (ZnO) when given the choice, and to investigate the resultant performance and choice feeding behaviour of individual piglets in the immediate post weaning period.

“A nominal amount was still eaten in our trial, suggesting the piglets consumed a small amount in ‘continuous sampling behaviour’, albeit insufficient to benefit the piglet,” Fiona Reynolds told delegates at this year’s British Society of Animal Science annual conference.

ZnO is frequently added to nursery piglet diets at pharmacological levels to combat scouring and to improve performance of weaned piglets. “It is anecdotally recognised in the pig industry that piglets do not like the taste of zinc although increased feed intake is frequently reported,” added Miss Reynolds.

The study involved 60 piglets which were weaned at 7.8kg and 27.8 days of age into eight mixed sex groups of seven or eight piglets per pen. Groups were balanced for litter origin, weaning weight and sex, and housed in fully slatted weaner pens. Piglet feeding behaviour was constantly recorded by a multi-spaced feed intake recording system.

Each pen of pigs was offered ad-lib access to two different foods, each in two troughs per pen. Feeding time – in minutes – was recorded for each individual at each trough. Foods (16.2MJ DE, 1.6g lysine/kg) differed only in the level of ZnO supplementation – unsupplemented or supplemented at a rate of 3.1g/kg.

The unsupplemented feed contained a basal level of zinc (100ppm). Piglets were weighed at weaning and at day seven and 13 thereafter. The experiment ran for 13 days.

Piglets were then categorised by weaning weight into three categories: small, less than 7.0 kg); medium, more than 7.1kg but less than 8.0kg; and large, more than 8.1 kg.

“And we saw that, on a pen basis, groups of piglets showed significant preference for the unsupplemented food in both week one and two post weaning,” said Miss Reynolds. “Average piglet gain was low, at 0.039kg and 0.272kg per day in week one and two respectively.

“When feeding behaviour data were examined on an individual basis, the effect of weaning weight and gender on proportion of time spent eating each food did not influence diet choice.”

Miss Reynolds said that ZnO has proven positive effects on piglet health and performance post weaning, although the newly weaned piglet would have no prior experience of such.

“The proportion of time spent eating the supplemented food was not influenced by weaning weight or gender. And, ironically, diet selection by piglets on this experiment is associated with poor performance and incidence of scour, highlighting the importance of ZnO on the health and performance of the weaned animal,” she added.

Presented to the British Society of Animal Science Annual Meeting, March 31 to April 2, 2008, Scarborough, UK.

Full details: Reynolds F, Forbes M, Slade R and Miller H: “The effect of offering two feeds, with or without pharmacological levels of zinc oxide, on the individual feeding behaviour and performance of weaned piglets.”

For further information visit [http://bsas.org.uk/Meetings\\_&\\_Workshops/](http://bsas.org.uk/Meetings_&_Workshops/) or contact BSAS on 01314 454508

**Adding straw will improve pig growth efficiency,  
but not physiological development**

**BSAS Paper 91**

Adding straw to pig pens can improve pig growth efficiency, but in trials it did not influence physiological development at slaughter or carcass taint.

These were just two of the findings of a study, carried out at the University of Newcastle, to determine whether straw supplementation, in the absence of confounded space and lighting effects, influenced physiological development and associated undesirable effects in entire boars and gilts grown from 60kg to 120kg slaughter weight.

“We also found that 7% of boars had taint levels above thresholds considered detrimental to consumer acceptance. And although the addition of straw improved welfare, by reducing pig directed behaviour, this was not reflected in reduced aggression or lesions,” said Lorraine Salmon, who presented the results of the trial to delegates at this year’s British Society of Animal Science annual conference.

For the purpose of the study, 96 pigs were randomly grouped, at 63kg live weight, in pens of eight. They were housed in controlled-environment housing with un-bedded part-slatted pens, provided with a plastic toy for enrichment. Straw treatment pens were provided with free access to long wheat straw held in a wall-mounted rack.

Pigs were fed an ad-lib commercial pelleted finisher diet with pig live weight and pen feed intake recorded fortnightly from 63kg to 100kg and weekly from 100kg to slaughter at 120kg. Skin lesion scores were recorded fortnightly and rind-side damage post slaughter. For an assessment of maturity, ovary weights and follicle scores or testicle weights were recorded at slaughter. Pen mean values were subject to analysis of variance to compare treatment effects and interactions on performance, physiological maturity and related measures.

“Mean daily straw usage was 58g/pig and boars showed higher daily live weight gain compared with gilts,” said Miss Salmon. “There were no effects of straw on daily feed

intake, but feed conversion ratio was improved. Carcass back fat depth was greater in boars and tended to be reduced where straw was added. There was no effect of straw on any boar or gilt physiological maturity parameter measured.

“Pigs in pens with access to straw showed increased lesions on the rump and tail area, a numeric increase in activity level and a tendency to increase biting interactions. Straw decreased nose-nose interactions, but showed only a tendency to reduce nose-body interaction,” she added.

Presented to the British Society of Animal Science Annual Meeting, March 31 to April 2, 2008, Scarborough, UK.

Full details: Salmon L and Edwards S: “The effect of straw supplementation on the performance, physiological development, aggression and boar taint compounds in pigs slaughtered at 120kg live weight.”

For further information visit [http://bsas.org.uk/Meetings\\_&\\_Workshops/](http://bsas.org.uk/Meetings_&_Workshops/) or contact BSAS on 01314 454508

**Piglet birth weight could be key  
to reducing pre and postnatal mortality**

**BSAS Paper 159**

Piglet birth weight can influence both prenatal and postnatal mortality rates under outdoor conditions, so genetic approaches to optimise birth weight offers pig breeders and producers an opportunity to improve pig welfare and enterprise profitability.

These were two of the key findings of a study to gain a better understanding of the risk factors for different causes of piglet mortality in order to help to design strategies to minimise losses.

“Outdoor farrowing system account for 27% of breeding sows in England, and it is therefore important to understand the factors affecting their production efficiency,” Newcastle University’s Sandra Edwards told delegates at this year’s British Society of Animal Science annual conference.

“Piglet mortality is a significant economic and welfare issue, with farrowing and preweaning losses in commercial outdoor herds currently averaging 19% of all pigs born. Since sophisticated environmental and human interventions at the time of farrowing are infeasible in these systems, risk factors may differ in importance from those seen in indoor systems,” she added, explaining the rationale behind her team’s work, carried out in conjunction with the SAC and the Grampian Country Food Group.

As part of a large genetic research programme, data were collected on 17,191 individually identified piglets from sows farrowing over three parities in individual outdoor paddocks on Scottish units during a 15-month period.

For each piglet, litter information, gender, birth weight, fostering history and survival were recorded. All piglets that died before weaning were subject to post-mortem investigation to determine cause of death. The data were used to investigate the influence of different factors on prenatal mortality and postnatal mortality. A risk factor analysis was carried out.

“We found that, from a mean total litter size of 13.6 piglets, overall survival at birth was 97.3% and survival during the nursing period was 90.15%,” said Professor Edwards.

“The major cause of postnatal mortality was crushing, accounting for between 73% and 84% of all identified causes of death in different parities. Low vitality, starvation and scour each accounted for less than 10% of losses per parity.

“The pattern of mortality risk with month/parity was inconsistent. Male pigs were at greater risk of stillbirth and greater risk of subsequent mortality than females. Risk of both prenatal and postnatal mortality reduced progressively for each 0.1 increment in birth weight between 0.5kg and 2.3kg and increased progressively for each 0.05 increment in within-litter standard deviation between 0.10 and 0.65. And both parameters increased with sow parity,” she added.

Presented to the British Society of Animal Science Annual Meeting, March 31 to April 2, 2008, Scarborough, UK.

Full details: Shrestha NP, Roehe R, Smurthwaite KM, Jarvis S, Lawrence AB, Edwards SA: “Risk factors for piglet mortality in outdoor farrowing systems.”

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**Dietary protein level can be  
reduced to cut nitrogen losses**

**BSAS Paper 252**

Reducing protein to a low level in pig diets in the later stages of growth reduced nitrogen intake – a major factor in nitrogen losses to the environment – with relatively few deleterious effects on performance except that fat thickness was increased, particularly in the leaner breed.

“This suggests that energetic efficiency was increased on the low protein strategy,” said Bristol University’s Jeff Wood, presenting the findings of a trial – to compared three ‘nutritional strategies’ providing different protein and energy levels as pigs of two breeds grew from 40 to 120kg live weight – to delegates at this year’s British Society of Animal Science annual conference.

“Dietary protein is the main source of nitrous oxide and nitrates – harmful pollutants that are produced in pig units. So reducing the level of protein in the diet may be environmentally friendly. But will this compromise performance?” he asked.

The study involved 192 entire male pigs – half 75% Large White and half 75% Duroc. They were reared on one of three ‘nutritional strategies’ from 40 to 120kg live weight at Harper Adams University College.

The dietary ingredients were the same in all strategies and ‘state of the art’ and ‘low protein’ diets were balanced with amino acids so the ratios with lysine were the same as in the ‘baseline’ diet. The pigs were fed ad lib from hoppers and reared in groups of eight pigs per breed and strategy.

At approximately 120kg live weight, the pigs were transported to the University of Bristol abattoir where they were slaughtered and samples were removed for analysis. For individual pigs slaughter weight, carcass weight, P2 fat thickness, and daily live weight gain were statistically analysed. Intakes and food conversion ratios were also analysed for each pen.

“Of the data recorded on individual pigs, only P2 fat thickness was significantly different between factors, being greater in Duroc than Large White pigs fed the low-protein, baseline and state-of-the-art diets,” said Professor Wood.

“The small numbers of observations for data recorded on a pen basis was partly responsible for the lack of significant effects for intake parameters. When breeds were pooled, there were no significant effects of nutritional strategy on these parameters except for nitrogen intake per kilogram of weight gain, which was lowest for pigs fed the low-protein diet,” he added.

Presented to the British Society of Animal Science Annual Meeting, March 31 to April 2, 2008, Scarborough, UK.

Full details: Stewart AH, Wood JD, Stonehouse GG, Doran O and Hazzledine MJ:  
“Effect of dietary protein concentration on performance of group-fed pigs.”

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