Improving piglet survival: a management approach from breeding to farrowing

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Take home messages:

- 50% of piglet deaths before weaning take place within the first 3 days after farrowing due to low vitality and viability.
- We can improve piglet survival through improving management practices in both farrowing crates and loose-housed systems.
- Improving piglet birth weights, provision of heat and nutrition after farrowing are essential.
- None of this can be completed without knowledgeable and good stock skills.

Before weaning at around six weeks of age, piglet mortality on small scale units in Wales can be as much as 20%. This is considered unacceptable, with efficient pig units restricting mortality to 12%. The top 25% of units will have measures in place to achieve single figure losses. Of these deaths, 50% will occur within the first 3 days. There are many factors which influence piglet mortality, on most pig units perhaps the most common is crushing of piglets by the sow. When examining the overall picture, it is clear that maternal factors are a major factor related to piglet survival by contributing to a reduction in the piglets' vitality and viability, which in turn makes the piglet more prone to being crushed.

To understand how we can improve piglet survival, an understanding of the natural behaviour of a sow around farrowing and the physiology of newborn piglets is necessary. Within the first few hours of life, piglets are unable to control their own body temperature successfully through the thermoregulation process, due to a lack of fur and limited mobile energy reserves or essential fat tissue required for heat production. Therefore, piglets covered in birthing fluids experience rapid cooling and are subsequently highly susceptible to hypothermia. In a natural system, the sow would make a nest before farrowing, which provides warmth and prevents heat loss from the piglets. In our modern intensive production systems, bedding is rarely available for sows to perform nesting behaviour and cold floor temperatures add to the cooling of piglets. Even in our units that make best use of chopped straw, shavings or rubber mats cooling contributes to increased risk of further issues such as starvation or diseases, leading to a reduction in locomotion vigour and consequent susceptibility to crushing. As a result of cooling, piglets will tend to use their mother as a source of radiation heat and lie close to her udder, thus rendering them particularly vulnerable when the sow rises and even more so when she lies down. Piglets may be asleep and unaware of the possible rapid descent of the 250kg sow. There are many aspects of the overall management and farrowing system which need to be appropriately managed to minimise piglet mortality.

Breeding

Breeding for piglet survival can be targeted by either selecting for piglets' survival potential, or for the sow's maternal potential. In indoor systems it appears to be easier to make progress by selecting for the sow. However, it must be noted that breeding systems for indoor or outdoor systems will be different for both the piglet and sow. Outdoor systems preferentially breed for maternal traits in sows so that the system requires minimal input at farrowing.

Indoor housing – Farrowing crates vs Loose-housed farrowing

In the UK, 60% of sows are managed for farrowing indoors, with 96% of those in farrowing crates. Crate systems are designed to reduce crushing of piglets, however there can be welfare implications for the sow. Considerable interest has recently been given to the development of a loose-housed farrowing system, which supports the needs of the sow and reduces stress, discomfort and irritation, whilst also minimising piglet mortality. Designed pens are a satisfactory alternative to crates, with little difference in piglet mortality rates. An example of a designed pen is PigSAFE, which has been specifically planned through behaviour and welfare research. Overall, the best management strategies to improve piglet mortality in indoor systems is to increase birth weight through selective breeding and improve heating, giving the piglet more energy to move out of the way of the sow. More information about loose-housed farrowing and the benefits to indoor pig production systems can be found at www.freefarrowing.org/.

To utilise a loose-housed system for sows, attempts must be made to manage maternal behaviour and ensure that the best suited sows to the system are used. Preliminary research has shown that it is possible to preferentially genetically select gilts to exhibit less crushing behaviour in outdoor systems. It must be noted that different housing systems will require different traits to be bred for and this should be factored in to the breeding plan for a herd. Sainsbury's is currently funding a project with leading pig welfare academics to determine the best sows suited to loose-housed farrowing in a pen carefully designed to meet piglet and sow welfare, health and behavioural needs.

Litter size and birth weight

Genetic selection for more piglets per litter has had implications on piglet survival and welfare. The initial impact occurs whilst piglets are still in the womb, competing for nutrients and space, ultimately reducing birth weight. Larger litter sizes take longer to farrow which increases the risk of hypoxia in piglets. Piglets with a lower birth weight have further problems after farrowing, being prone to chilling, crushing and starvation. Thus, future breeding strategies need to work with prolific lines to improve the birth weight of piglets. A discussion on the impacts of large litter sizes on sow health and welfare is out of the scope of this technical article, but should also be accounted for when breeding for litter size.

There are several management solutions to cope with large litter sizes. Firstly, cross-fostering works to equal out the amount of piglets over several sows, be it in number per sow, to ensure each piglet has a teat, or standardising piglets for gender or strength, amongst other traits. Nevertheless, it must be ensured that piglets are not moved too early, missing out on colostrum, or too late which can detrimentally affect welfare and reduce growth rates. An alternative to fostering is the use of a nurse sow,

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commonly used in intensive pig units in both the UK and Netherlands. Yet, both fostering and nurse sows have welfare implications through separation and aggression between new litter mates. To prevent movement of piglets between sows through use of fostering, an alternative is to use split suckling within the first day. This method should ensure that all piglets receive colostrum, though potential negative effects are clear on some units. Finally, artificial rearing can be operated at around 3-7 days post farrowing and weak or surplus piglets raised with milk replacer. However, results are mixed as to the success of this management strategy versus use of a more natural system.

Piglet temperature

One to two hours after birth is a critical period for maintaining piglets' body temperature to improve survival rates. Piglets born with a lower body weight have a lower rectal temperature at birth and also slower average daily gain (ADG) and therefore require extra heat in this period. When born in areas with a temperature above 20oC the ADG of low body weight piglets increases, likely due to a redirection of energy away from heating their body to growth. However, sows can experience heat stress if room temperature is too high, although they appear to be more tolerant around farrowing. Therefore, it is suggested that the optimal solution is to utilise a room temperature of 25oC at the beginning of farrowing, but lower the temperature to 20oC after the last piglet of the litter is born.

Several methods for managing piglet temperature have been investigated, such as: radiant heat, underfloor heating, drying piglets alongside use of a heat lamp and straw in the farrowing area. All have shown promising effects by reducing the initial drop in rectal temperature following birth and improving time to first suckle. The application of heat is most important in the first 12 hours post farrowing and should be concentrated around the sow. After 24 hours, piglets become more independent of the udder and utilise creep areas. On comparison of several thermal aids, the use of straw is demonstrated to be the best solution, as long as it remains dry. Straw within the farrowing area not only helps prevent hypothermia, but also helps to increase piglet weight gain and sow welfare by stimulating the natural behaviour of nesting. Nevertheless, systems which utilise slatted floors will find it difficult to provide straw bedding, at which time, radiant heat is the best alternative. A more hands on approach in loose-housed systems is to individually dry each piglet and place them under heat lamps after birth. However, this is estimated to cost on average 2-3 hours extra work per farrow. The economic benefit of these extra hours would need to be determined in relation to the scale of the farm and price of the piglets, but it is estimated that an extra 19.5 piglets would be saved in a batch of 30 sows. By spending this extra time at farrowing, it is also possible to aid in other ways such as placing piglets nearer to the udder to suckle colostrum as soon as possible after birth. An additional benefit of a coloured heat lamp over a cornered-off area stems from the fact that piglets will be drawn to the light as well as heat. In fact, even when a required creep-area temperature is reduced below 29degrees after the first days, piglets will return to the light.

Starvation

Suckling of colostrum in the first 12 hours of the piglet's life is essential. More information on this subject is available in a technical article discussing the use of good nutrition for piglet survival.

Piglets compete for a teat within the first few hours of their life, which they regularly return to throughout the suckling period. However, teat numbers may not have increased with litter sizes, leaving piglets without a teat or competing over a shared teat. Females entering the breeding herd should not be selected with less than 12 – 14 teats. In the first few days although milk is present in the teat at all times, it is only let down for around 30 seconds each hour and piglets learn to recognise the maternal 'invitational grunts' to attend for suckling at their own teat. However, due to the limited time period of availability, piglets that can't compete for space at the udder are often left to starve in the first 3 days. At a later stage, the piglets nuzzle the udder to encourage milk let-down which is controlled by hormones produced by the sow, that are stimulated through suckling.

Stockmanship

Although many of the measures described are essential management tools that can improve piglet survival, their implementation depends on real knowledge and stock skills being utilised in the birth area of the unit. Experienced and well trained labour can improve both welfare and mortality of sows and piglets during the farrowing period. Appropriate human to pig interactions are essential. Over handling can cause stress to piglets and the sow, but if farrowing is appropriately observed and staff intervene only when necessary within the system, piglet survival can be improved.

Nutrition of both the sow pre and post farrowing and of newborn piglets up to weaning is essential in improving piglet survival. More information on this subject is available in the technical article – Improving piglet survival: a nutritional approach for the sow and piglet.

For more practical information on piglet survival, advice on how mortality rates are impacting your herd and business and how to improve your system through a Piglet Priority Protocol, complete our e-learning module covering piglet survival.

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