

A Review: The pattern of mortality in piglets (birth to 2 months of age) and means to reduce the mortality rate.

Lee McCosker

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1. Introduction

Piglet survival has been identified as one of the main factors affecting the economic performance of the Australian pig industry. Hughes & Van Wettere, (Oct 2012) identified stillbirths and pre-weaning mortality rates as being too high in Australian pig herds as they account for approximately 18% of litters born. Table 1. supports these findings.

Several risk factors are associated with piglet mortality and they include litter size, sow body condition and nutritional deficiencies, diseases, gestation length, parity number, farrowing length, dystocia and stress due to environmental temperatures and human interference during parturition (Borges *et al.* 2005, cited in Persdotter, 2010)

Understanding the causes of piglet mortalities on farm will enable the producer to assess their operation and implement strategies to reduce mortality rates.

Table 1. (Australian Pork Limited, 2012).

Australian Herd Breeding Statistics

2010/2011	Weaned/Sow/Year	Born Alive - Sows + Gilts	Gilt %	Total Born Gilts	Total Born Sows	Farrowing House Mortality	Weaning Age	No. Weaned	Wean to Service Interval	Farrowing Rate % - Sows and Gilts	Litters / Sow / Year	Sow Mortality %	Sow Turnover Rate %
	No. Pigs	No. / Litter	% of Bred	No. / Litter	No. / Litter	% Born Alive	Days	No. / Litter	Days	% of Bred	No. of Litters	% of Herd	% of Herd
Max	24.30	11.70	29.1%	12.30	13.48	18.3%	27.98	10.23	11.5	88.5%	2.46	19.2%	84.0%
Min	18.30	10.08	10.0%	9.12	11.10	5.8%	15.90	8.58	4.7	76.7%	2.1	2.0%	37.1%
Overall Average	21.80	10.89	21.10%	11.12	12.00	11.8%	22.52	9.54	6.91	83.3%	2.27	10.2%	54.8%
Average - Northern	21.69	10.64	19.50%	11.80	11.44	10.2%	21.70	9.43	6.25	83.7%	2.29	8.3%	51.2%
Average - Southern	21.71	11.02	23.90%	10.98	12.00	13.6%	22.39	9.55	8.13	82.0%	2.26	13.2%	60.8%
Average - Best 3	23.72	11.80	13.60%	11.93	13.33	7.3%	26.68	10.21	5.31	88.6%	2.41	4.7%	42.1%
Average - Northern	22.87	11.03	14.30%	11.61	12.38	7.3%	22.67	9.66	5.31	87.2%	2.41	4.7%	42.1%
Average - Southern	23.20	11.40	20.70%	11.90	12.57	11.5%	26.12	10.10	6.25	84.8%	2.33	9.1%	51.1%

Source: Pork CRC

2. Foetal Mortality

Litter Size

Stillborn piglets in small litters can be associated with diseases such as parvovirus or other pathogenic agents. The increase in stillbirths with increasing litter size can be explained by the prolonged duration of the farrowing process (Persdotter, 2010).

Litter size – Reducing Mortality

Supervision of farrowing sows has shown to decrease the proportion of litters with stillborn piglets (Cozler et al., 2002, cited in Persdotter, 2010). Vaccination and good housing hygiene practices would also assist in managing this risk.

Dystocia

Dystocia is defined as difficult parturition to the point of needed human intervention (Blood and Studdert, 1999, cited in Kirkden et al., 2013) and can result in asphyxia, a common cause in most cases of stillbirth and results in reduced viability and vitality, both increasing the risk of postnatal mortality (Kirkden, et al., 2013) .

Dystocia – Reducing Mortality

Attending the farrowing of older sows or sows expected to have large litters as well as minimizing stress during farrowing can impact on mortality rates. Lawrence et al., (1992, cited in Kirkden et al., 2013) found that stress during farrowing causes the production of opioids which inhibit oxytocin and can prolong farrowing.

Age of Sow

The rate of stillbirth is reported to be greatest in high parity sows, probably due to dystocia caused by fatness or poor uterine muscle tone (Bille et al., 1974a; Pejsak, 1984, cited in Kirkden et al., 2013).

Age of Sow – Reducing Mortality

Culling of old sows, attending the farrowing to provide assistance and ensuring that sows are not excessively fat at farrowing are recommended by (Kirkden, et al., 2013).

3. Live Born Mortality

Crushing

Crushing deaths generally occur when the sow changes posture, particularly when lying down from standing or rolling over (Damm et al., 2005a, cited in Kirkden et al., 2013).

Crushing- Reducing Mortality

The restraint of sows in farrowing crates for many generations may have reduced selection pressure for some aspects of maternal behaviour (Algers, 1992; Rudd and Marchant, 1995; Lay et al., 2005, cited in Kirkden et al., 2013). Selection for maternal behaviour in breeding sows is more likely to have a greater influence on piglet survival (Marchant et al., 2001; Anderson et al., 2005, cited in Kirkden et al., 2013).

Litter Size

Large litters are often associated with variation in piglet birth weight and small piglets which are also associated with higher mortality during the lactation period due to crushing and starvation (Anderson et al., 2007; Lay et al., 2002; Quiniou et al., 2002; Weber et al., 2009, cited in Persdotter 2010). Colostrum does not increase with litter size, the amount of colostrum available to each piglet is significantly less in larger litters and could result in starvation or dehydration if the sow does not produce enough in the first few days of life (Kirkden, et al., 2013).

Litter Size – Reducing Mortality

Ensuring that the number of piglets per litter does not exceed the number of functioning teats may require fostering soon after birth (Kirkden, et al., 2013).

Consideration of selection of sows with lower litter sizes born could help reduce mortalities. Supervised farrowing would be best practice.

Sow Nutrition during lactation

Sow nutrition during lactation plays a major role in the performance of piglets and is discussed further under the heading 'Post Weaning Mortality'.

Housing System

With some sectors of the pork industry moving to alternate housing systems such as barns, sow stall free or free range, consideration was given to the impact of these facilities on piglet mortality. KilBride, et al., (2011) conducted a study on 112 breeding farms in England to investigate the impact of farrowing accommodation on pre-weaning mortality in four systems; farrowing crates, indoor loose pens, crate/loose systems and outdoor farrowing in paddocks. The study concluded that pre-weaning piglet survival in non-crated systems is similar to that in crated systems.

While free range or outdoor systems are not always straightforward and can present welfare and economic disadvantages, Vanheukelom, et al., (2011) found that outdoor systems resembled closest natural conditions and allowed highly motivated behaviours in the sow and piglets with the piglets spending extended time away from the sow and learning to consume solid feed at an earlier age as a result. This would be advantageous when the piglets are weaned to reduce weight loss post weaning.

Early Weaning

Weaning of piglets before four weeks of age is common practice in the modern pig industry. This abruptly changes the piglets from sow's milk that is highly digestible to a comparatively poorly digested diet resulting in a reduction in feed intake and growth and vulnerability to developing diarrhoea (Kuller, W. I., Soede, N. M., van Beers-Schreurs, H. G. M., Langendijk, P., Taverne, M. A. M., Verheijden, J. H. M., and Kemp, B., 2004). Weaning is one of the most stressful periods in a pig's life and can result in reduced pig health, reduced growth rates and feed intake exposing the piglet to subsequent diseases and other production losses (Campbell, et al., 2013). van der Meulen, et al., (2010) concluded that weaning pigs at 4 weeks of age or earlier caused significant stress for piglets and that weaning at an age of 7 weeks causes less stress and improves feed intake after weaning.

Early Weaning - Reducing Mortality

Weaning of piglets under more natural conditions is a much more gradual process that takes place over a more extended period of time than today's pork producers permit. It is unlikely that the pork industry would consider extending the weaning age of piglets for economic reasons (van der Meulen, et al., 2010). 'Intermittent suckling (IS) is a

management technique that separates piglets from the sow for a number of hours each day in the second part of lactation with the aim of increasing feed intake by the piglets.’ (Kuller et al., 2004) This system would perhaps mimic a more natural weaning.

Regardless of the age of weaning, it is critical that the pig producer manages the nutrition and health of the piglets and has management strategies in place to minimize the adverse effects of weaning stress (Campbell, et al., 2013).

4. Post Weaning Mortality

The piglet will experience physiological, environmental and social challenges when it is weaned from the sow. If these stressors are too great for the piglet to overcome, it can lead to poor performance, susceptibility to disease and increased mortality. Feed intake drops after weaning as the piglet adjusts and as a consequence, the piglet can become malnourished with reduced growth rate. ‘The metabolizable energy (ME) intake is about 60 – 70% of pre-weaning milk intake and it takes approximately 2 weeks post-weaning to achieve full recovery to the pre-weaning ME intake level’ (Campbell, et al., 2013).

‘Prewaning growth is a major determinant of post-weaning pig performance’ (Klindt, 2003, as cited in Sulabo, et al., 2010). Sulabo, et al., (2010) found that total body weight gain and weaning body weight of individual pigs was greater in ad libitum fed sows when compared to piglets from sows that had feed restricted.

5. Conclusion

Piglet mortality, in many instances, is a management issue and could be dramatically reduced by better selection of breeding sows, attendance at farrowing of at risk sows, reviewing housing conditions and managing sow and piglet nutrition.

Sows should be selected for maternal behaviour and moderate sized litters to reduce stillbirths and low viability in new born piglets. While the farrowings of at risk sows should be attended, this should be done so with minimal human intervention to reduce stress in the sow.

Housing conditions do play a role in preventing piglet mortality. Hygienic housing conditions can help prevent the build-up of pathogens to help prevent infection diseases in the piglets. Housing that better mimics more natural conditions does appear to benefit both the sow and litter but must be well managed to prevent animal welfare issues arising and the economics of alternate housing systems much be considered.

Nutrition plays such an important role not only in the sow's body condition and ability to produce quality milk, but in the growth rates of the piglets pre-weaning that will help them better cope with the transition to solid food post weaning.

A good understanding of the needs of pigs and how they behave in a natural environment needs to be balanced with current intensive production systems and management practices adopted to better suit these requirements for the best outcomes for sow and piglets.

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