Farm management can improve perinatal survival and performance

As stillbirth rates range between 5-15%, and neonatal mortality (< 7 days after birth) hovers at similar levels, perinatal mortality represents the bulk of pre-weaning piglet losses. A wide variance in neonatal performance is prompting researchers to explore how farm management practices may improve the outcomes of sows' litters.

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Asphyxia is a common cause of stillborn piglets and reduced piglet performance. The hormone oxytocin controls uterine contractions, pushing piglets through the sow's birth canal. During contractions, oxygen supply to the foetus is interrupted, placing the piglet at greater risk of asphyxia or stillbirth. Several stressors contribute to farrowing risks and are discussed below, along with farm management practices to address these stressors.

Housing stress

As farrowing approaches, hormonal changes typically trigger sows' nest-building behaviours. However, most pen designs lack space and substrates that support sows' innate nesting activities.

Behaviours such as rooting and clawing concrete floors or chomping on metal crates express the sow's frustration and may result in reduced oxytocin levels. Lower oxytocin levels will extend farrowing time, increasing stillbirth risk and asphyxia. Pen design may support sows' farrowing behaviours and reduce stress.

Substrates such as straw, Hessian sacks or other materials may help sows express nest-building. As moving sows to the farrowing unit may increase stress, sufficient time should be allowed for sows to habituate to a new environment.

Handling stress

Handling or moving sows during farrowing may complicate the process. Palpation, pulling of piglets from the sow and interventions such as pharmaceutical injections to stimulate uterine contractions should be considered cautiously.

A field survey by Vanderhaeghe et al. (2018) comparing farms with high stillbirth rates and low stillbirth rates found monitoring and interventions during farrowing yielded no clear benefit.

Sows may perceive manual handling as a stressor, reducing oxytocin levels and slowing the farrowing process even more. Obviously, removing a piglet obstructing the birth canal will relieve the sow and allow farrowing to resume. However, a long interval between piglets is not necessarily an indication of an obstructed birth canal.

A Scottish research team demonstrated that handling sows during farrowing can reduce their oxytocin levels and even inhibit birth of piglets altogether. The team moved gilts from one farrowing crate to another when the first piglet was born. Only when exogenous oxytocin was injected, did farrowing resume.

Dietary stress

Constipation around farrowing likely results from adjustments in diet and feed allowance. Typical lactation diets may have fibre levels only half that of gestation diets. A common practice is to reduce feed allowance from around 3.5kg in late gestation, to 2kg or lower in the final days

before farrowing. This practice may be based on the thought that high feed intake before farrowing may increase risk of udder oedema, and poor intake after farrowing. However, reducing a sow's feed allowance while also switching to a diet low in fibres severely reduces her intake of fibrous material.

Measured in grams of neutral detergent fibre (NDF), this may be a reduction from 1,200g NDF per day in late gestation, to 400g NDF per day just before farrowing.

Reduced fibre intake slows down feed transition through the gut and impacts gut peristalsis, which may give rise to bacterial endotoxins accumulating in the gut, leading to endotoxaemia, metritis, and impaired colostrum production.

As reduced fibre leads to hard faeces and constipation, resulting pain will be perceived as a stressor potentially impacting oxytocin secretion and extending farrowing time. These effects have been demonstrated in studies comparing fibrous diets to standard

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Table 1. Effect of time between two successive piglets on stillbirth rate.

Time between two piglets (minutes)	0-30	30-60	60-90	>90
Number of observations	2,978	539	162	245
Stillborn (%)	5.6	6.8	7.4	18

Table 2. Effect of cumulative farrowing time on stillbirth rate.

Time that sow is farrowing (hours)	<2	2-4	4-6	6-8	>8
Number of observations	1,827	1226	535	164	172
Stillborn (%)	2.7	6.9	10.7	13.4	27.3

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lactation diets. For example, when sows received a diet consisting of 8-11% crude fibre, positive effects were seen on faecal consistence, farrowing duration and percentage of stillborn piglets.

In studies (for example DeCaluwe et al., 2014), abundant feeding levels before farrowing did not find any negative effects, and increased colostrum production. Even ad libitum feeding in a research study was well accepted by sows before farrowing, and increased feed intake and litter gain after farrowing.

A sow's water intake typically increases during farrowing. During gestation, average water intake is around 7.5L/d, although intake varies. However, in the days before farrowing, sows have been seen to increase their water intake to an average of 15L/d. Water intake helps alleviate constipation, and sows tend to drink more when their feed allowance is higher. Especially when water binding fibres are used in the diet, faecal consistency will be improved.

A dietary topic of debate is pre-farrowing calcium intake. Calcium is important for uterine contractions during labour and the average lactation diet provides more than the requirements one would expect for a transition sow using a factorial approach.

With this in mind, Trouw Nutrition developed a patented technology (Gestawean Oxiliv) delivered through drinking water that supports the sow in maintaining her own calcium levels, bypassing the calcium supplementation quandary. Field studies have shown the additive yields 0.4 extra live piglets, while improving neonatal performance.

Farrowing intervention considerations

Data from Trouw Nutrition's Swine Research Centre involving nearly 4,000 piglets illustrates how the length of time between piglets' births may impact the risk of stillbirth (Table 1). The percentage of stillborn was barely influenced when a piglet was born within 30, 60 or even 90 minutes after the previous piglet.

Only when the time between the previous piglet and the birth of a new piglet exceeded 90 minutes did the stillbirth risk increase considerably. Yet most farrowing protocols today dictate palpation be considered when more than 30 minutes have elapsed between successive births.

Data from the same study shows that time elapsed since the onset of farrowing has much more impact on the stillbirth risk. Piglets born >2 hours into the farrowing process had a higher stillbirth rate compared to piglets born within two hours. Piglets born >4 hours into the farrowing process had a higher stillbirth rate than those born 2-4 hours into the farrowing process, and so on.

This stands to reason as piglets born later in the litter are subjected to repeated uterine contractions (Table 2).

The decision to provide manual assistance to a sow or other form of intervention, therefore, should be based on how long the sow has been farrowing for rather than the interval between two piglet births.

The harmful impact of cumulative contractions on piglet oxygenation suggests concerns about the widespread use of uterotonics such as oxytocin to speed up farrowing.

While reducing farrowing time can be beneficial, if stronger and more frequent contractions result, increasing asphyxia and risk of stillbirth may arise.

Uterotonics should be applied only when lack of effective contractions has been confirmed and applied judiciously. Doses of oxytocin above 20 IU have been shown to cause serious asphyxia and increase stillbirth. A more prudent approach is injecting 10 IU of oxytocin initially and increasing if needed at a later stage.

Practical farm management practices including feed, health and farm management can help reduce stillbirths and support perinatal performance. ■

References are available from the author on request