Dietary strategies to manage second litter syndrome

Second litter syndrome describes what occurs when the number of live piglets in a sow's second parity is smaller than the number in her first parity. The challenge has been linked to several risk factors including a sow's poor body condition. In this article we consider how this problem can be tackled through dietary interventions for the sow.

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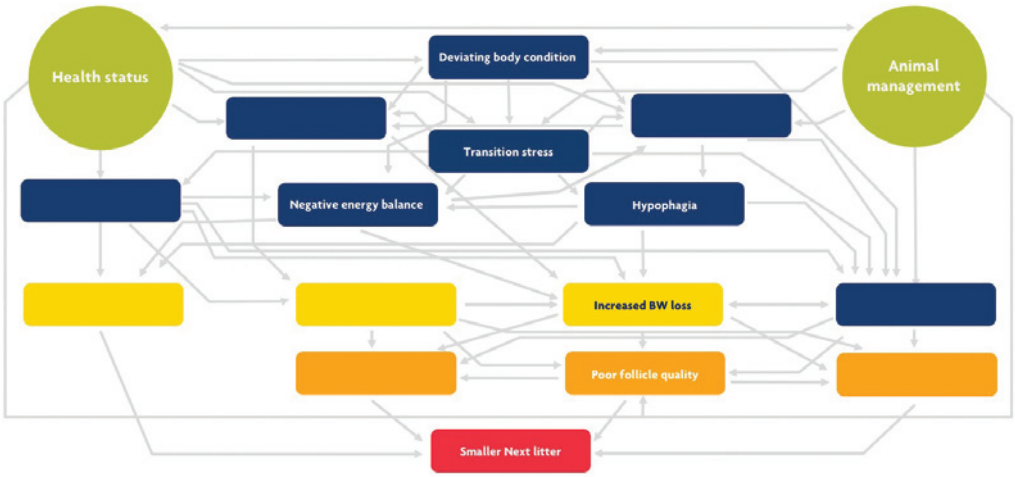

Fig. 1. Multiple elements are factors in second litter syndrome.

Gilts and sows face a range of challenges related to sow peripartal syndrome (SPS), a complex web of interactions affecting sows and piglets throughout the peripartal period. These include early or slow parturition, transition stress, poor body condition, negative energy balance, hypophagia and hypogalactia.

When these elements occur, they can lead to production challenges and tie in to production loss. Many of these elements also influence the development of second litter syndrome. As demonstrated through on-farm case studies, it is possible to address many of the challenges that animals face through targeted nutritional interventions. Providing gilts with optimised nutrition improves body condition, helps support the animals through multiple parities, and reduces the risk of second litter syndrome.

Focusing on second litter syndrome

Gilts experience more stress during gestation and farrowing compared to sows with multiple parities. Gilt challenges can include lower feed intake in lactation and reduced weight and body condition. As heat stress may reduce feed intake, it may also be a concern. Some farms have presented seasonal patterns with second litter syndrome occurring for animals that had an initial litter in the summer.

Additionally, lactation lowers body weight and at the end of the lactation period sows are being prepared for the next reproductive cycle. Losses in body weight also reduce the weight of organs in the reproductive tract. Low feed intake and reduced body weight limit the production of follicles, leading to a smaller litter.

A study done in 2003 tracking follicular development in sows that lost 7% or 16% of body weight found that lighter animals generated fewer follicles.

The genetic potential in modern sows is huge, with animals potentially producing 100 live piglets over multiple parities.

However, few reach that production potential in actual production environments. Changes need to be made to support gilts, so they more consistently reach seven or eight parities.

Herds face high culling rates of relatively young animals, meaning total lifetime performance does not have the opportunity to develop. Tracking commercial data in Denmark for a 10-year period, it was found that about a quarter of the sow population were first litter sows.

However, offspring from gilts underperform those of sows on later parities. Culling sows earlier leads to more gilt production and may lose money for the producer.

Providing interventions

Reproduction is a cycle for sows and a goal is to have as many repetitions as possible. The circular nature of the process means that anything that

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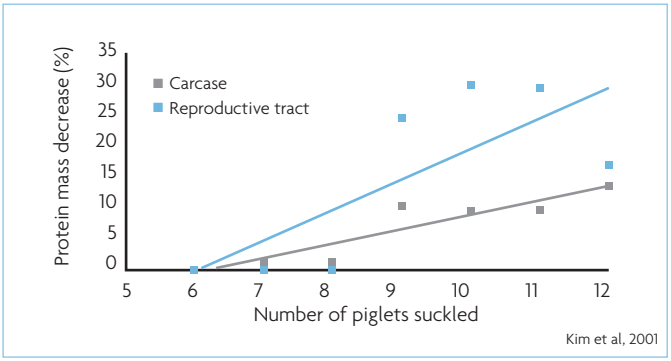
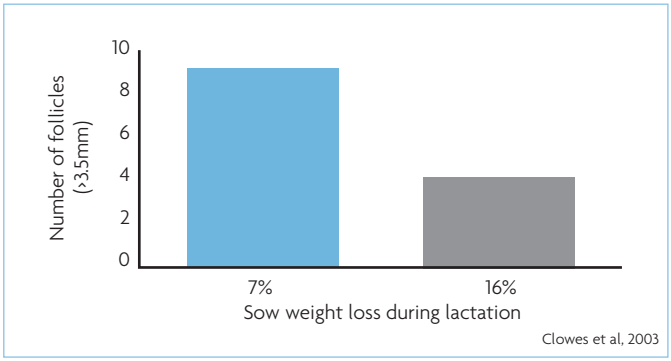
Fig. 2. Weight loss during lactation reduces the protein mass of the reproductive organs and the number of follicles that develop.



Kim et al, 2001



Clowes et al, 2003

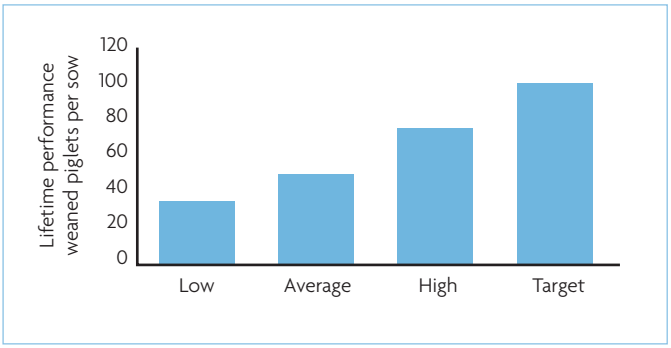


Fig. 3. On average sows produce about 50 piglets during their production lifetime, but they have the potential to double that amount.

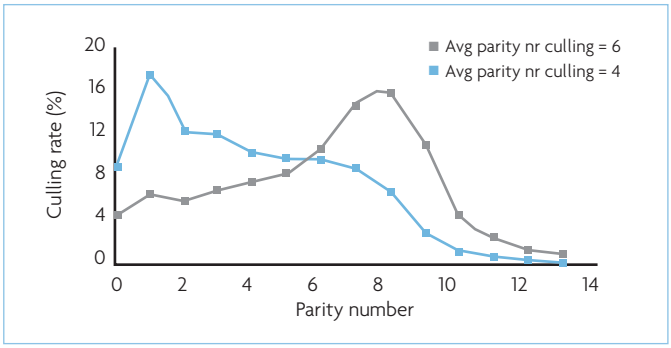


Fig. 4. Culling rate patterns per parity of 60 farms.

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occurs in gestation influences lactation and what happens during lactation also influences reproductive performance.

If sows are in a suboptimal condition during lactation, they may lose more body weight, which affects reproductive performance on the next phase of the cycle. Understanding this pattern allows for prevention and interventions to be applied.

To prepare gilts for a successful second parity, feed intake needs to be increased during lactation to prevent severe weight loss. A sow starting the second litter with a better body condition score should have better reproductive performance and be more likely to have more years of healthy production.

Trouw Nutrition developed the NutriOpt Sow model to identify and suggest interventions that maintain sows' optimal condition and support genetic potential.

The sow model considers multiple factors including climate, housing type, genetics, management and activity level.

With this data, a feeding plan can be tailored to address the challenges and meet the sow's nutritional requirements in gestation and lactation. The model has been deployed on-farm to address producers' specific challenges. One case study demonstrates how the system can be used to reduce instances of second litter syndrome.

A practical example of reducing second litter syndrome with hyper-prolific animals

A producer with a 1,000-sow operation in Spain asked for help improving second litter performance in sows. During a shift to sows with hyper-prolific genetics the farm was experiencing about a €5 loss per gilt and had a high culling rate. It was hard to maintain production through the second and third parities, especially as the year progressed.

In the January to March window, litter sizes in parity 1 and 2 were similar, but from April to June sows were losing about 1.6 piglets from the first to second parity (Table 1).

Once the problems had been specified, an assessment was done of the farm, the animals and management practices. Body condition of nulliparous and primiparous sows was measured using backfat as an objective metric and a variation coefficient was determined. The body conditions found were evaluated against the genetic standard for the type of sow and the feeding curves were examined.

Gilts and sows were found to have poor body conditions for their genetics and the feeding curves used did not match recommendations.

Following the initial assessment, information on the sows, the facility, management, feed and feeding practices were put into the sow model to run simulations and the simulation results of the current situation were in line with the poor sow body condition found in the farm. The sow model was then altered to provide the desired outcomes – better body condition and improved litters – which generated new feeding curves.

Changes were implemented and several follow-up audits assessed sow condition and birth rate. The shift in feeding curves improved backfat thickness and reduced the incidence of the second litter syndrome.

Born alive	January-March	April-June
P1	13.2	14.9
P2	13.4	13.3

Table 1. Producer switching to high-performing sows had problems with second litters.

Modelling to save €2.4/sow

Another farm in Canada applied the NutriOpt Sow model to reduce feed costs while maintaining production. As the facility was moving from individual to group housing, a significant increase in feed prices occurred.

An analysis of production practices and facility layout found that all sows received the same feed. After evaluating the requirements for sows with the sow model it became clear that the nutritional needs of sows experiencing different parities are not the same. The sow model was then used to calculate two diets for sows of different ages.

Afterward, gilts and sows received the same diet for the first 35 days of gestation and then more mature sows received a less nutritionally dense diet for days 36-102 of gestation. Evaluating the economics of the system found that, on average, the change saved €2.4 per sow annually.

Conclusions

Overcoming the challenges posed by second litter syndrome is possible by assessing farm practices and providing nutritional support. Steps in the process include defining the specific issue or challenges being faced, and using data collection, concrete metrics and technology to advance measurable solutions. ■

References are available from the author on request

Fig. 5. Requirement of lysine SID by parity during gestation.

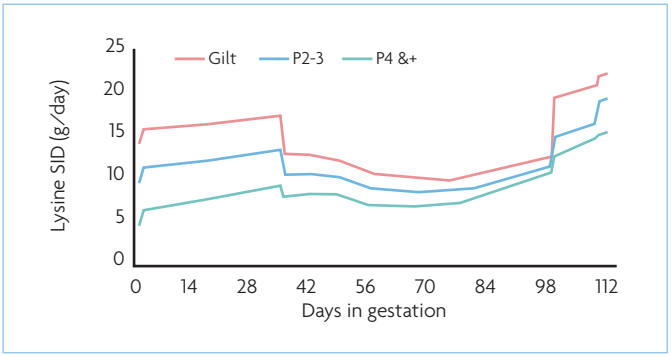

Table 2. Changing diets for older sows helped reduce the overall production costs.

Gestation feed programme	Current	New
Day 0-35	Feed 1	Feed 1
Day 36-102	Feed 1	Feed 2
Economic		
Total gestation feed/sow/cycle (kg)	297	300
Cycles/sow/year	2.40	2.40
Total gestation feed/sow/year (kg)	712	719
Gestation feed price/ton (€)	325.0	318.5
Total gestation feed cost/sow/year (€)	231.4	229.0
Savings per sow per year (€)	2.40	