

Feeding the modern sow to sustain high productivity

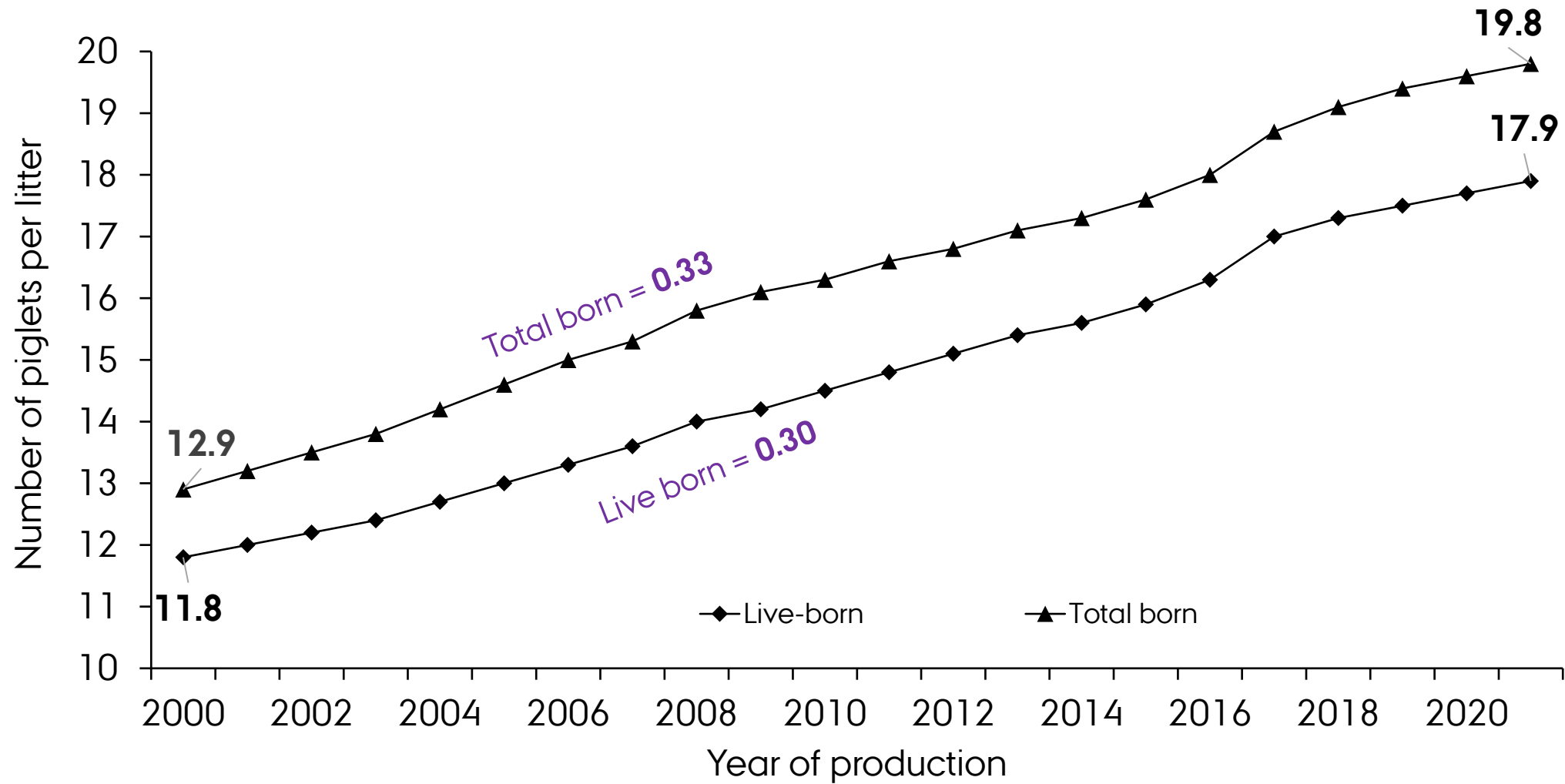
Takele Feyera, Assistant Professor
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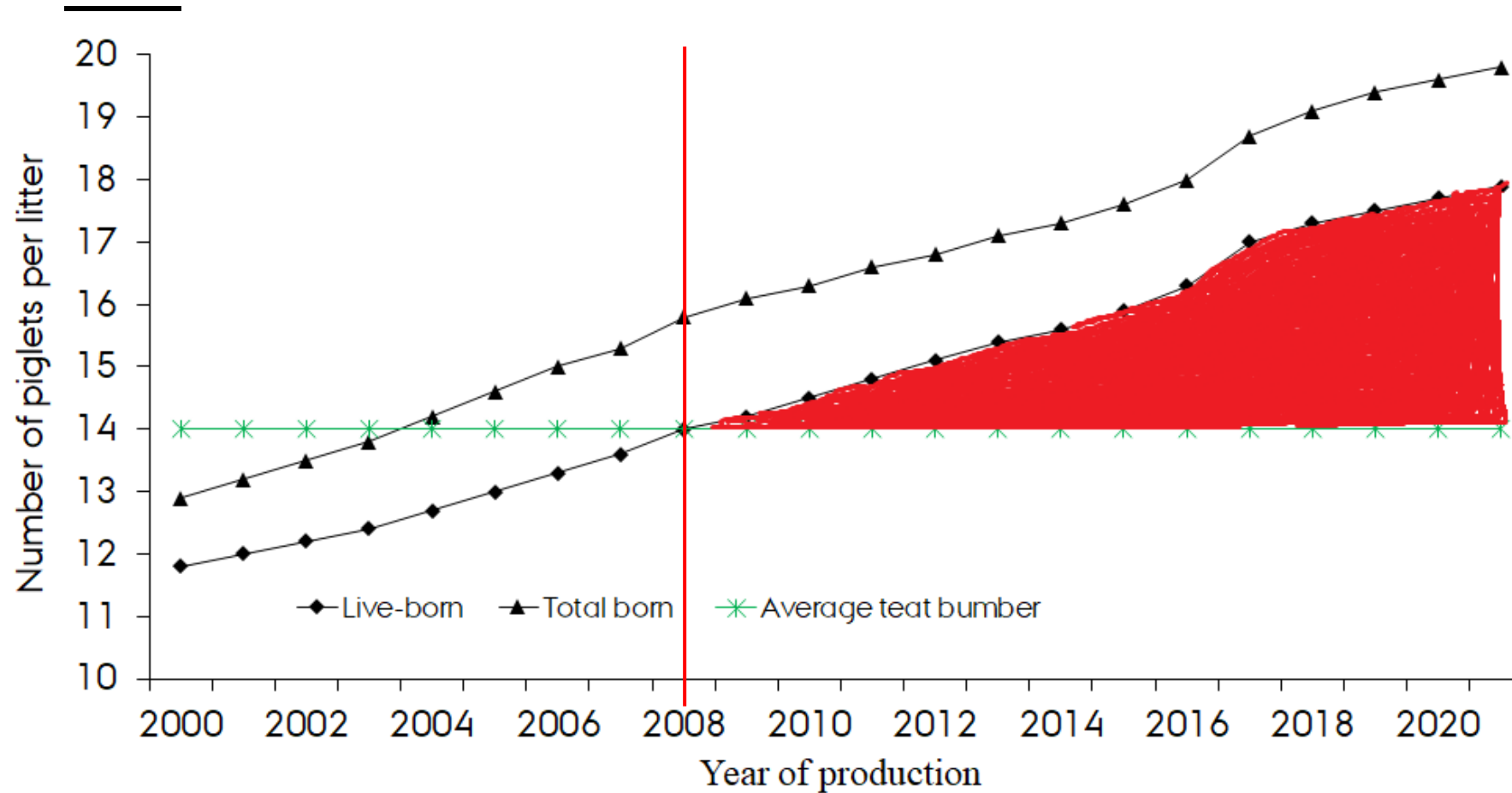
Agenda:

- 1. Hyper-prolific sows?**
- 2. Nutrition of gestating sows**
- 3. Nutrition of Transition sows and colostrum**
- 4. Two component feeding for lactating sows**
- 5. Home take message**

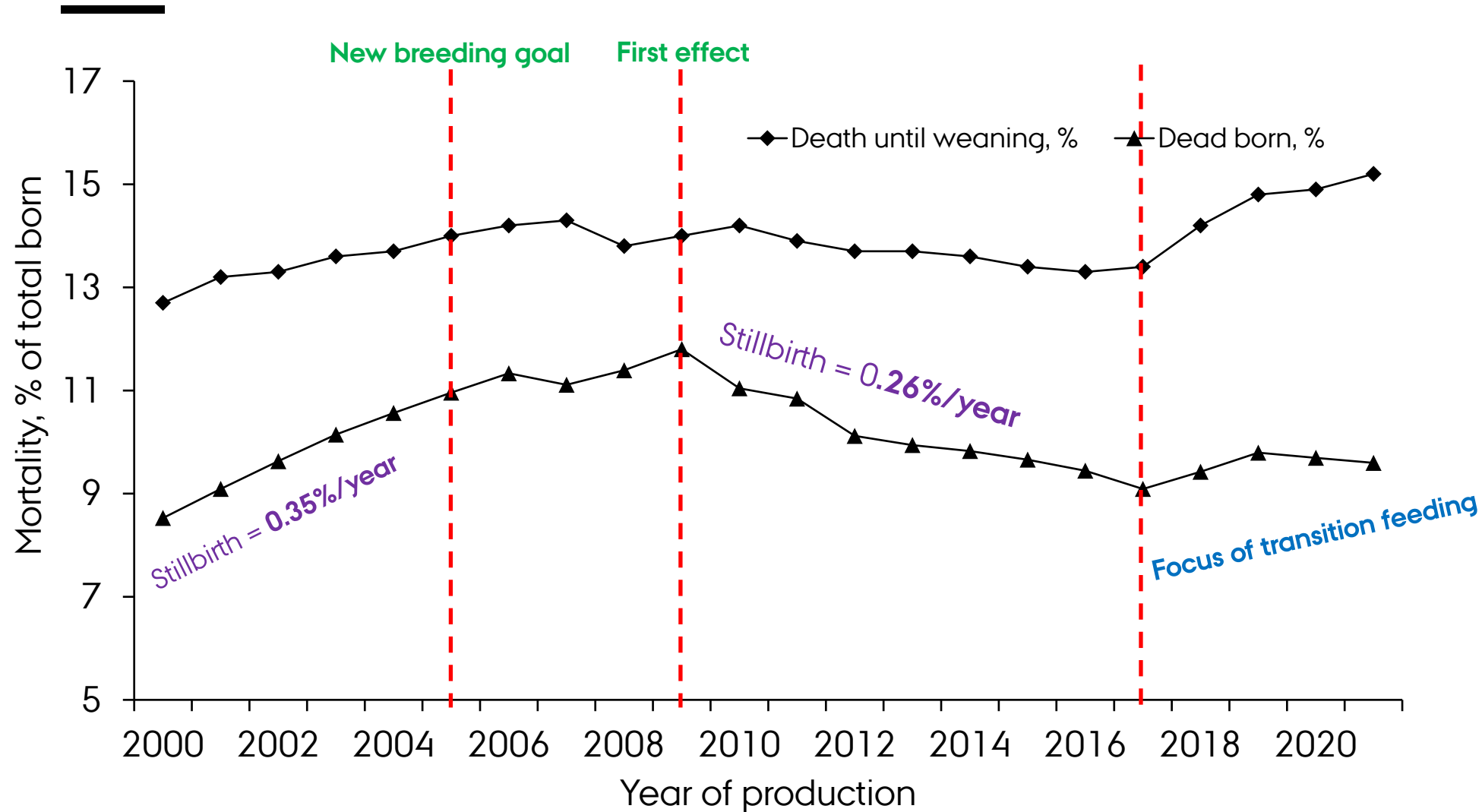
Hyper-prolific sows



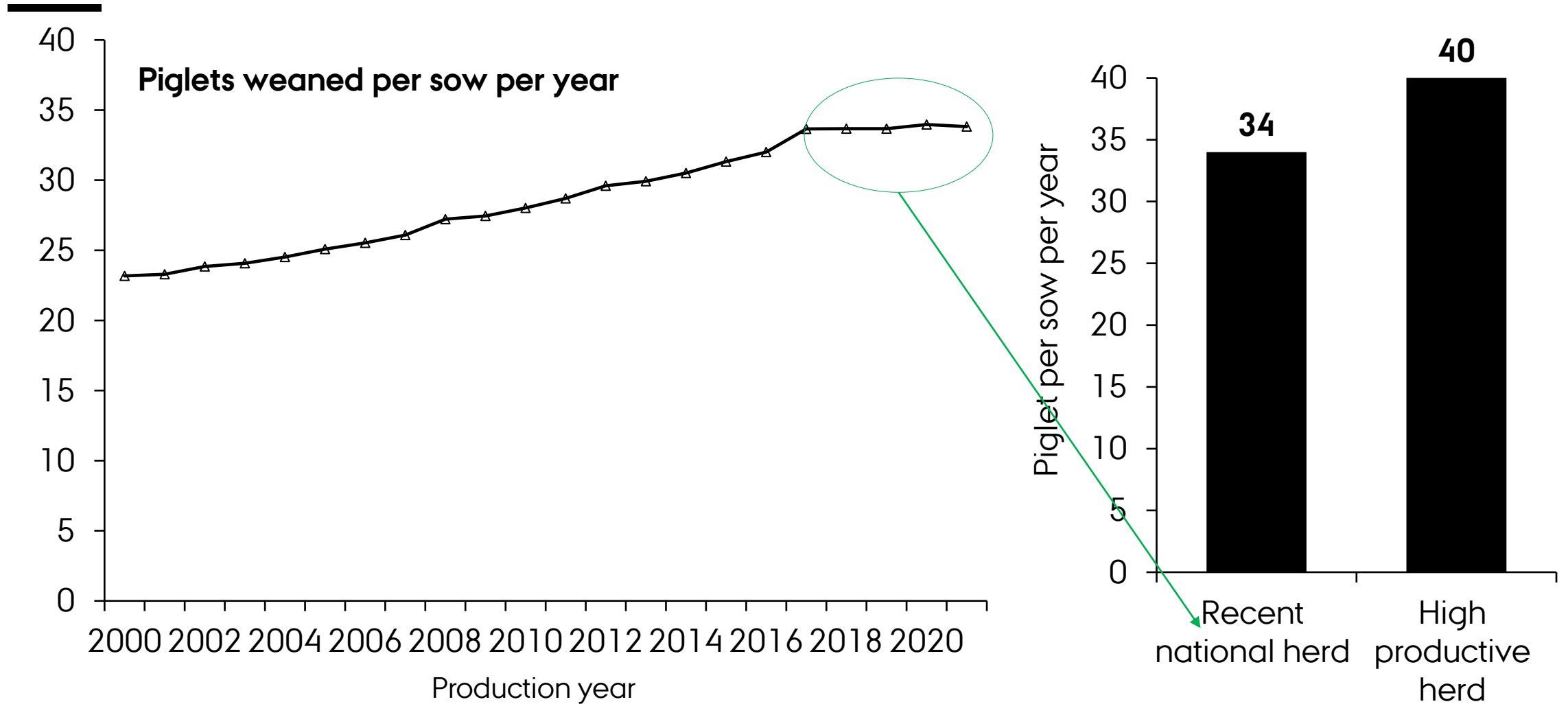
Hyper-prolific sows



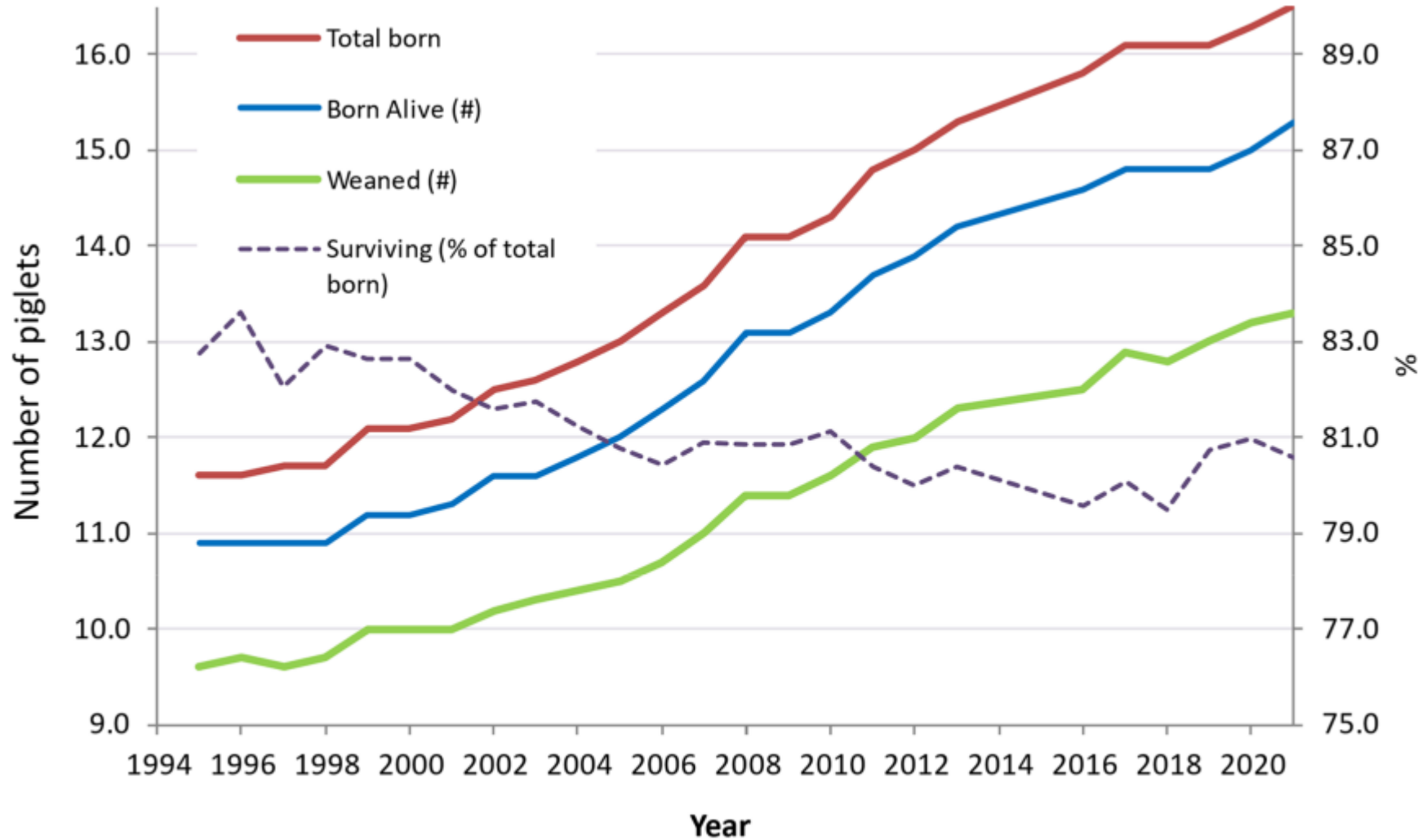
Hyper-prolific sows



Hyper-prolific sows



Hyper-prolific sows



Hyper-prolificacy is all over the globe but the extent
— could be differ from country to country based on the
genetic line, management, environment ...

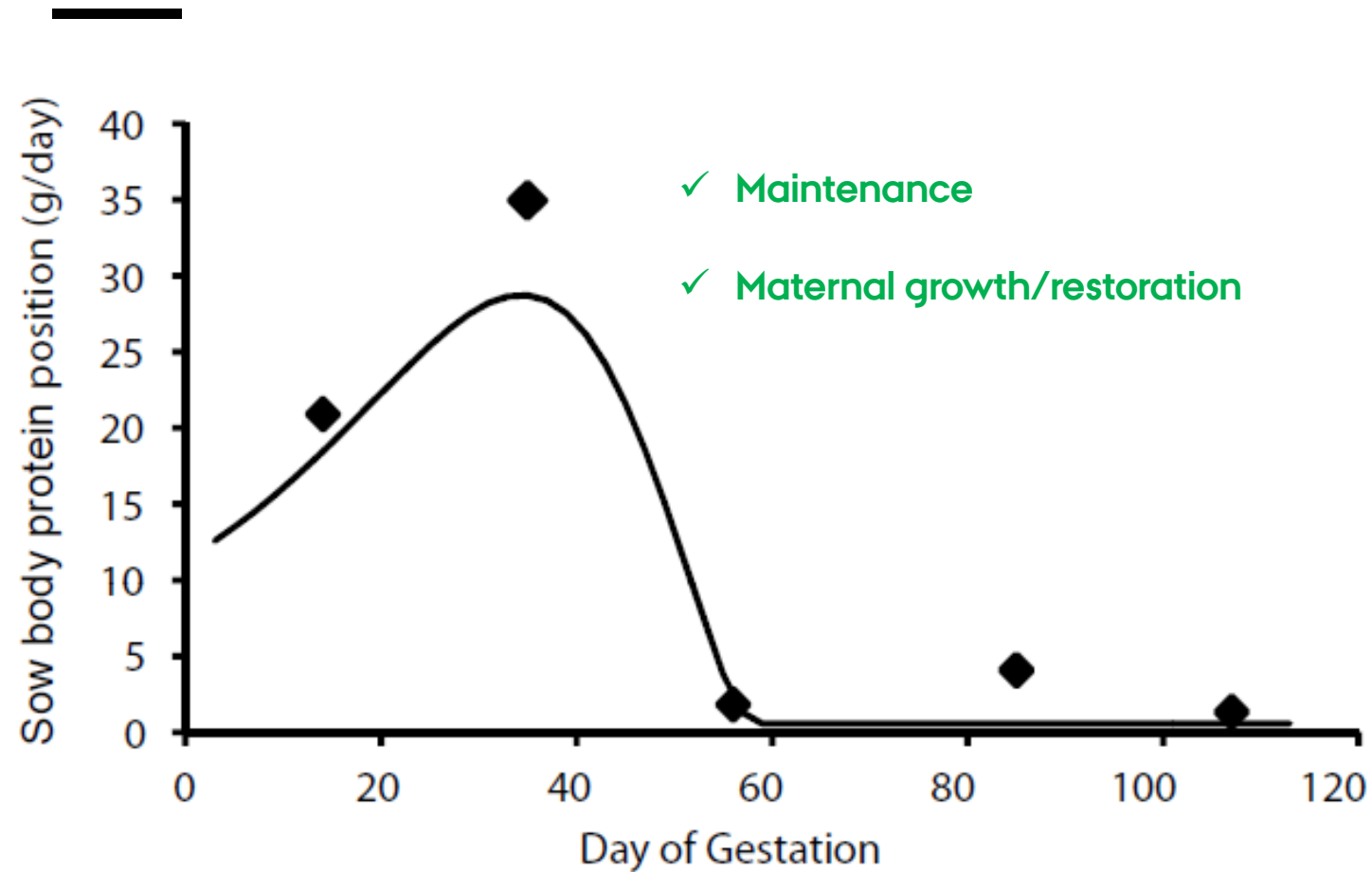


Nutrition of gestating sows

It is most challenging to meet a quantitative nutrient requirement of gestating sows

- Number of growing fetuses are unknown.
- The actual growth rate of individual fetuses is difficult to predict
- Great variation among the individual animals
- There is no best model for gestating sows

Priority of nutrient utilization in gestating sows



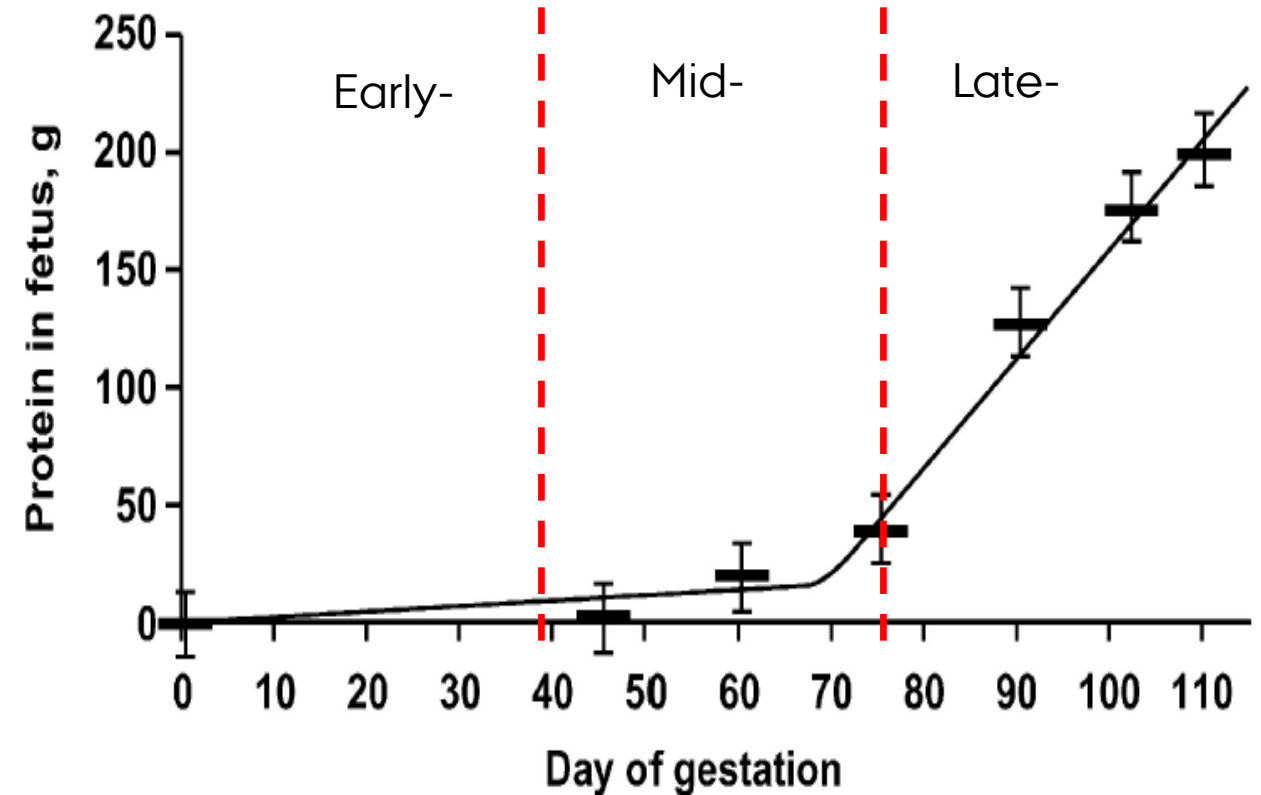
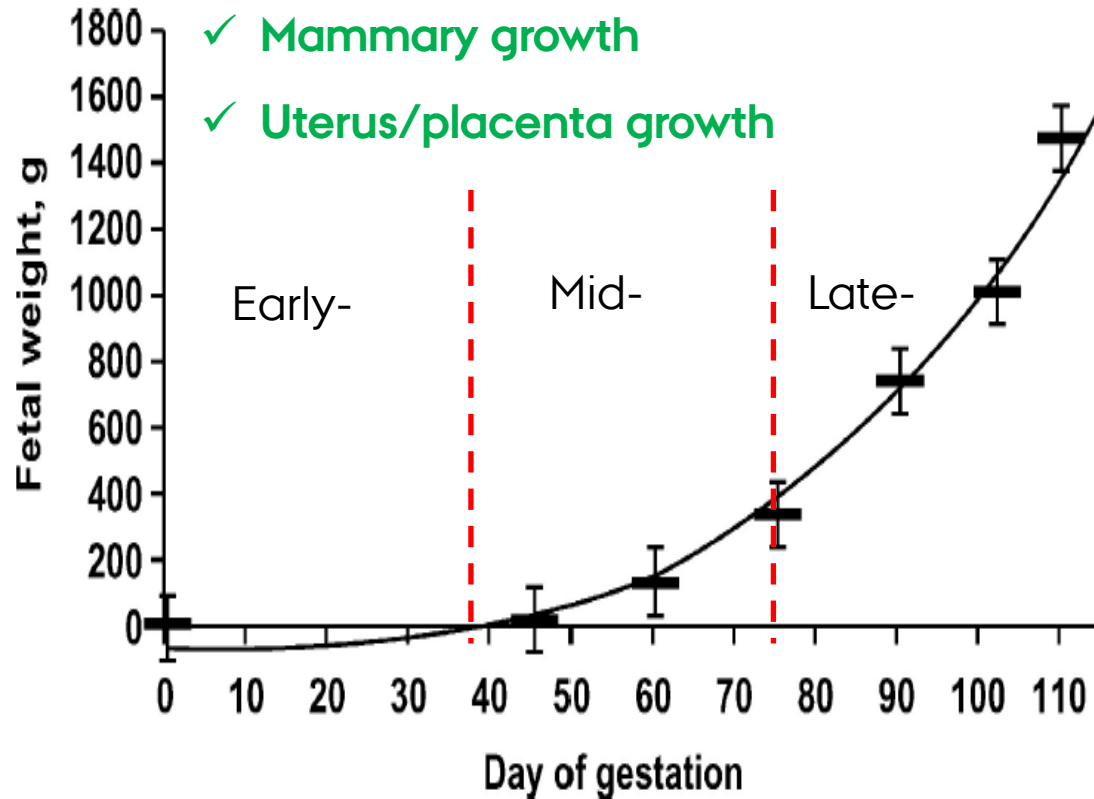
Time-dependent maternal body protein deposition in gestating sows.

Priority of nutrient utilization in gestating sows

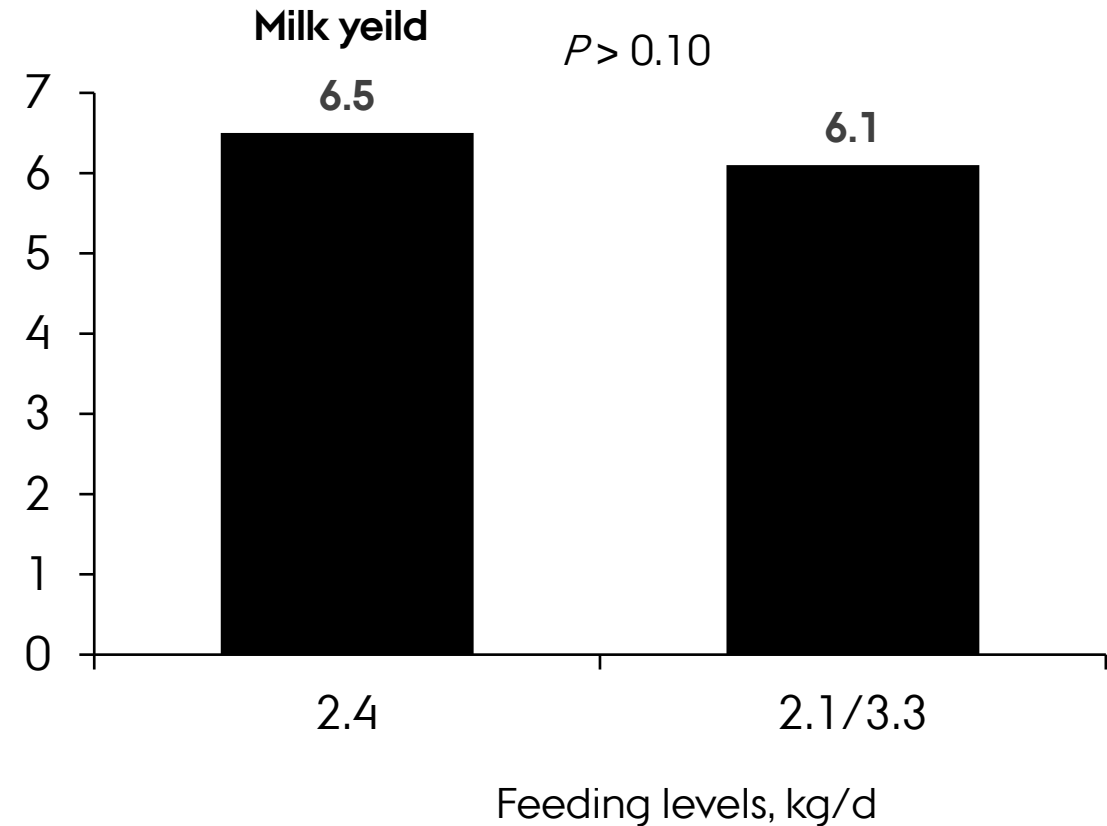
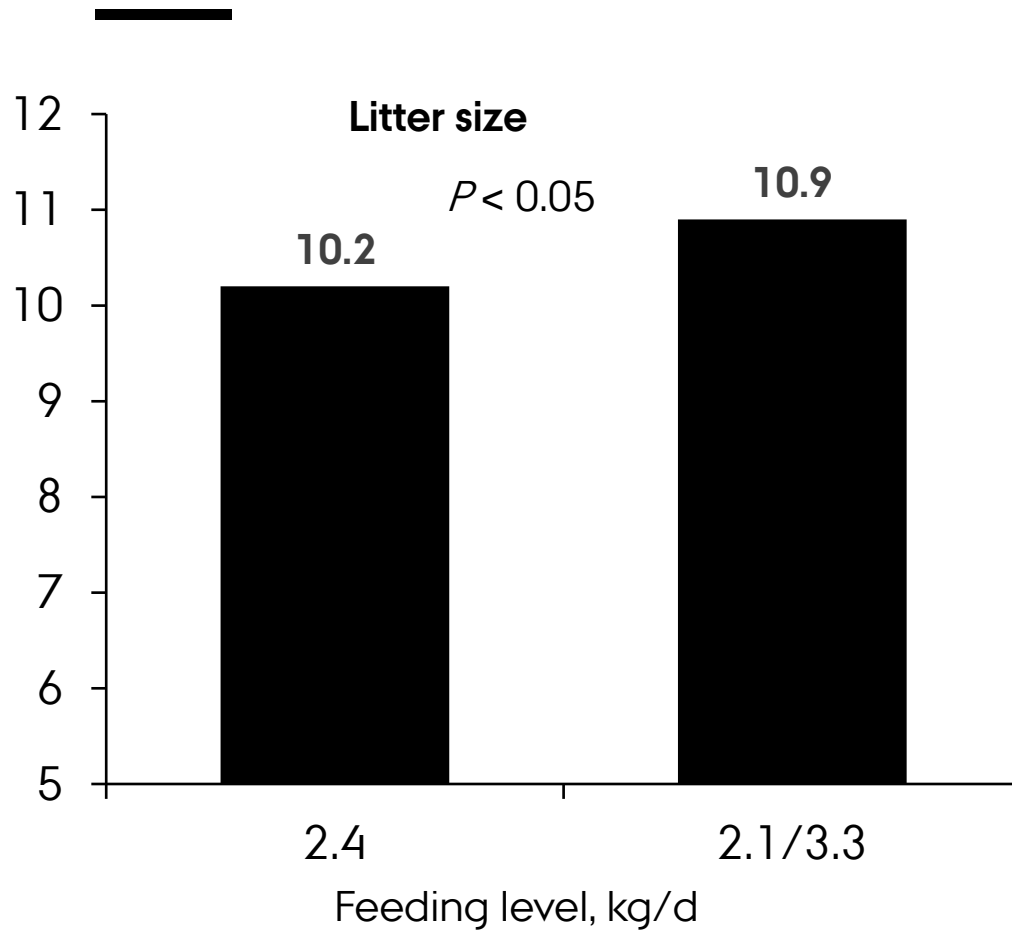
✓ Fetal growth: 35% in last 2 weeks

✓ Mammary growth

✓ Uterus/placenta growth

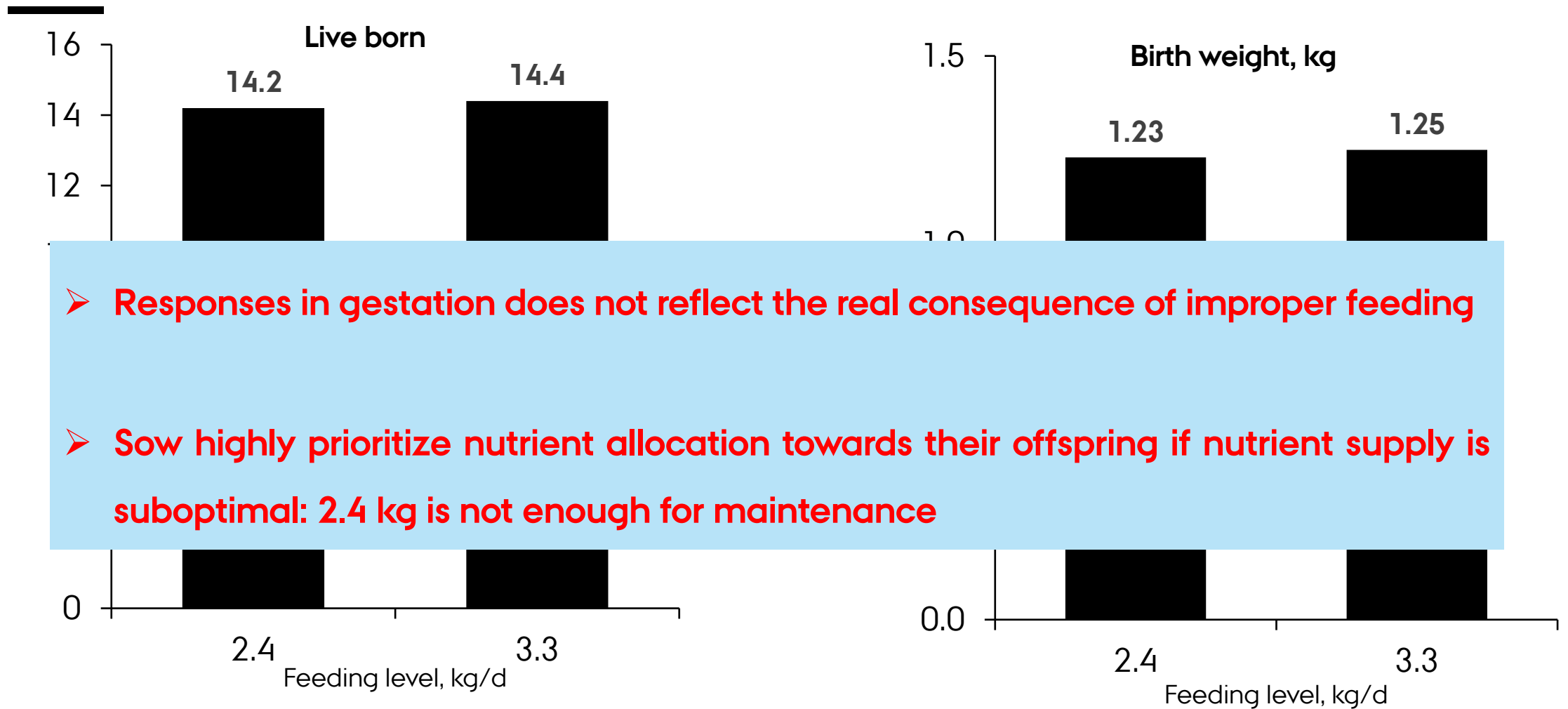


Effect of feed and energy intake

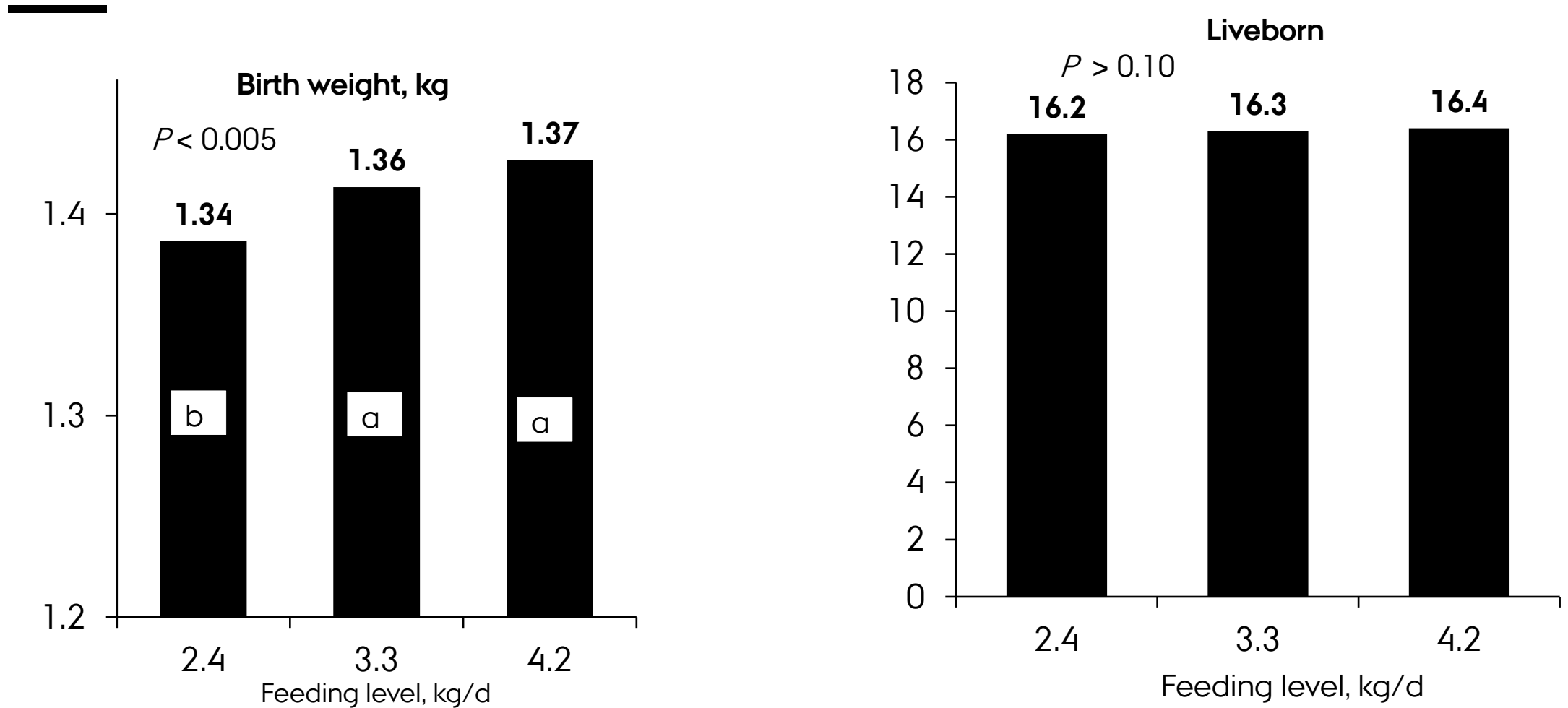


Intervention: 2.4 kg/d throughout or
2.4 kg in first two-third & 3.3 kg in the last-third in gilt

Effect of feed and energy intake



Effect of feed and energy intake

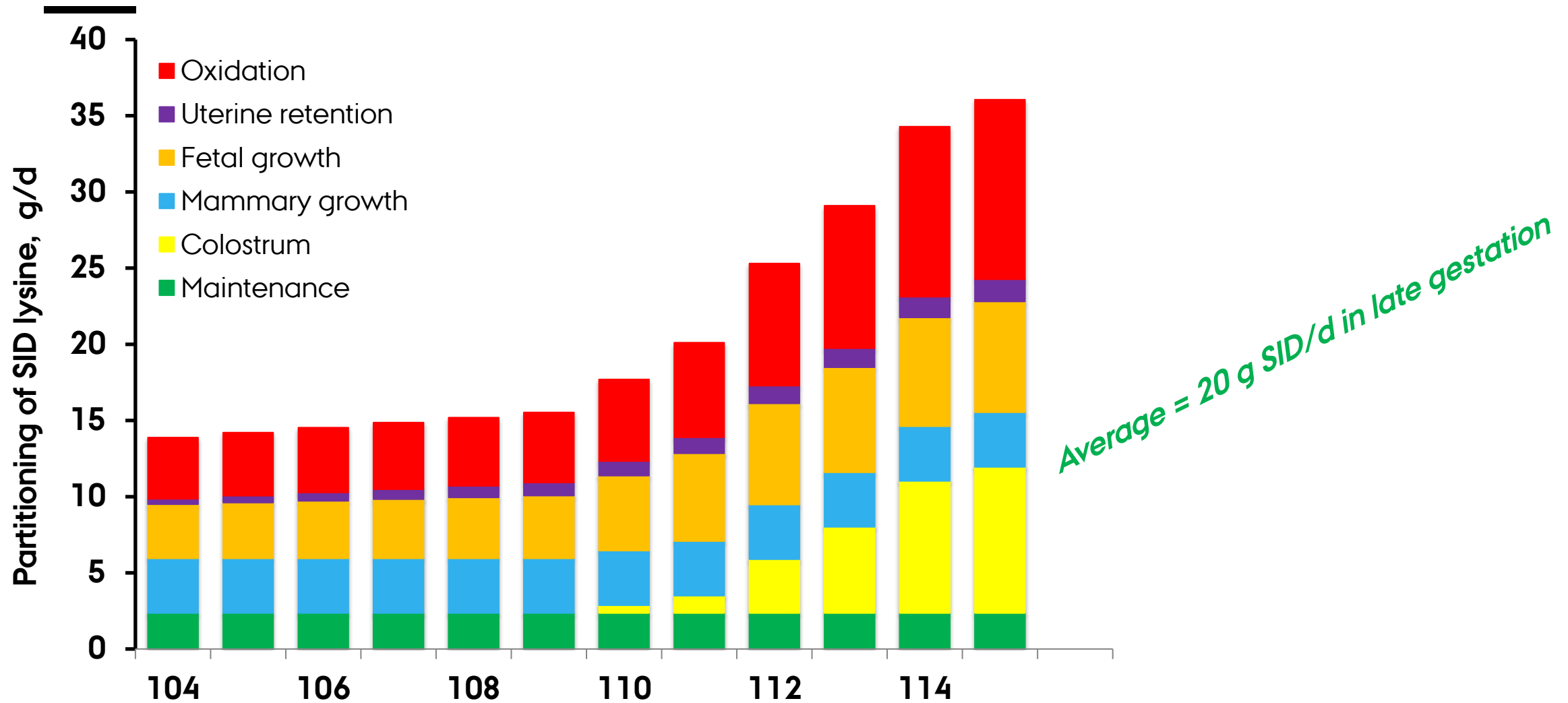


Intervention: 2.4 vs. 3.3 kg/d during the last 4 weeks of gestation in sows

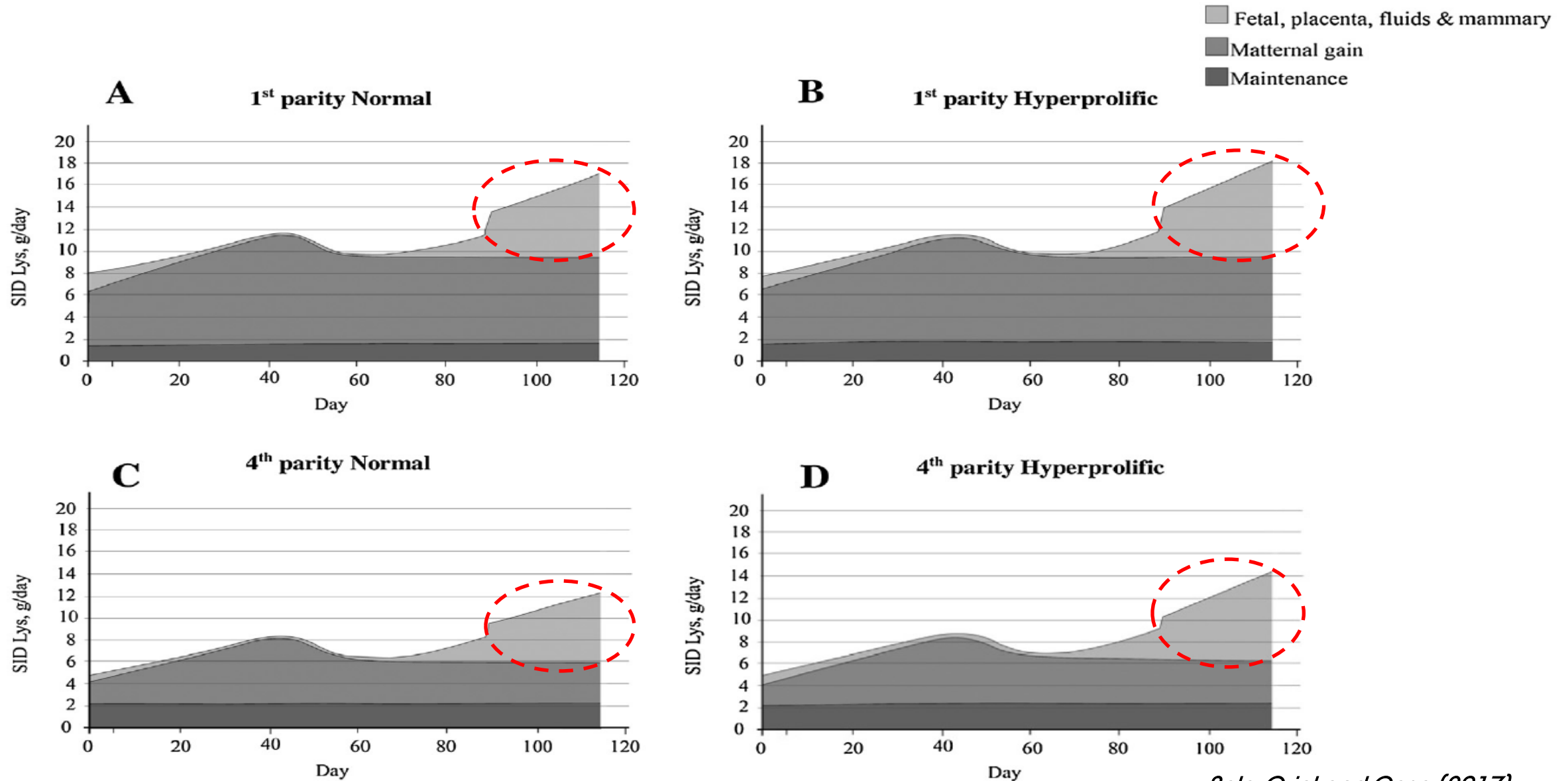
Lysine requirement

- Lysine is the most studied amino acid in sow nutrition
- Lysine requirement increase with the progress of gestation
- Measures of **ileal digestibility** are used as an estimate of **bioavailability** of AA:
 - ✓ Apparent ileal digestibility: *not used in practical diet formulation*
 - ✓ Standard ileal digestibility: *used in diet formulations*
 - ✓ True ileal digestibility: *not be used in practical diet formulation*

Lysine partitioning in late gestating sow



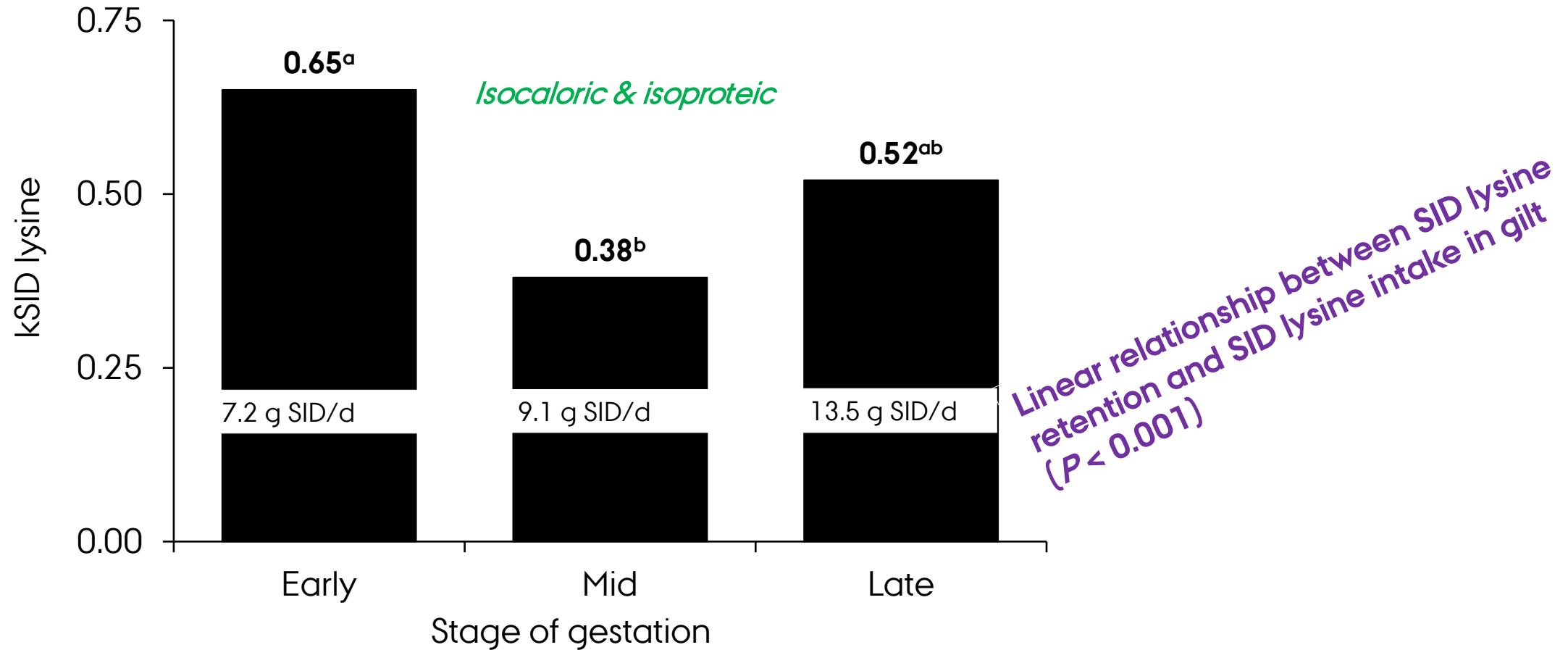
Lysine partitioning in pregnant gilts and sows



Sola-Oriol and Gasa (2017)

Efficiency of SID lysine utilization

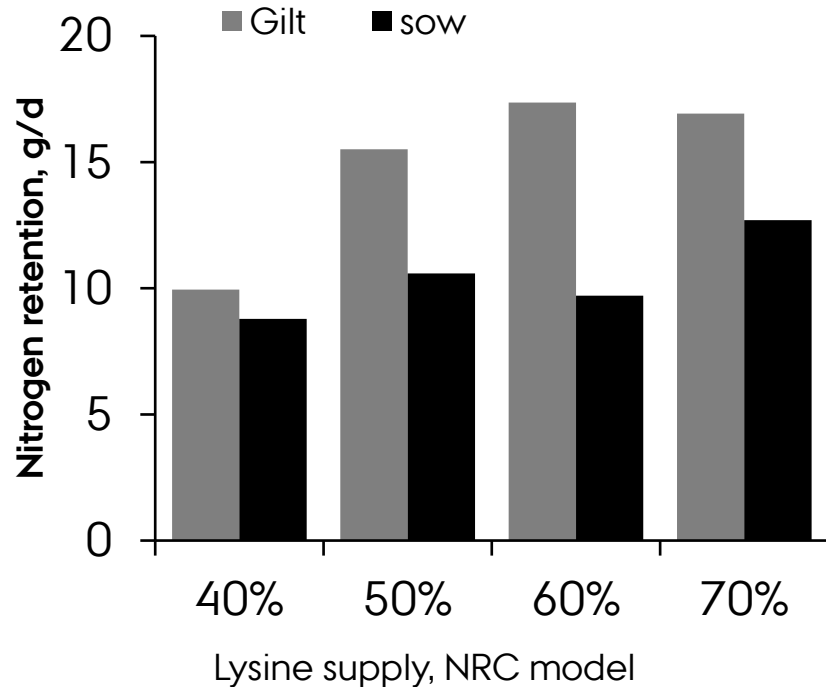
The efficiency of SID lysine represents the absorbed fraction of the lysine that is retained in the body



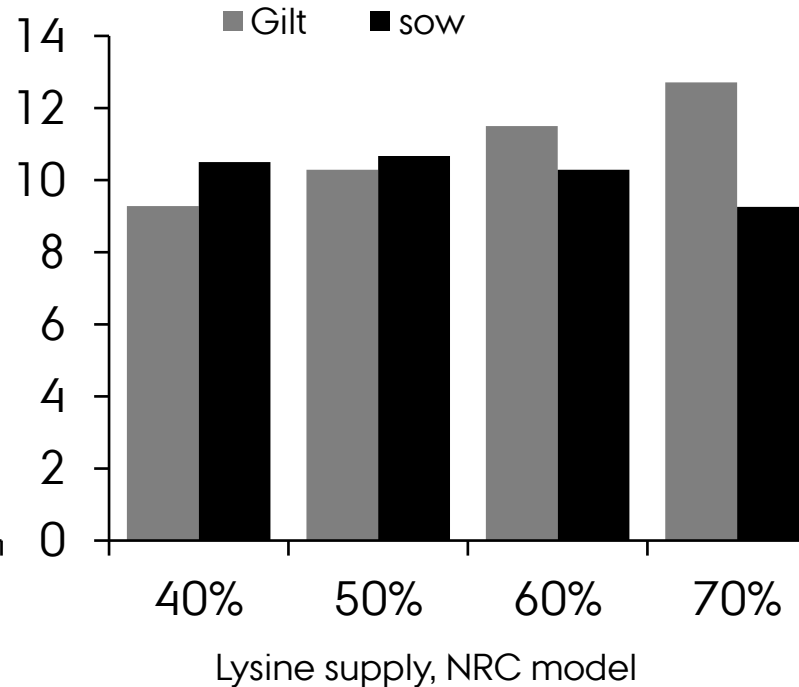
Intervention: 40, 50, 60 or 70% SID lysine above maintenance throughout gestation in gilt

Nitrogen retention in gilts vs sows

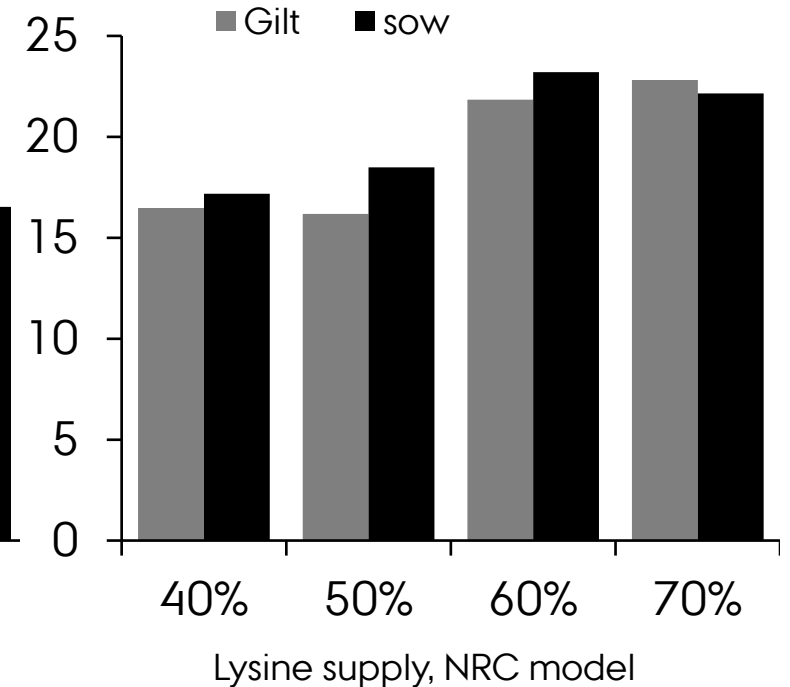
Early gestation: 48-52



Mid gestation: 75-79



Late gestation: 103-107

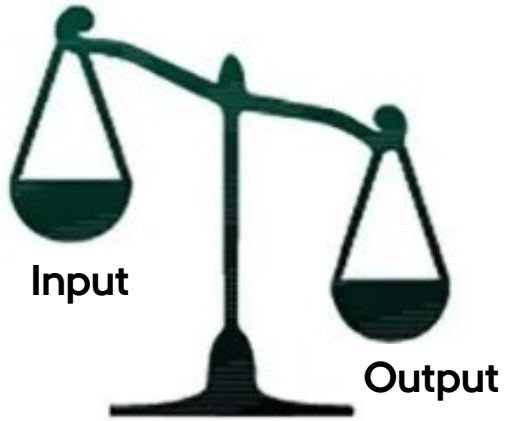


Intervention: 40, 50, 60 or 70% SID lysine above maintenance throughout gestation in gilt

Transition sows

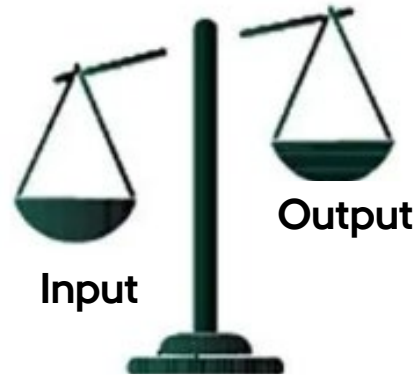
Transition period is not well defined: a shift from late gestation to early lactation

A. Intermediary metabolism undergo substantial changes



Gestation period

Metabolism: Anabolic



Transition period

Metabolism: Catabolic

- Colostrum synthesis
- Mammary growth substantial
- Fetal growth
- Onset of lactation

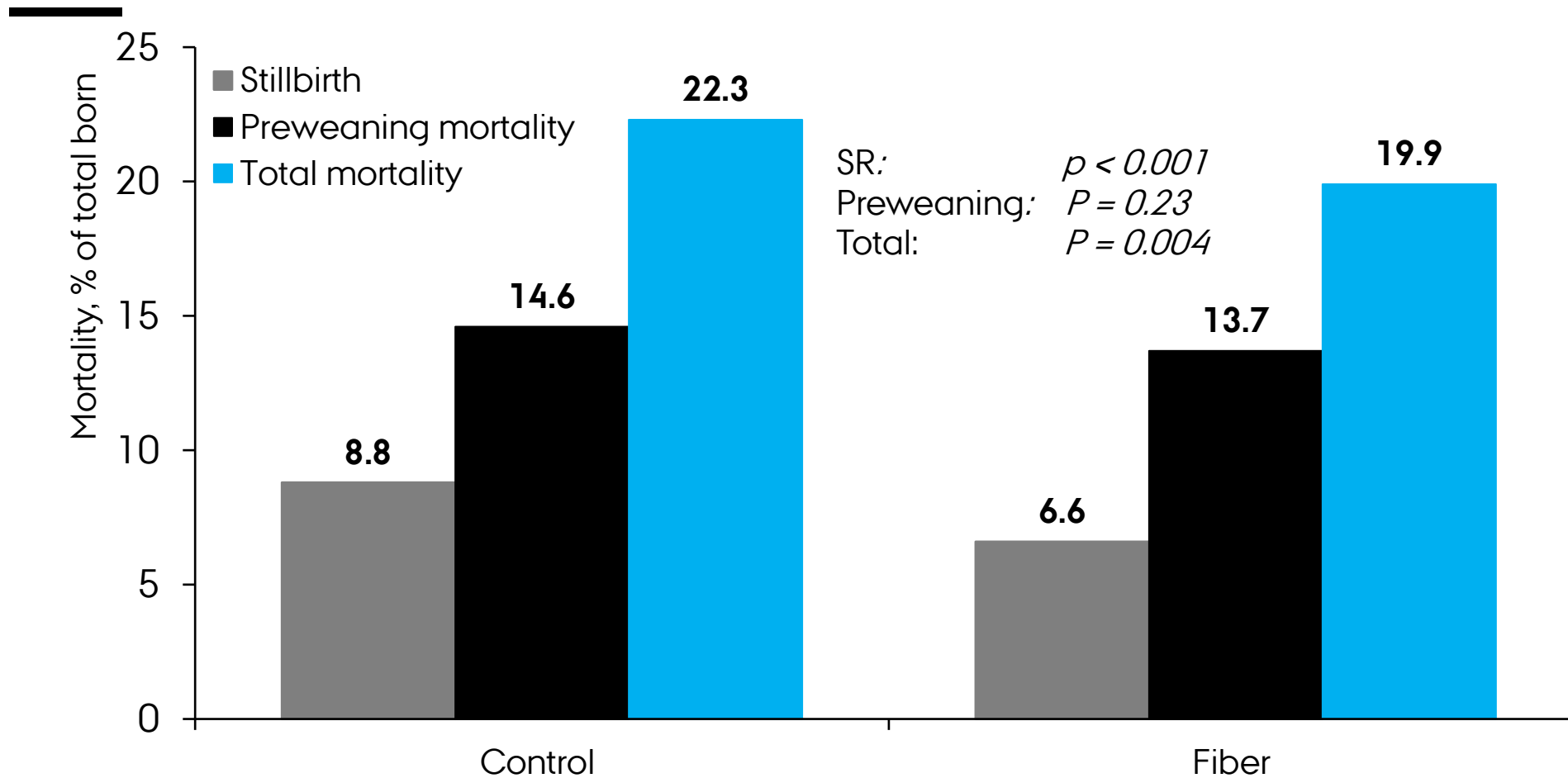
B. Piglet mortality is very high



Major focus:

- Influence farrowing process
- Improve piglet survival

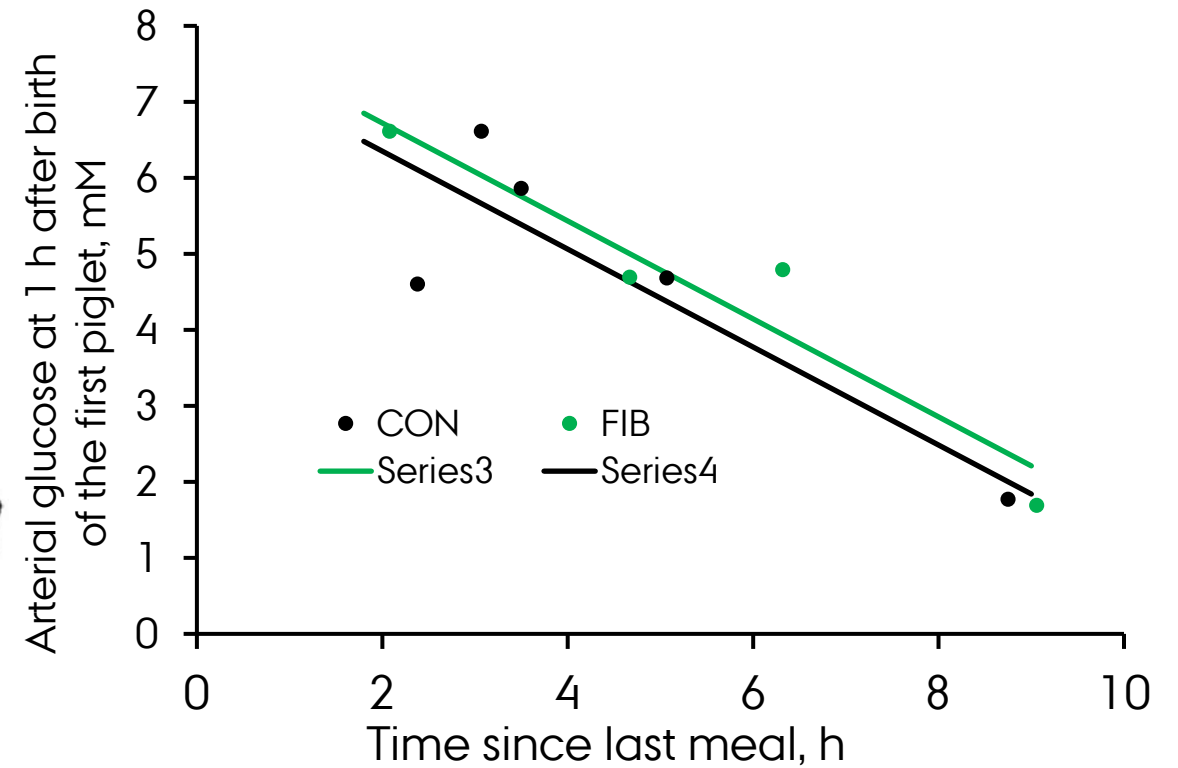
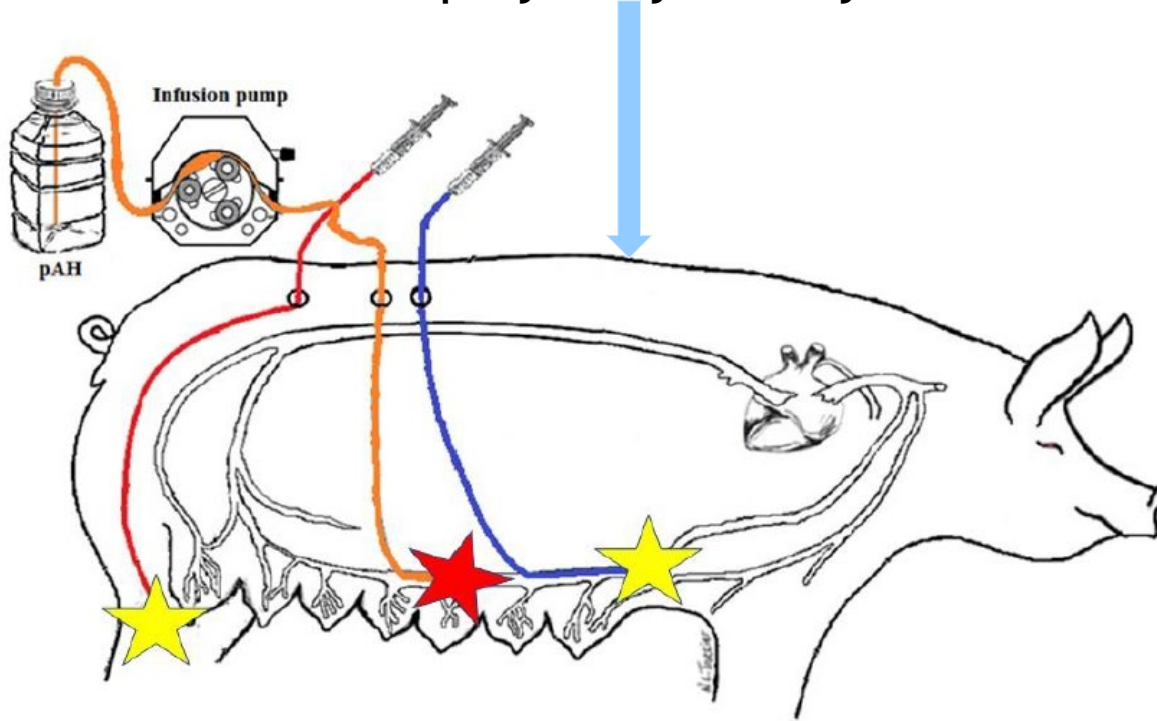
Dietary fiber in transition sows



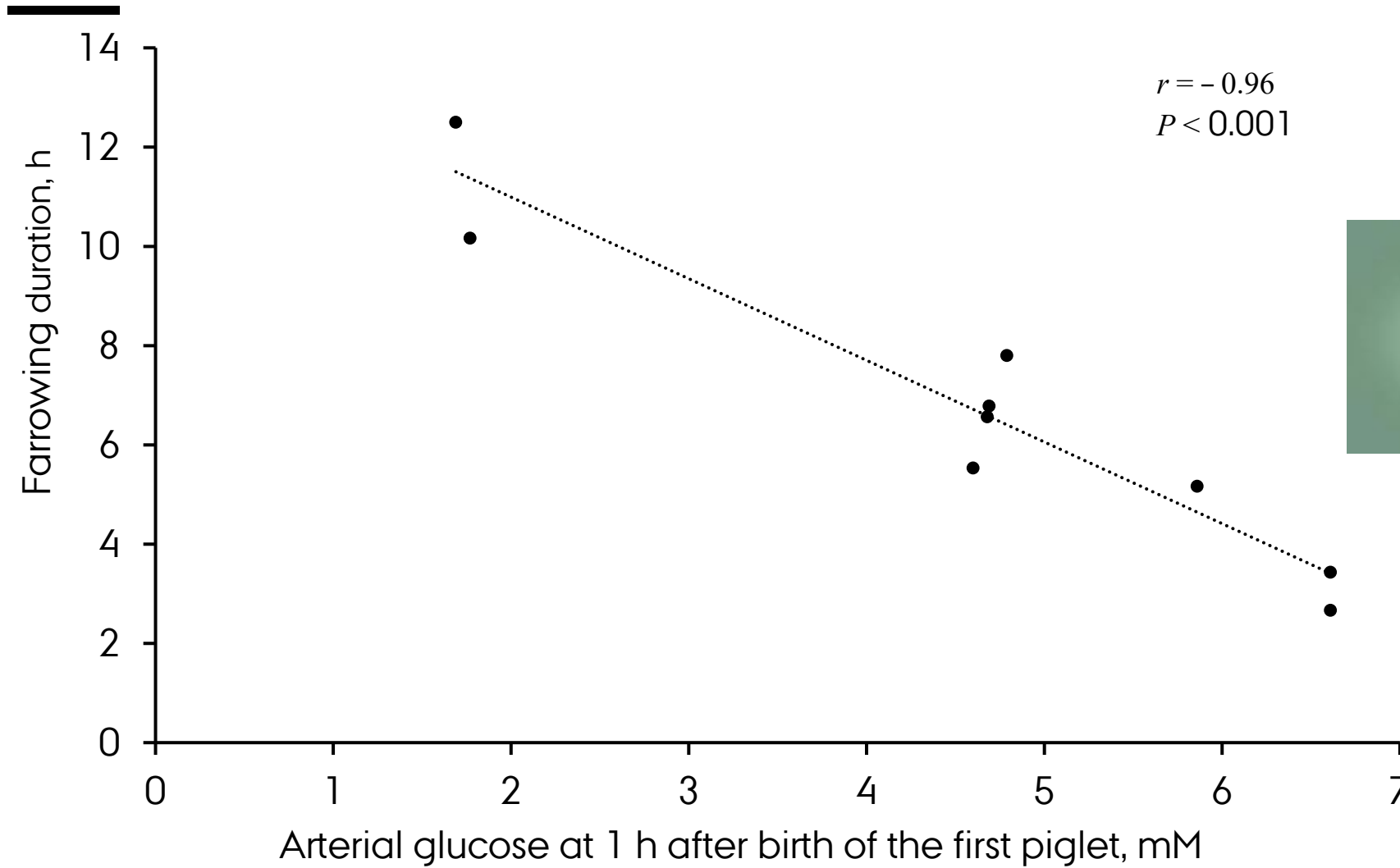
Intervention: d 102-108: 350 g/d; d 109-farrowing: 700 g/d

Dietary fiber in transition sows

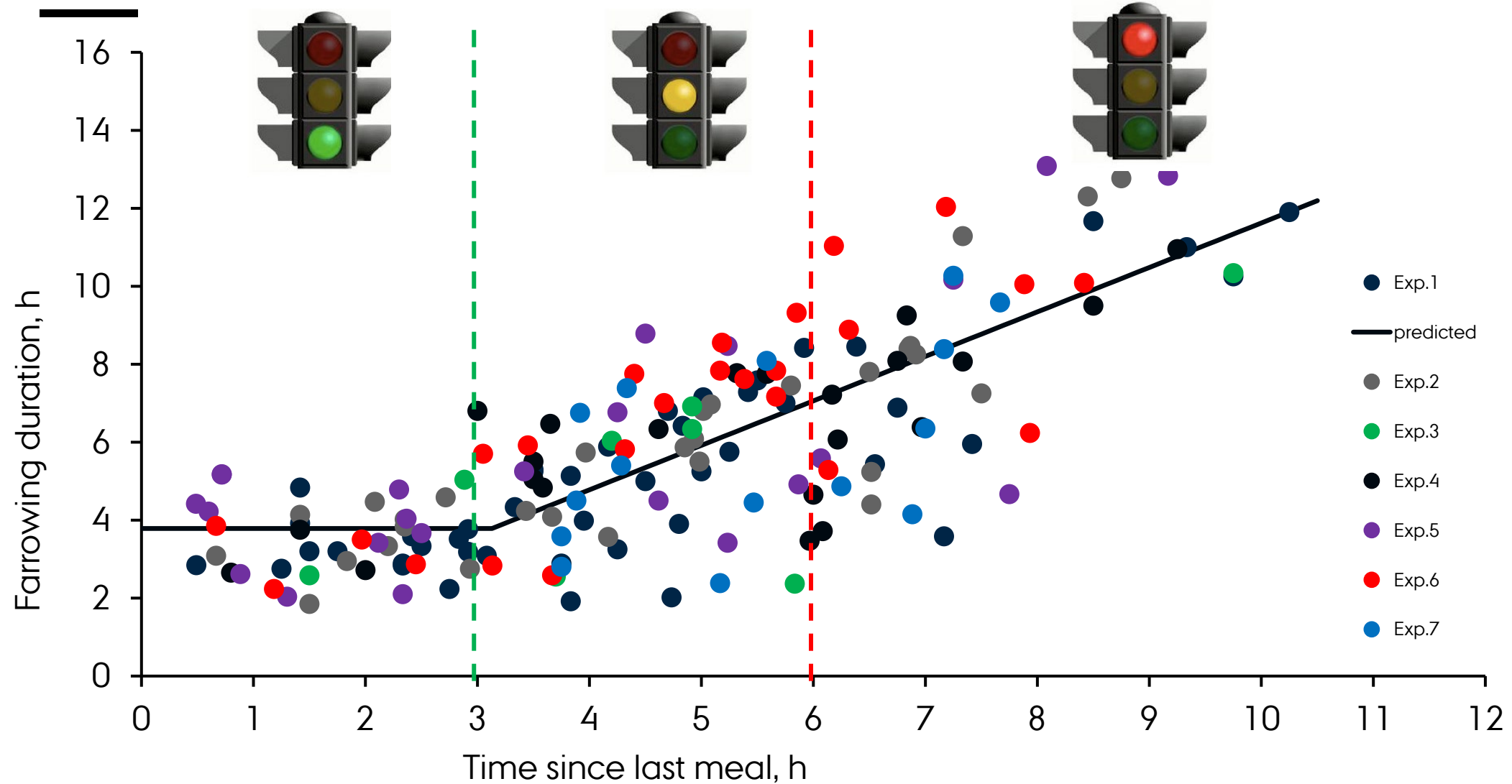
Serial blood sampling during farrowing



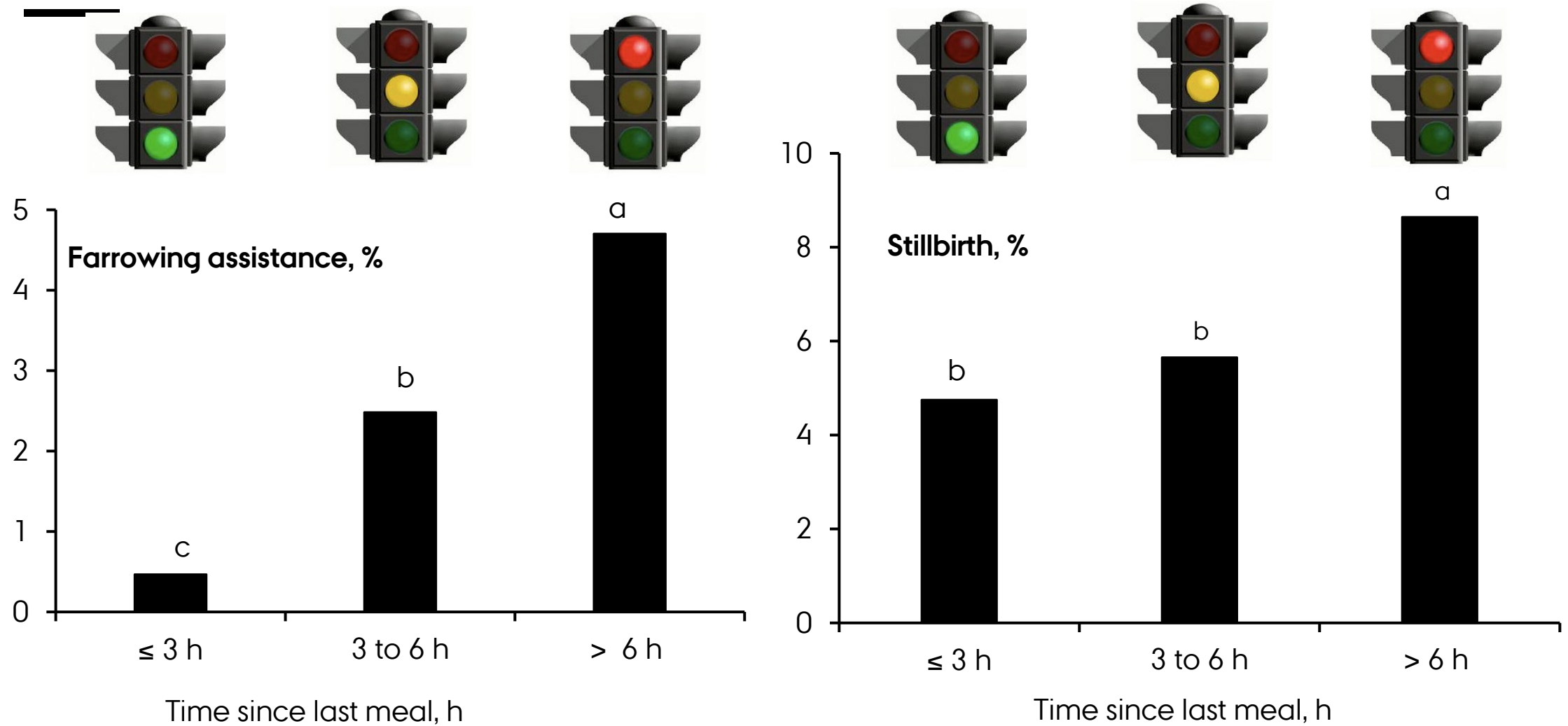
Energy in transition sows



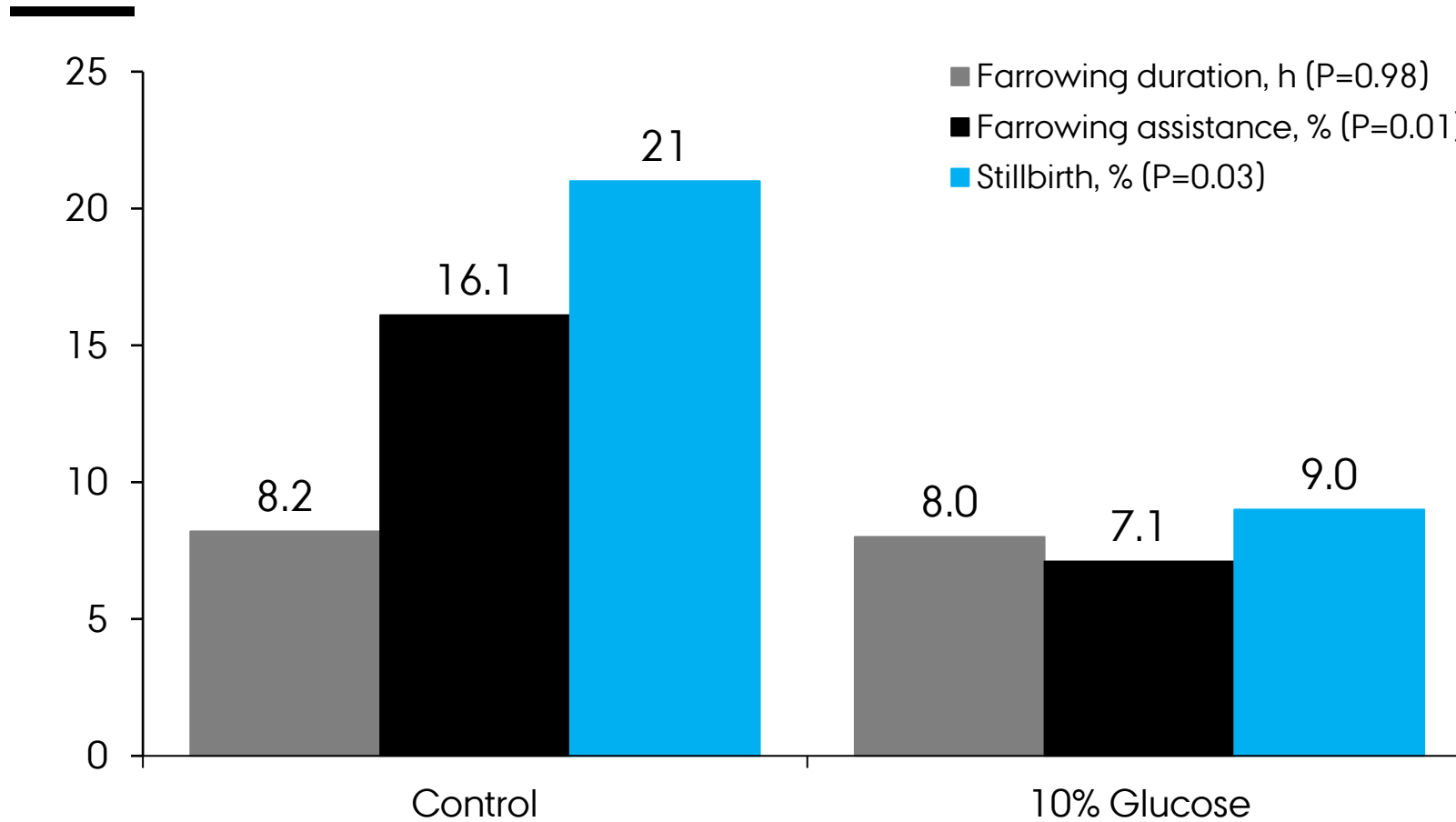
Energy in transition sows



Energy in transition sows

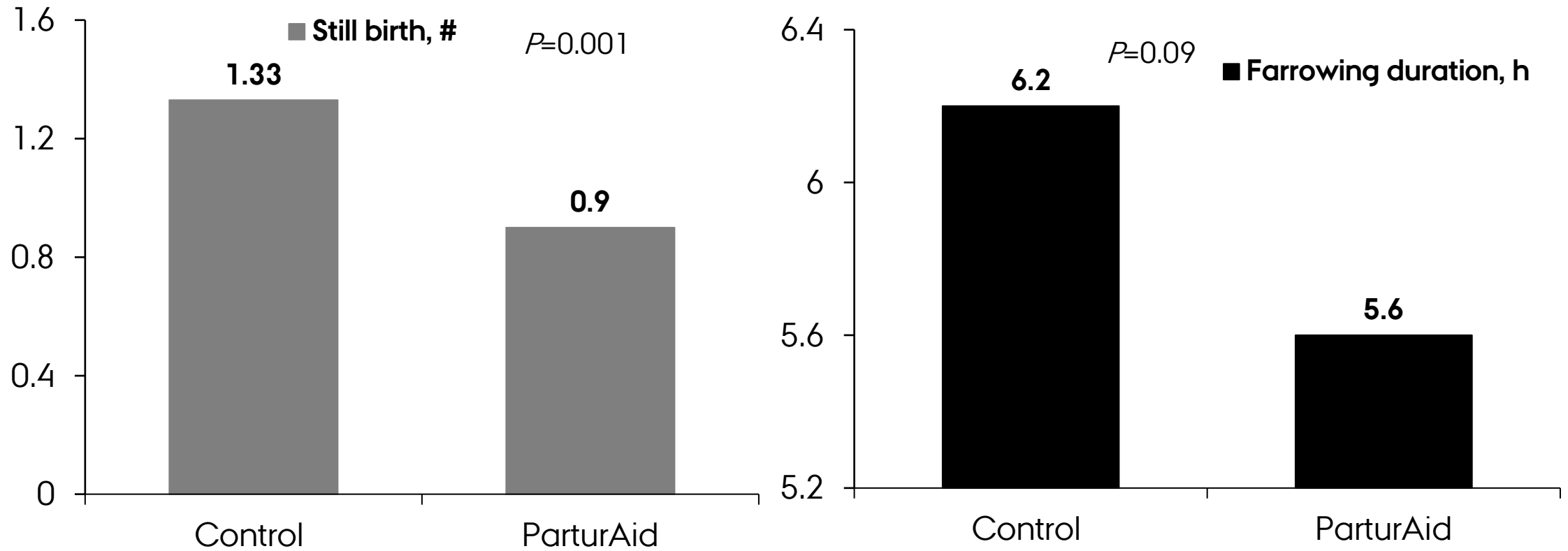


Glucose supplementation in transition sows



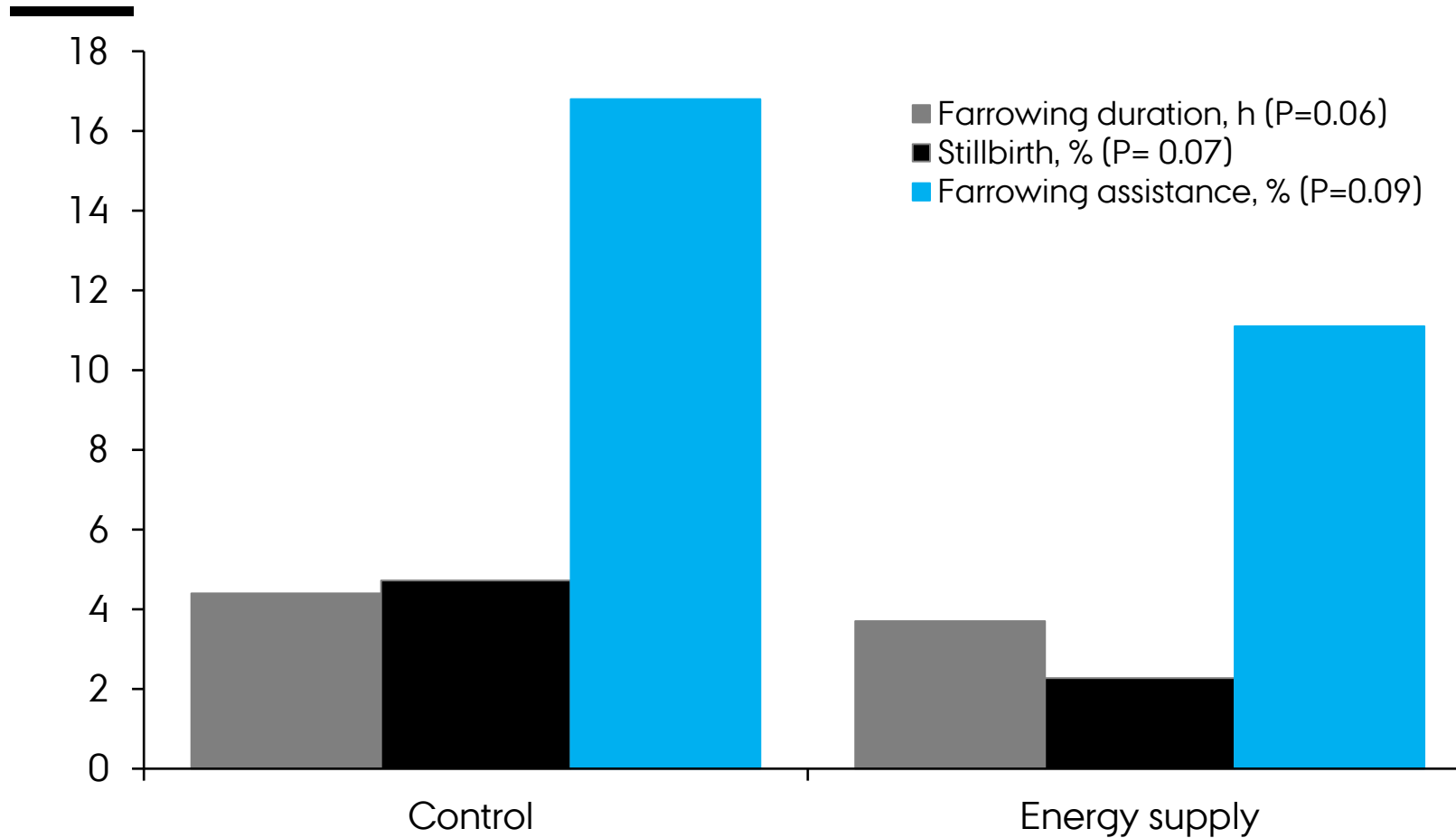
Intervention: 10% glucose solution from onset of nest-building until 24 h after birth of first piglets

Energy supplementation in transition sows



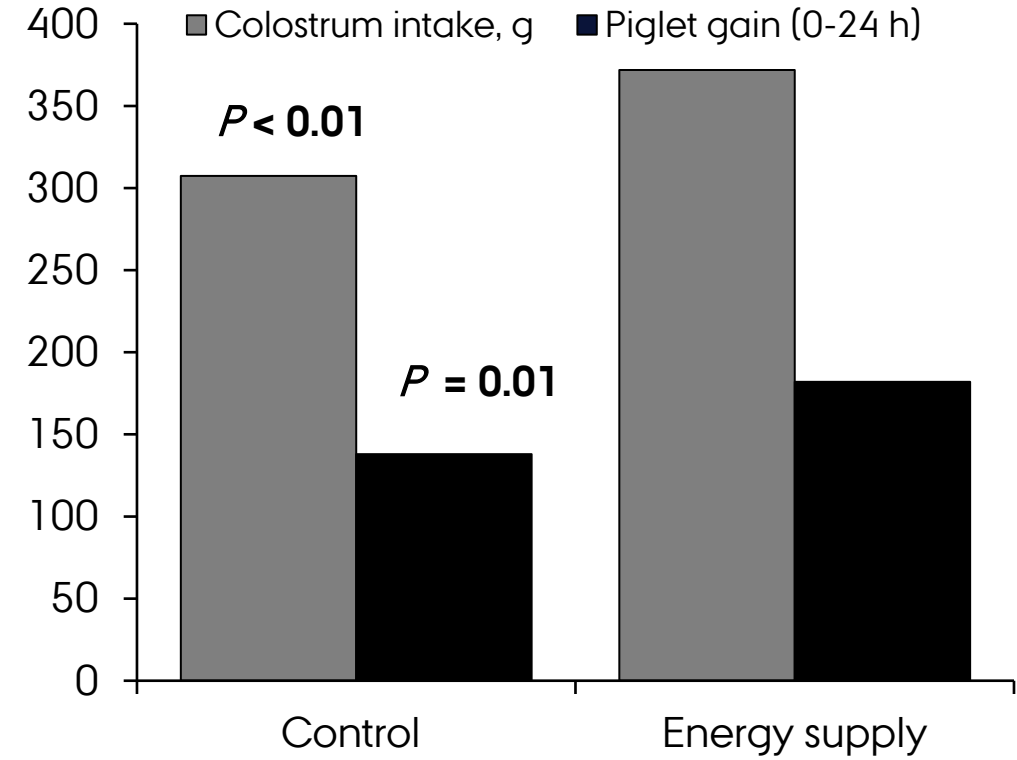
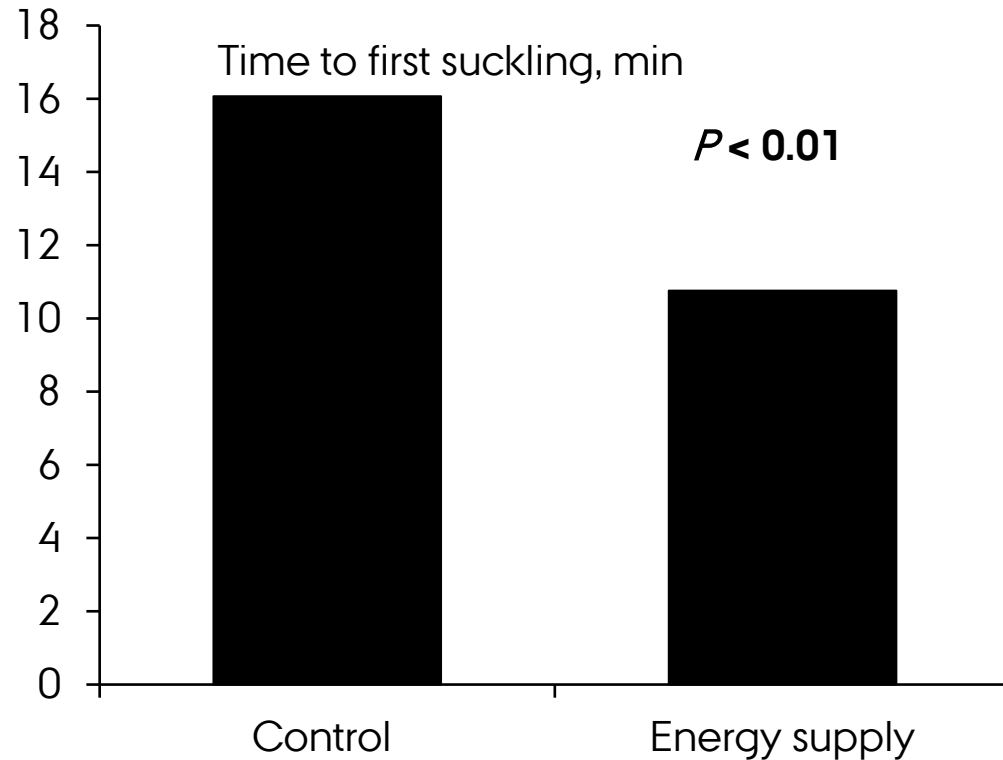
Intervention: parturient mammals (ParturAid), 30 ml, 8 h before expected birth of first piglets

Energy supplementation in transition sows



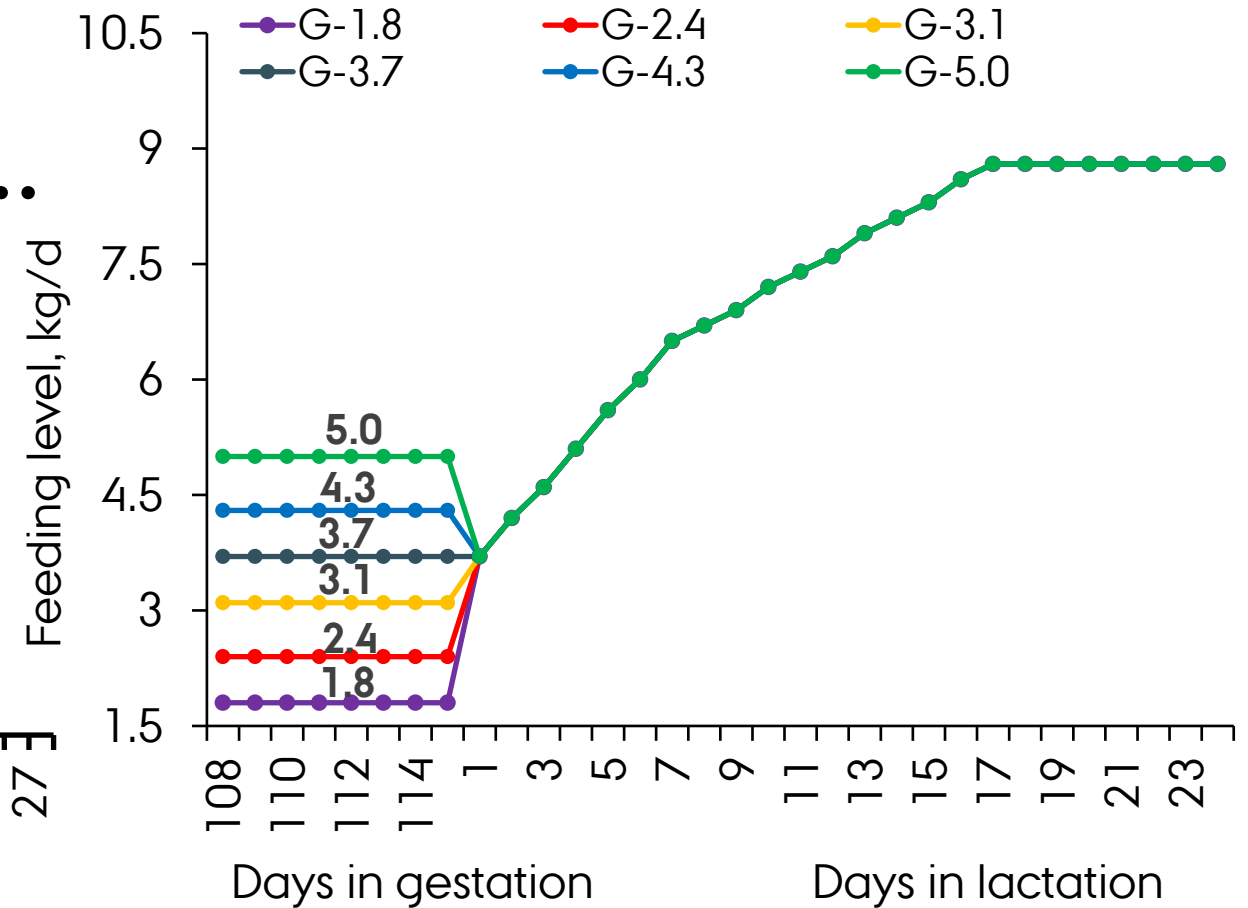
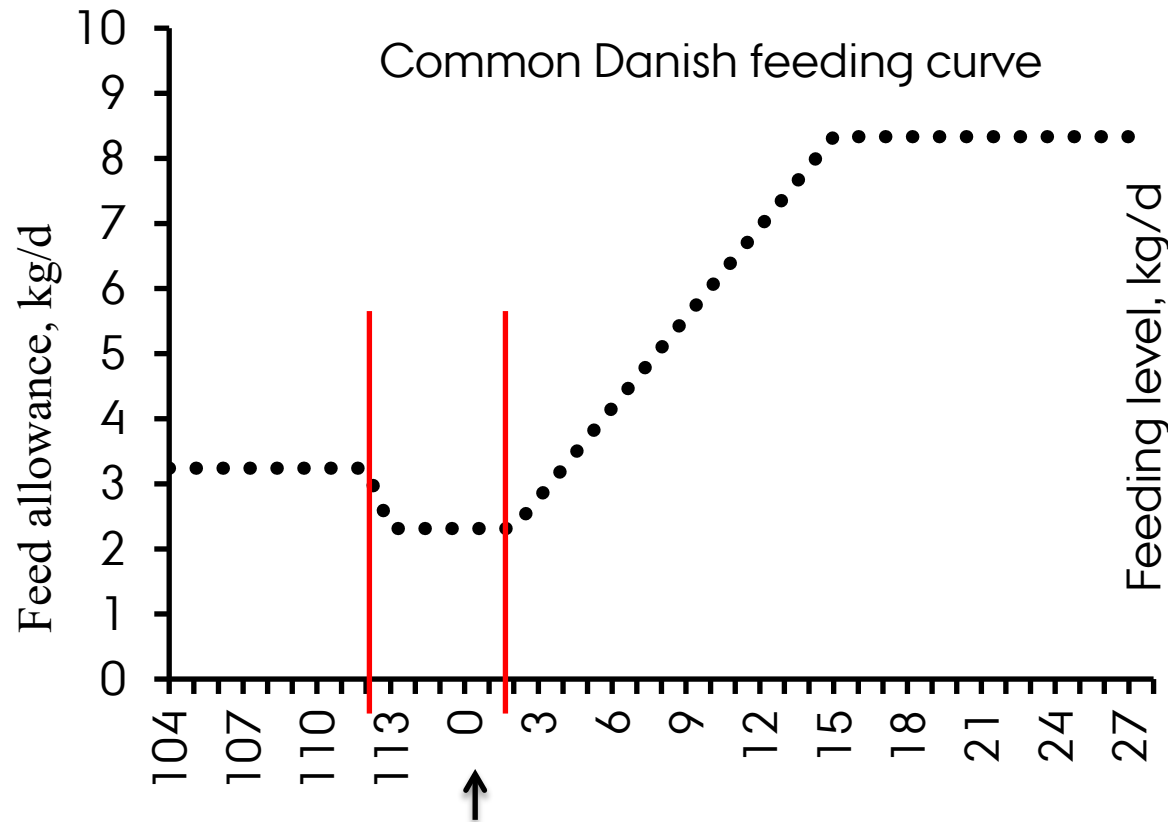
Intervention: 500 g of energetic supplement (250 g lactation diet plus 250 g of cane sugar, 18 h after farrowing induction)

Energy supplementation in transition sows

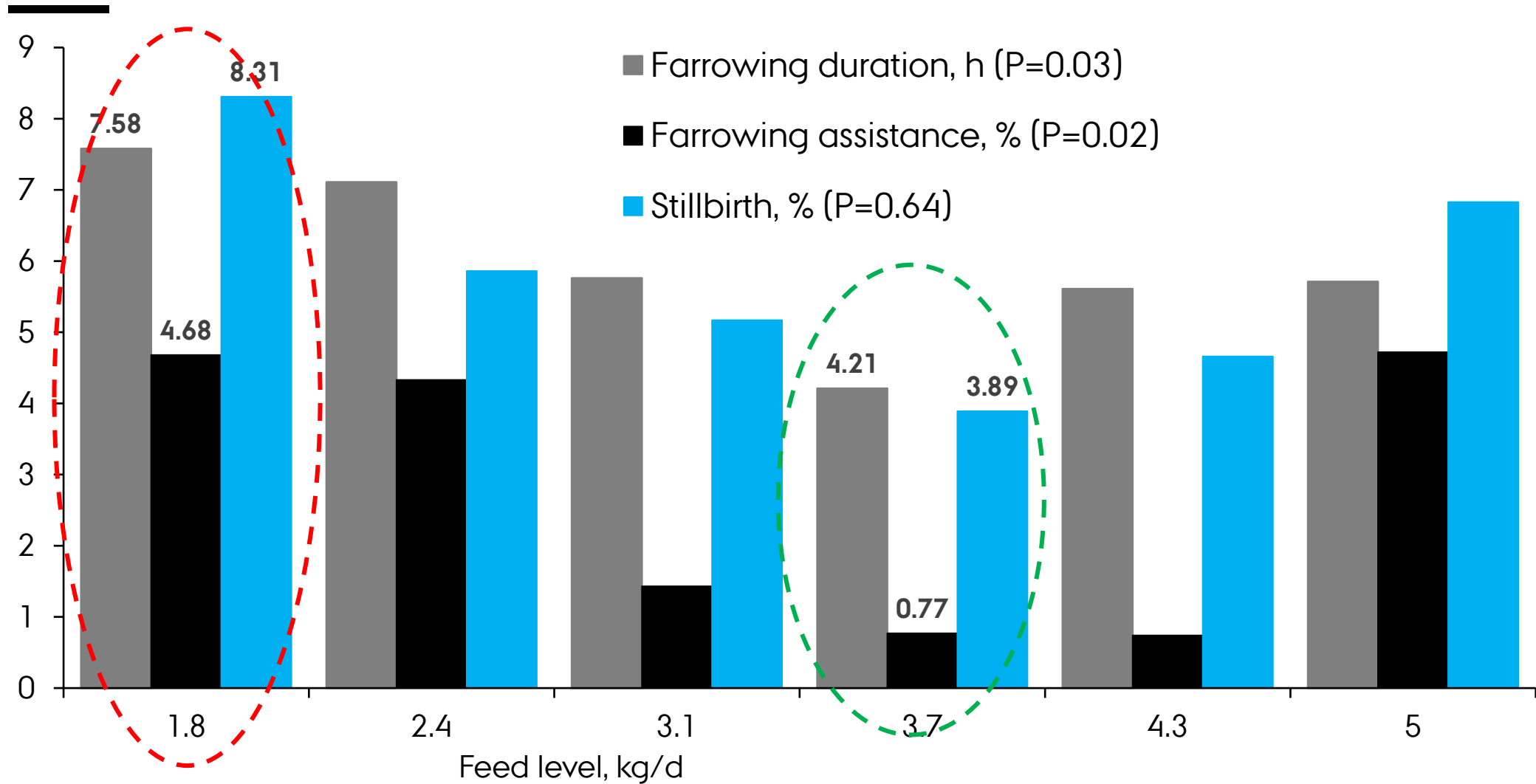


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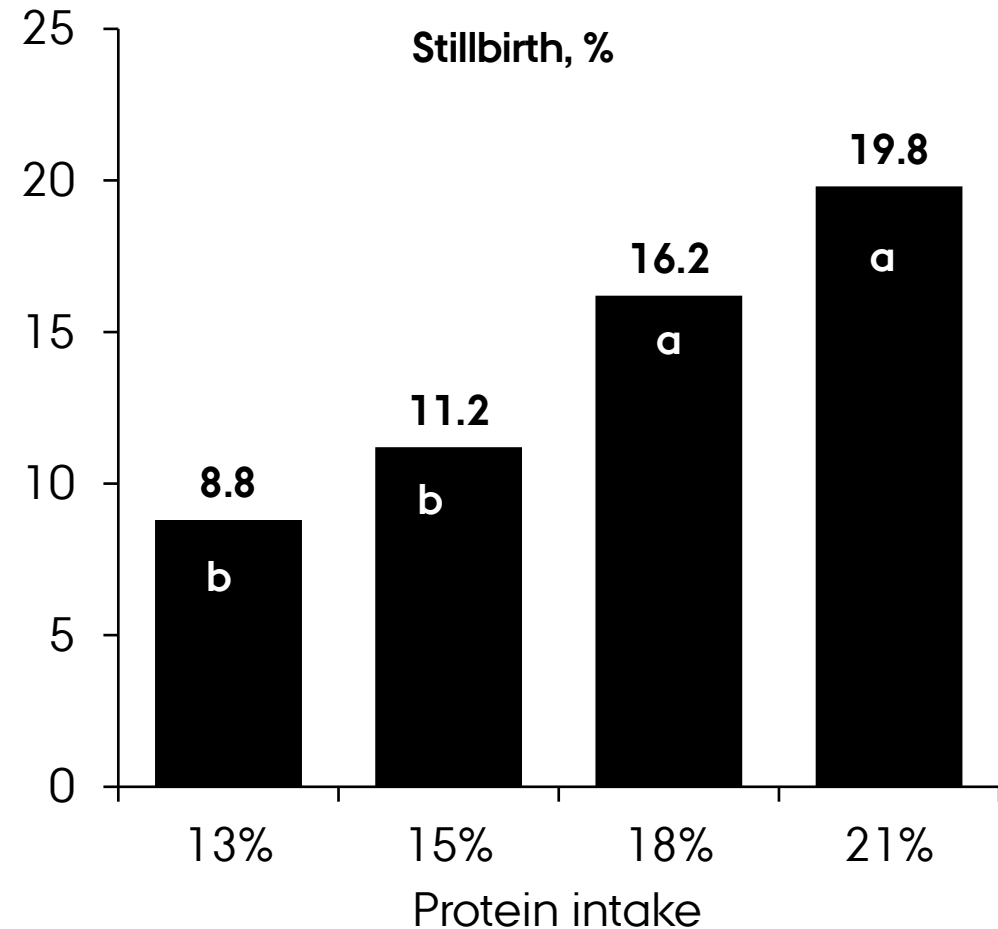
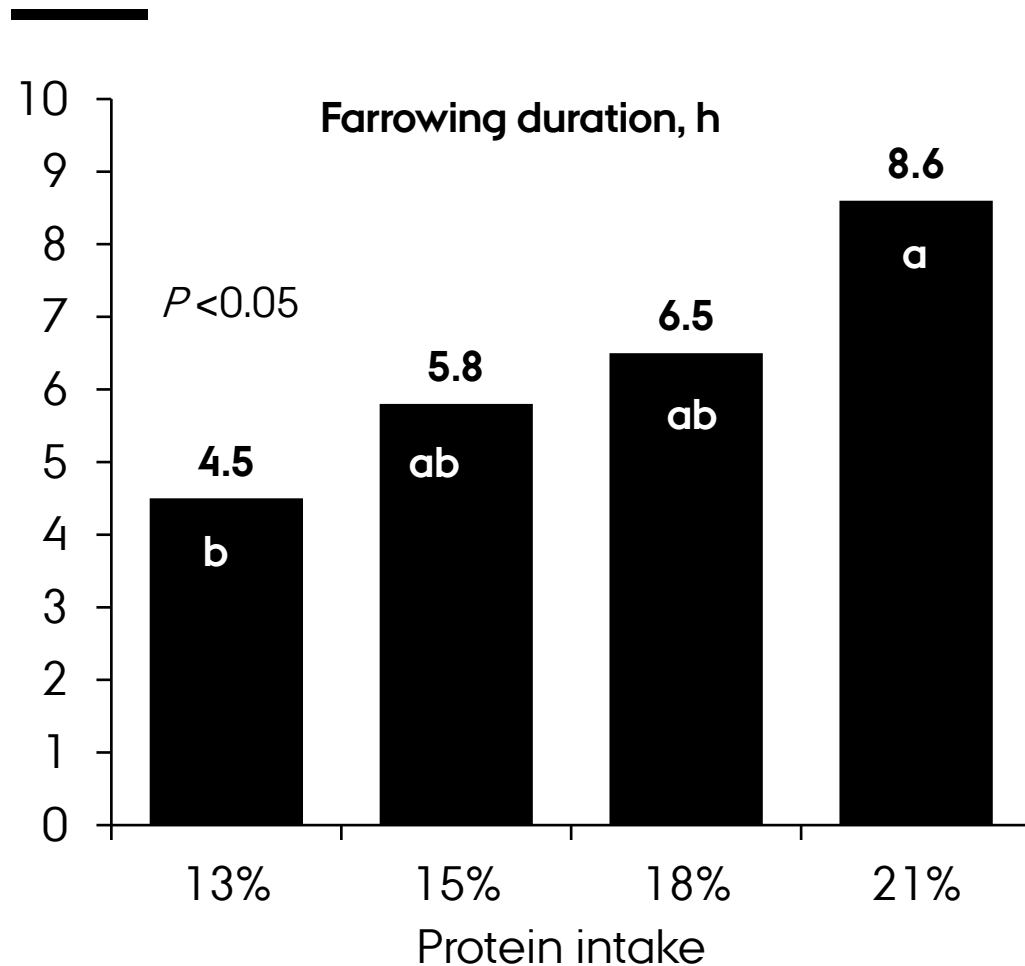
Feeding levels in transition sows



Feeding levels in transition sows

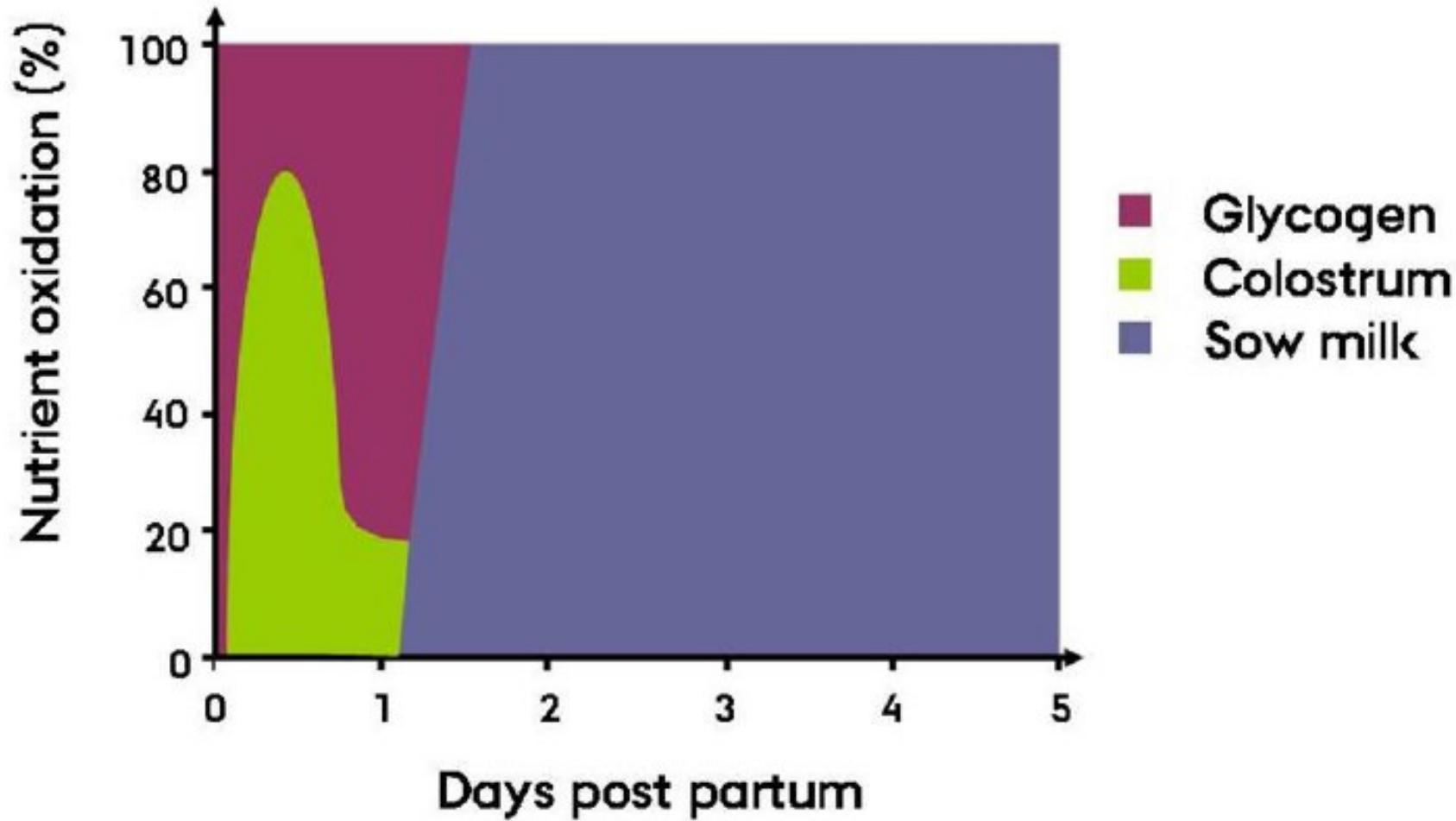


Pay attention to high protein intake in transition sows?



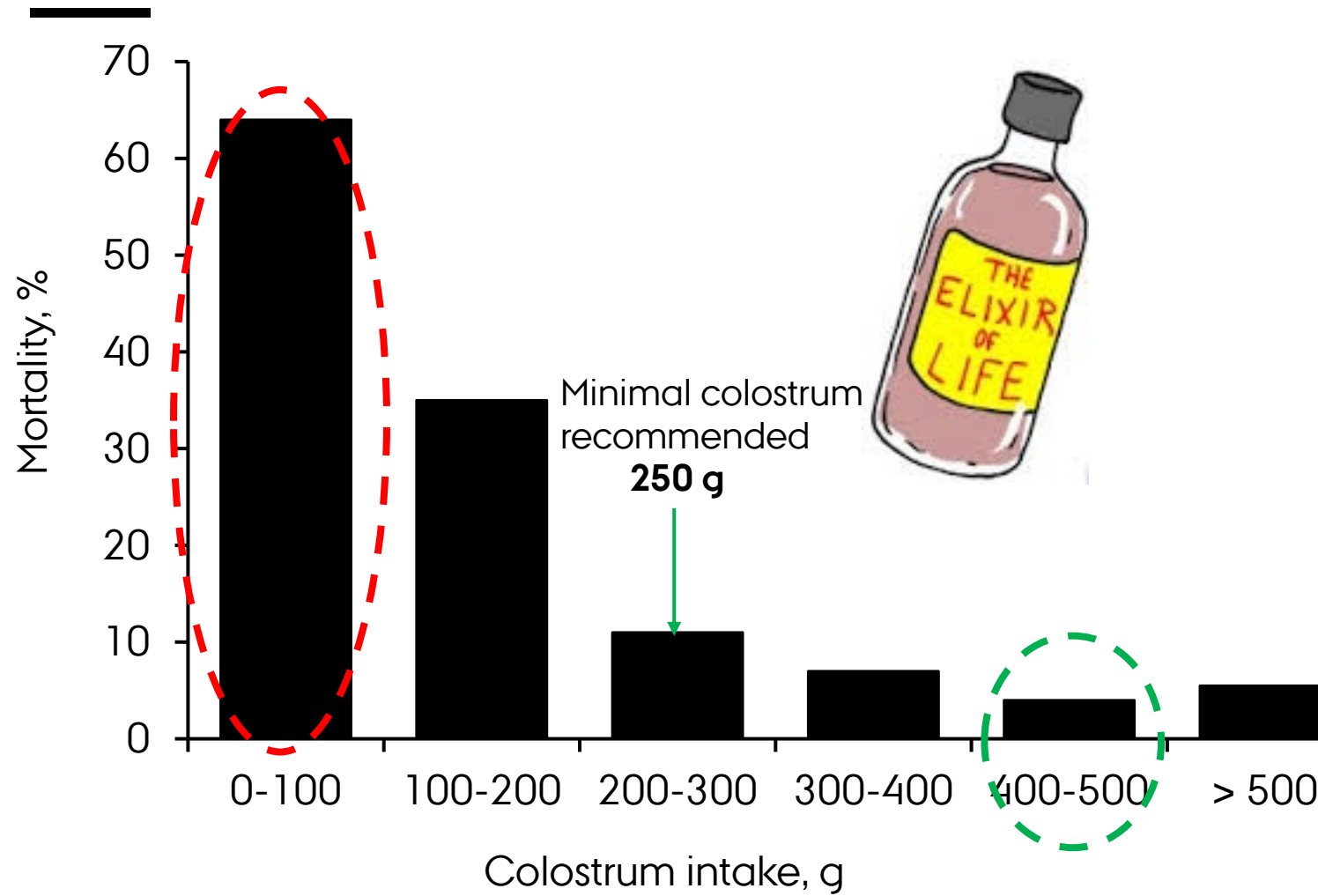
Intervention: from day 94 of gestation until farrowing

Colostrum and the piglets

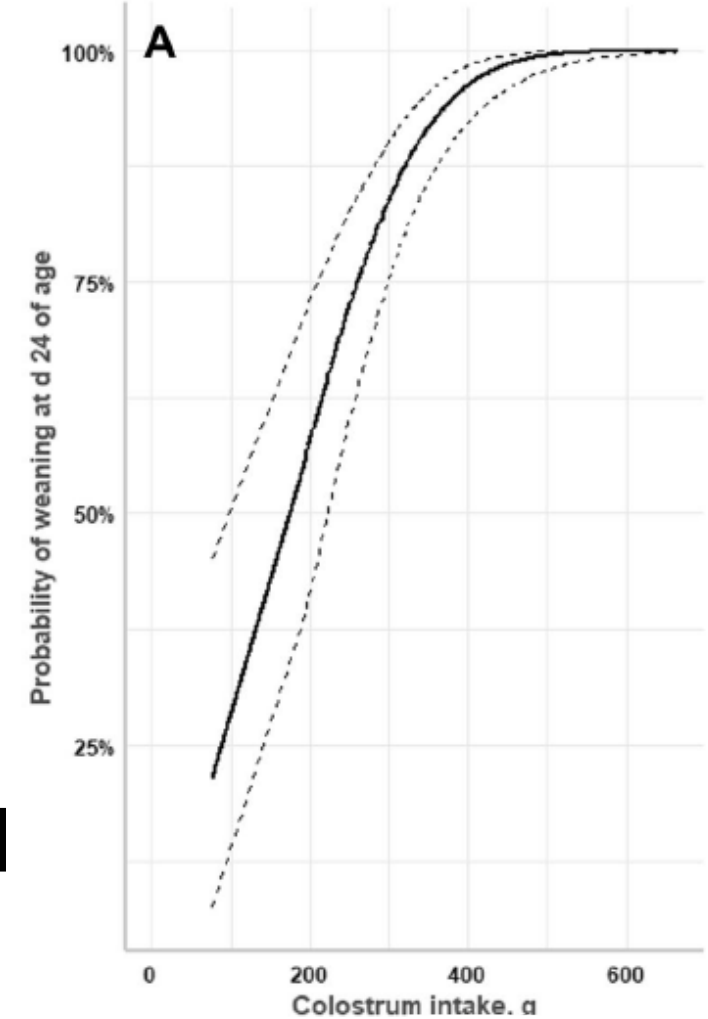


Oxidation of nutrients in piglets (in % of their heat production) during the first critical days postpartum (Theil et al., 2012).

Colostrum and the piglets

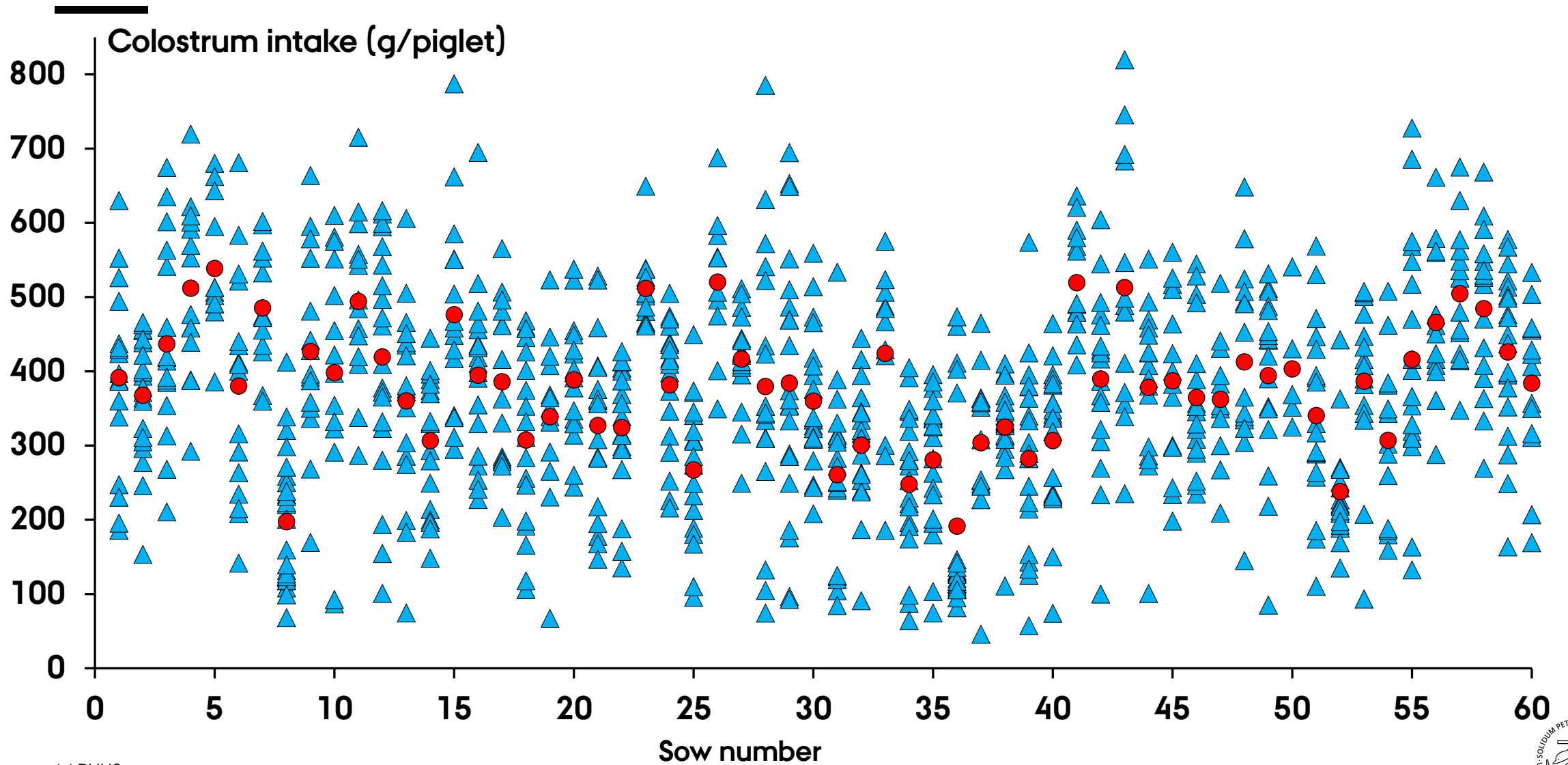


Quesnel et al. (2012)

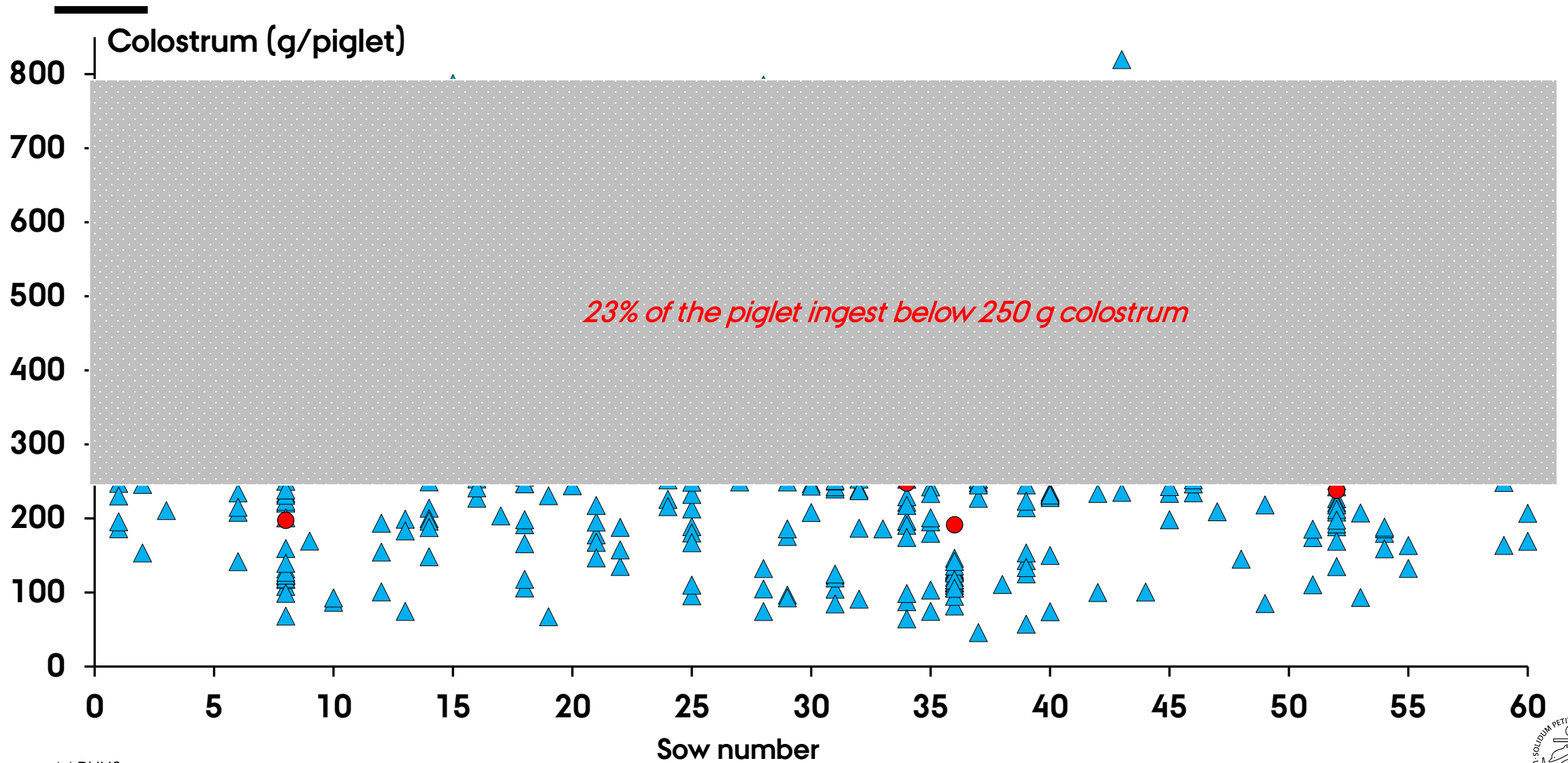


Vodolazska et al. (2023)

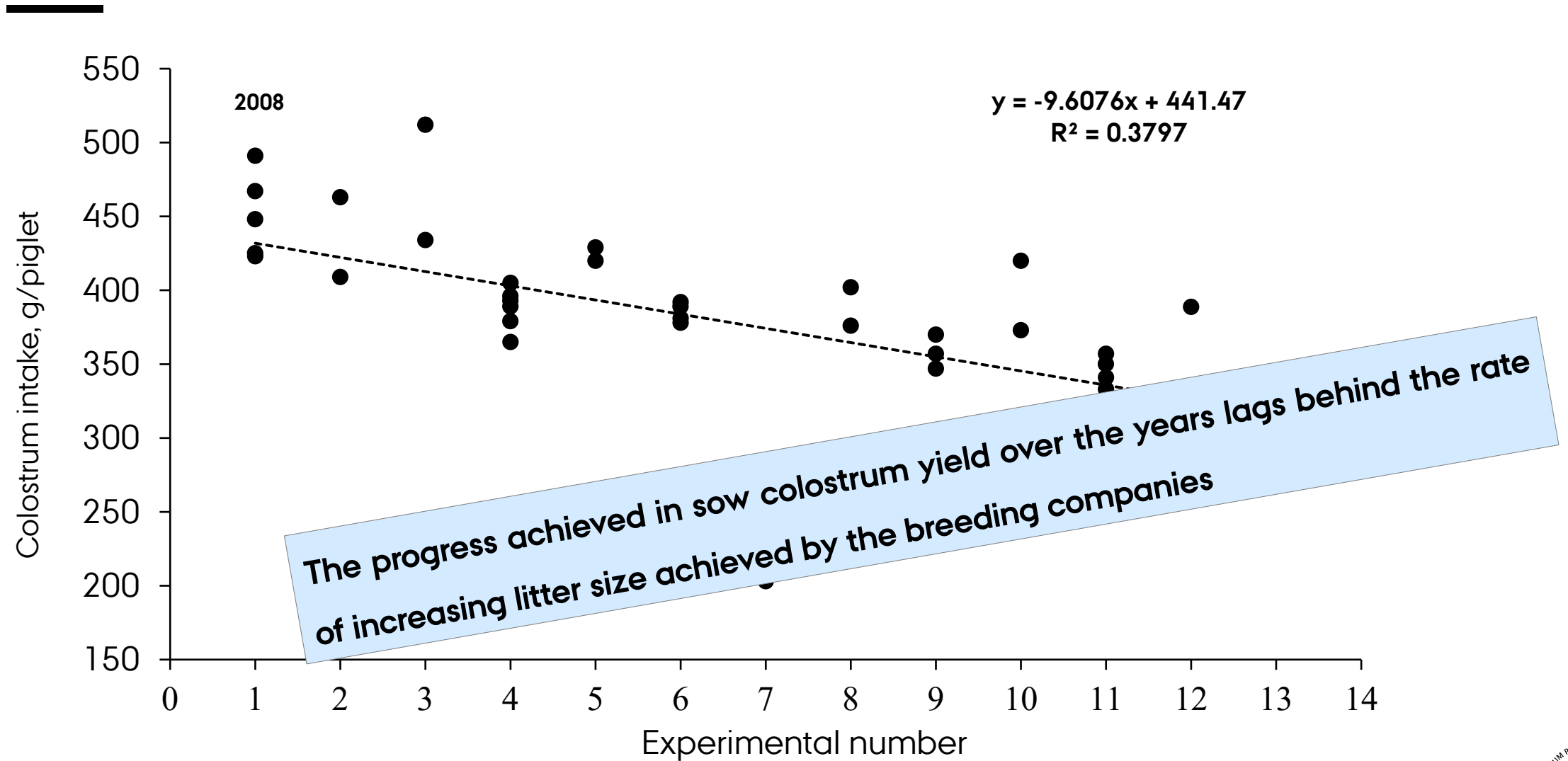
Colostrum and the piglets



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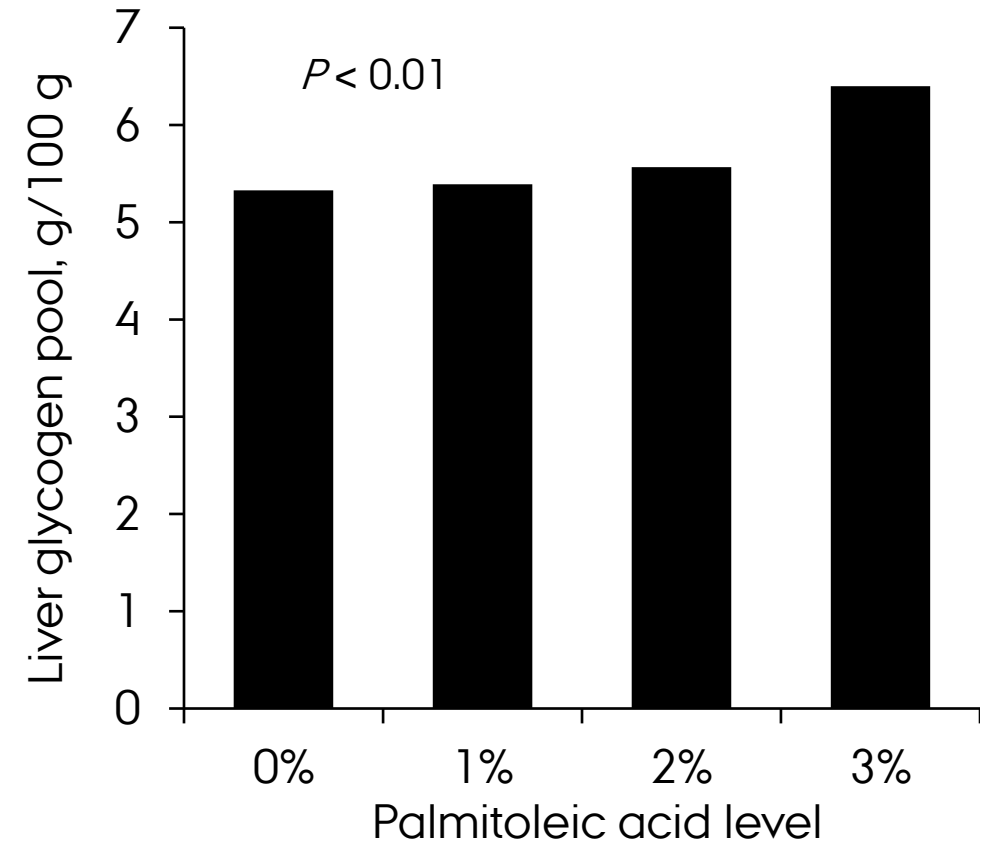
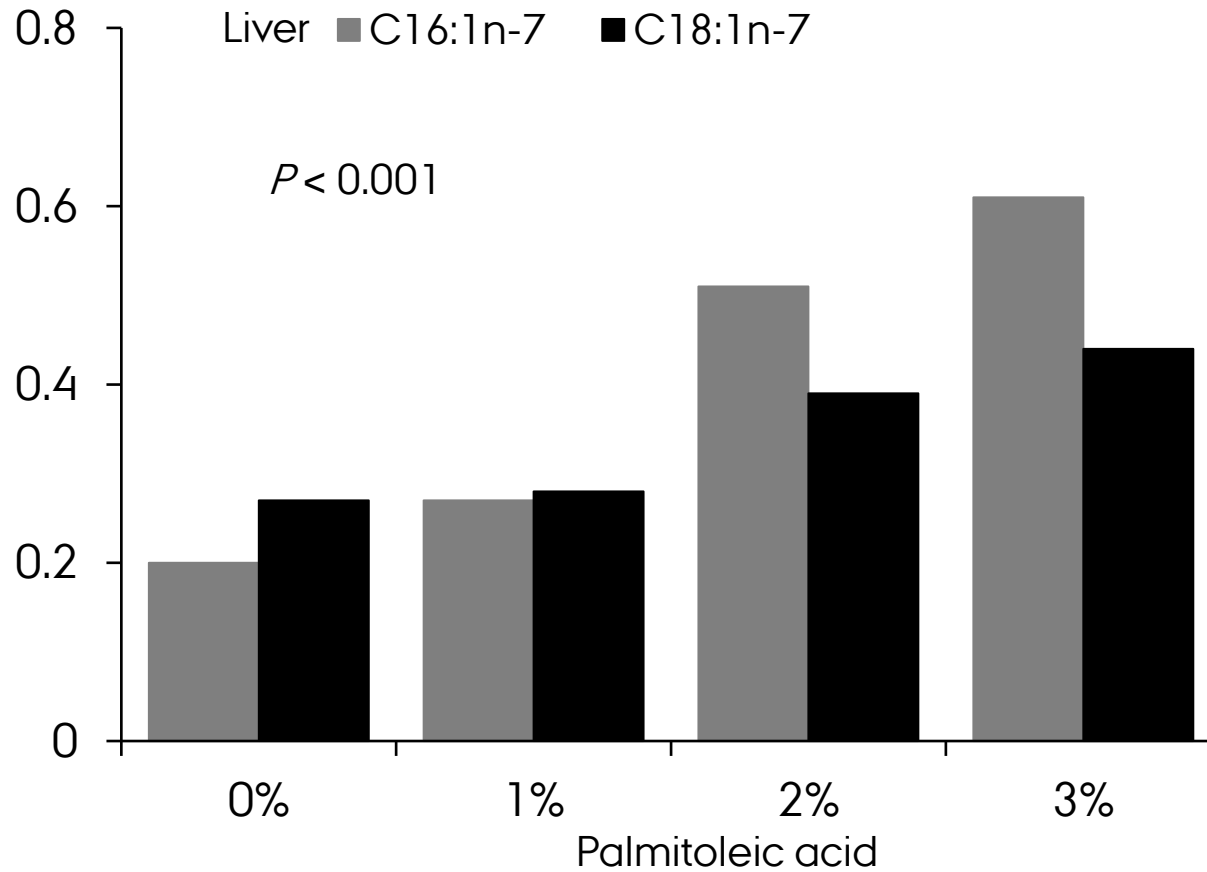
Piglets should be in focus

Graded level of palmitoleic acid (C16:1n-7)

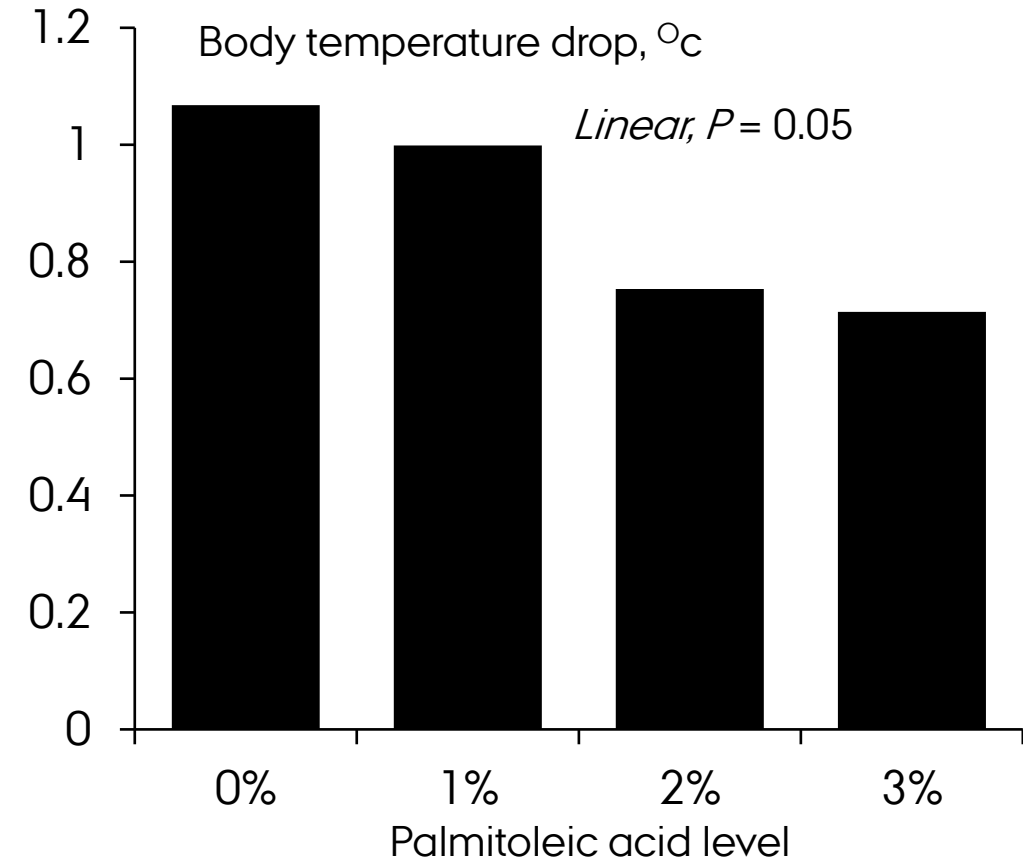
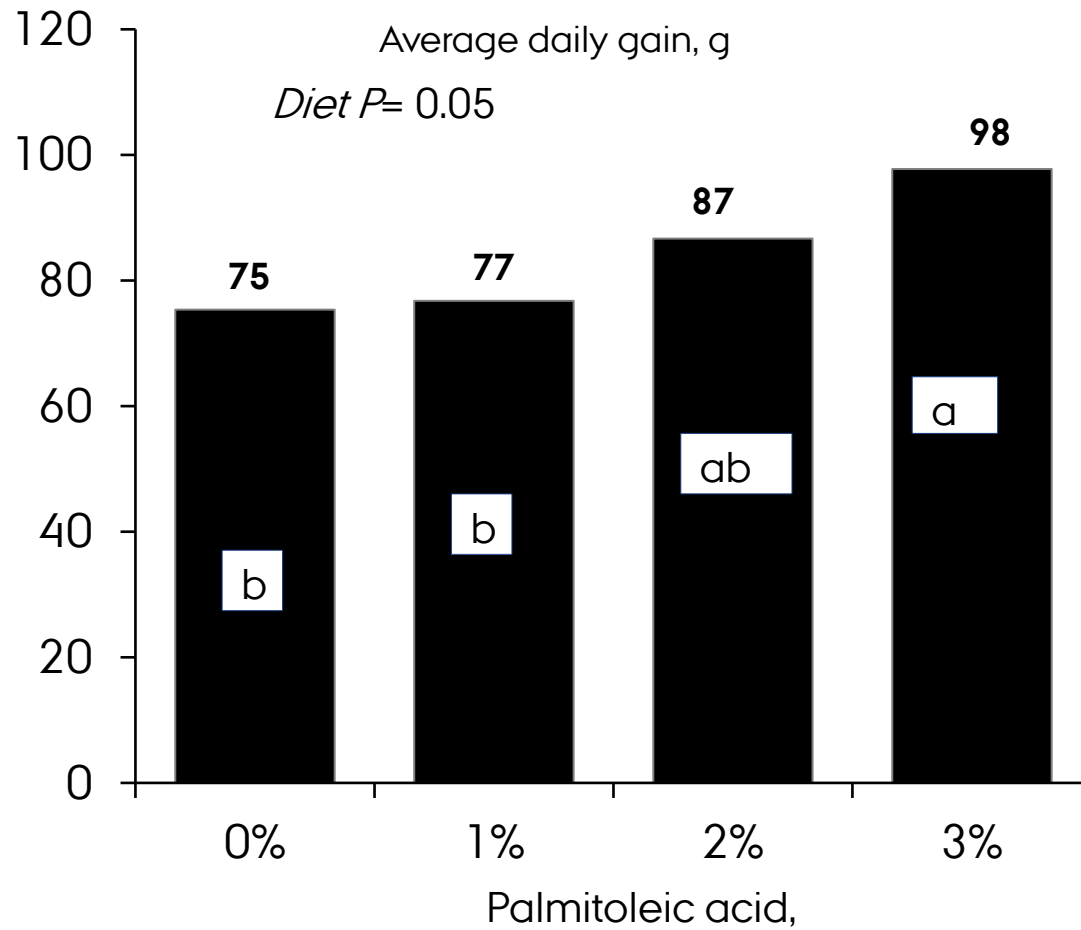
- 0, 1, 2, and 3% C16:1n-7 in milk replacer
- Orogastric feeding for 4-5 days
- Temperature challenged (-10°C below normal climate)



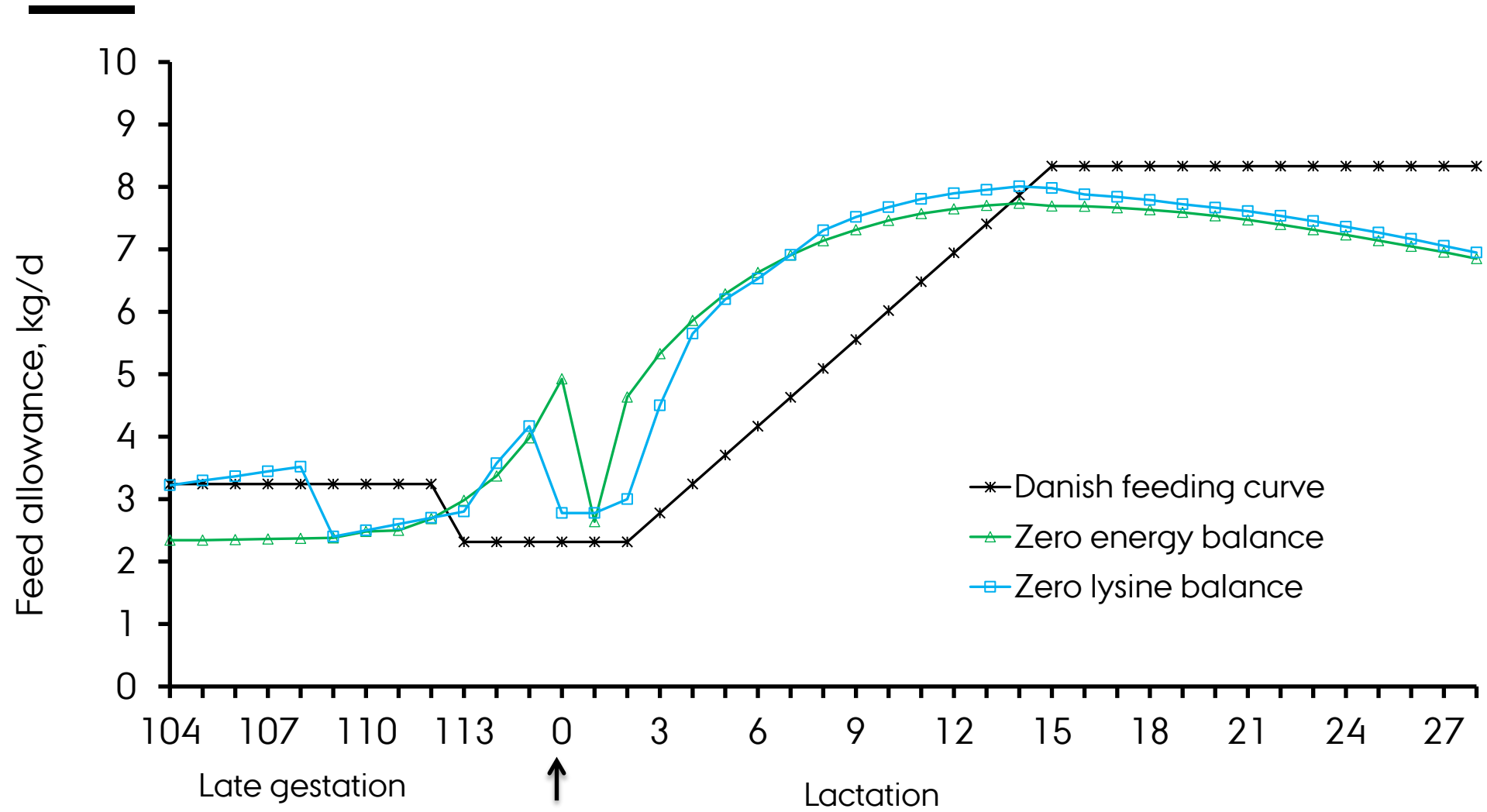
Piglets should be in focus



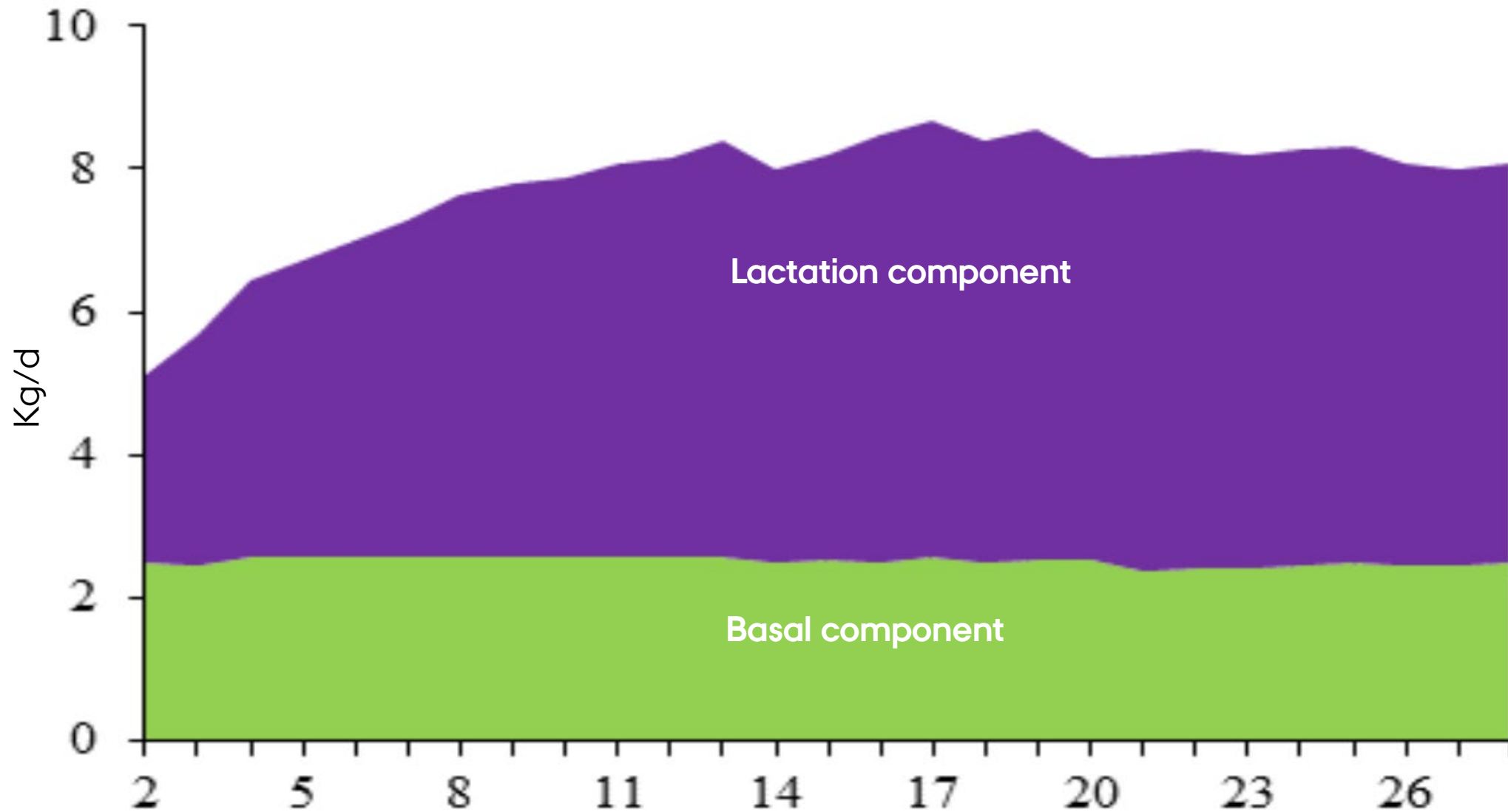
Piglets should be in focus



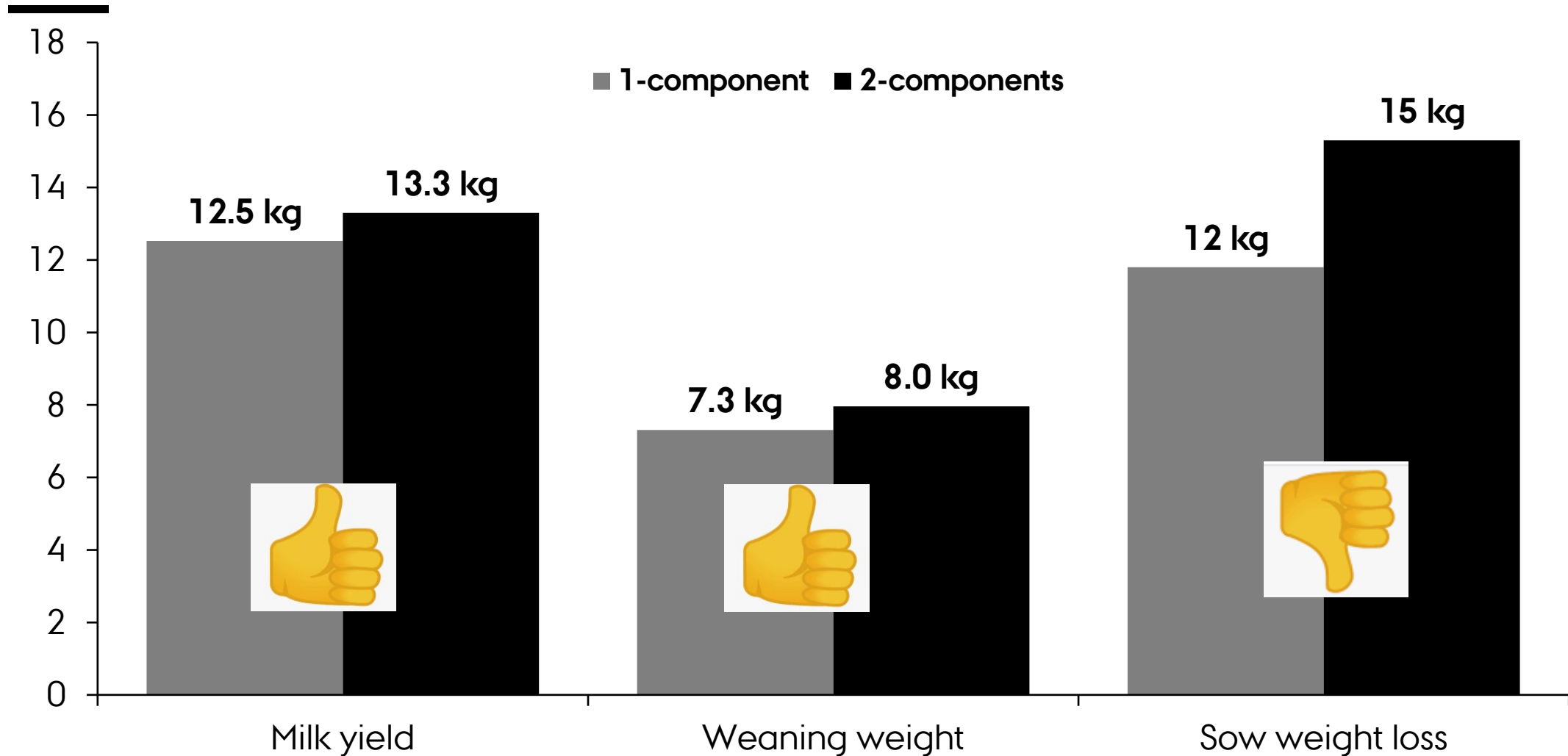
Two component for lactating sows



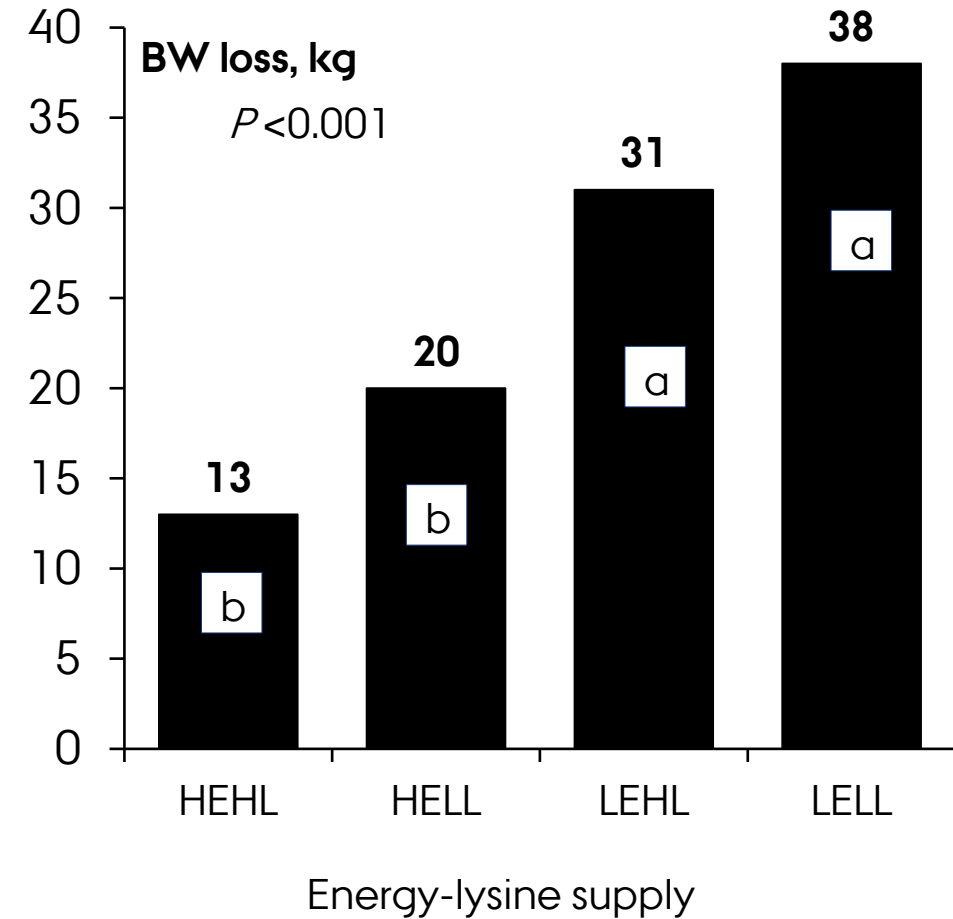
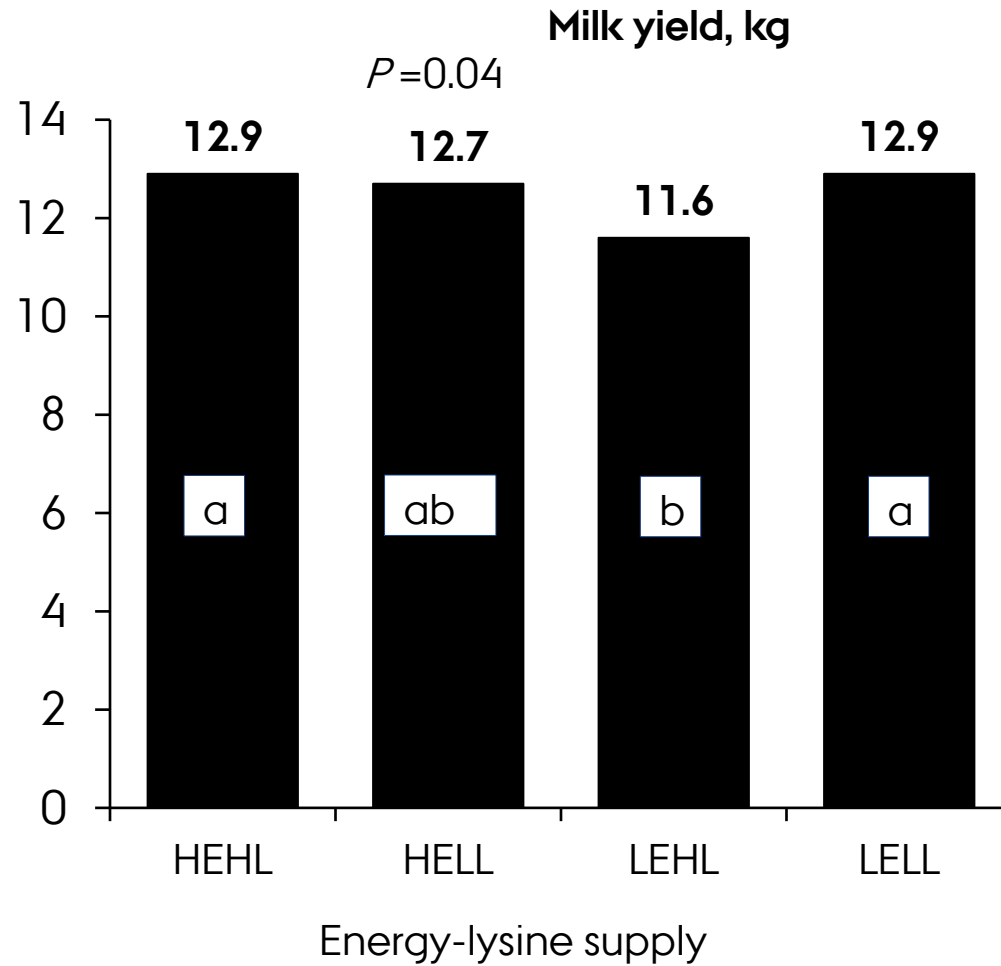
Two component approach



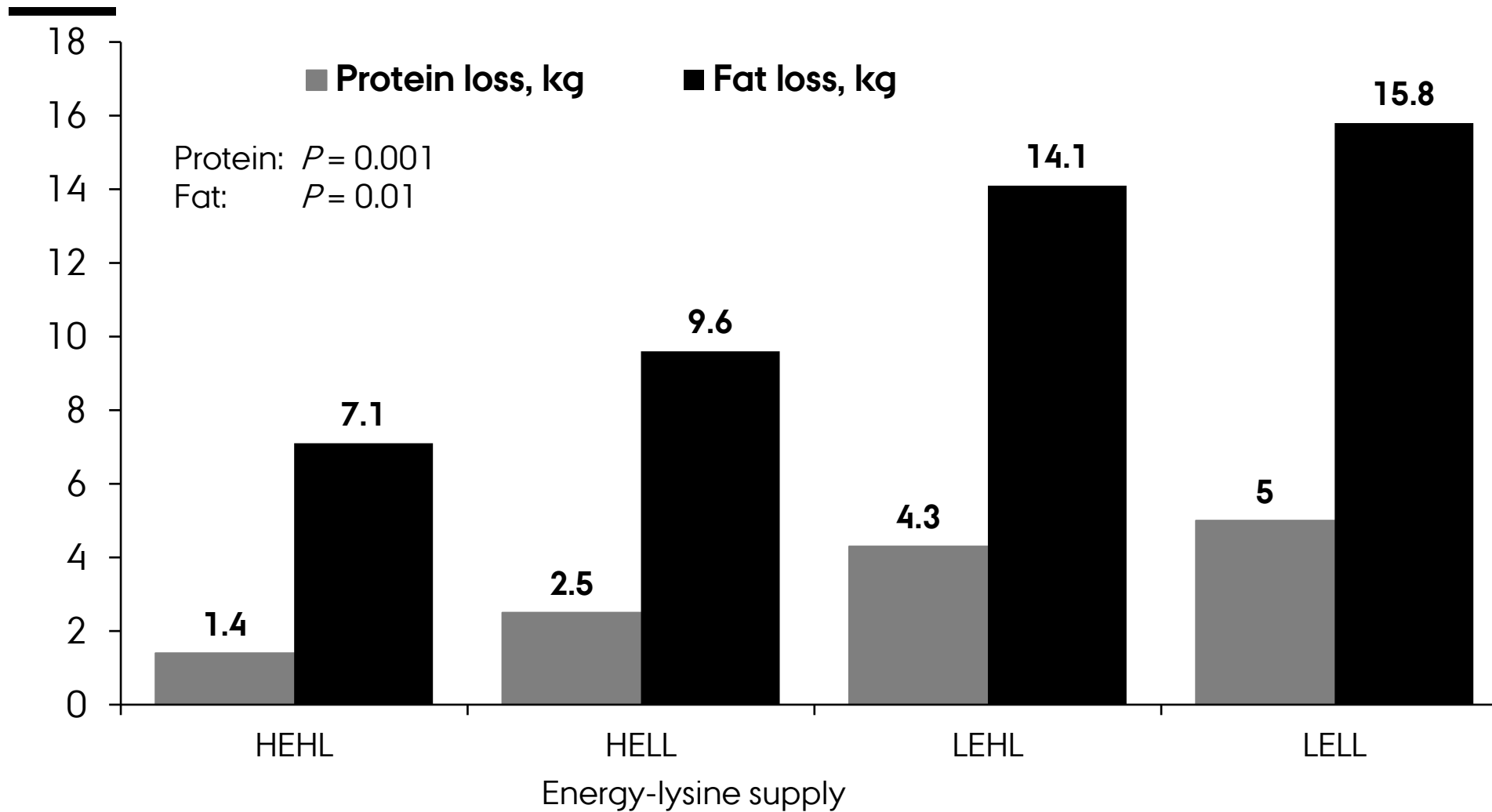
Two components and lactation performance



Two components and lactation performance



Two components and lactation performance



The French groups are so good in modelling

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Application of a precision feeding strategy

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Non Ruminant Nutrition

Benefit of two-components:

- Reduce feed cost (3.6%)
- Reduce N excretion (11%)
- Reduce P excretion (14%)
- No effect on litter size and litter weight

NON RUMINANT NUTRITION

Evaluation of a decision support system for precision feeding of gestating sows

Charlotte Gaillard,^{†,1} Nathalie Quiniou,[‡] Raphaël Gauthier,[†] Laetitia Cloutier,^{||} and Jean-Yves Dourmad[†]

Take home message

- ❖ Hyper-prolificacy is all over the globe with **opportunities** and **challenges**
- ❖ Feeding gestating sows to meet their precise requirements is **challenging**, and responses observed may not truly reflect the real consequences of inadequate nutrition
- ❖ There is **enormous potential** in transition nutrition to enhance the **farrowing process** and increase **piglet survival** rate
- ❖ Colostrum plays a **vital role in piglet survival**; however, it is insufficient to meet the need of piglets.
- ❖ Two-component is the way forward to enhance performance of reproductive sows through precision nutrition

Thank you for listening



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