Lysine requirements of pigs divergent in breeding value for nitrogen efficiency

L. Verschuren[1], S.L Thingnes[1,2], J. Merkesvik[3], **K.H. Martinsen[1,2]**, R. Bergsma[1], E. Grindflek[1,2]

[1] Topigs Norsvin Research Center B.V., Meerendonkweg 25, 5216 TZ 's-Hertogenbosch, Netherlands, [2] Norsvin SA, Storhamargata 44, 2317 Hamar, Norway, [3] NMBU, Universitetstunet 3, 1433 Ås, Norway

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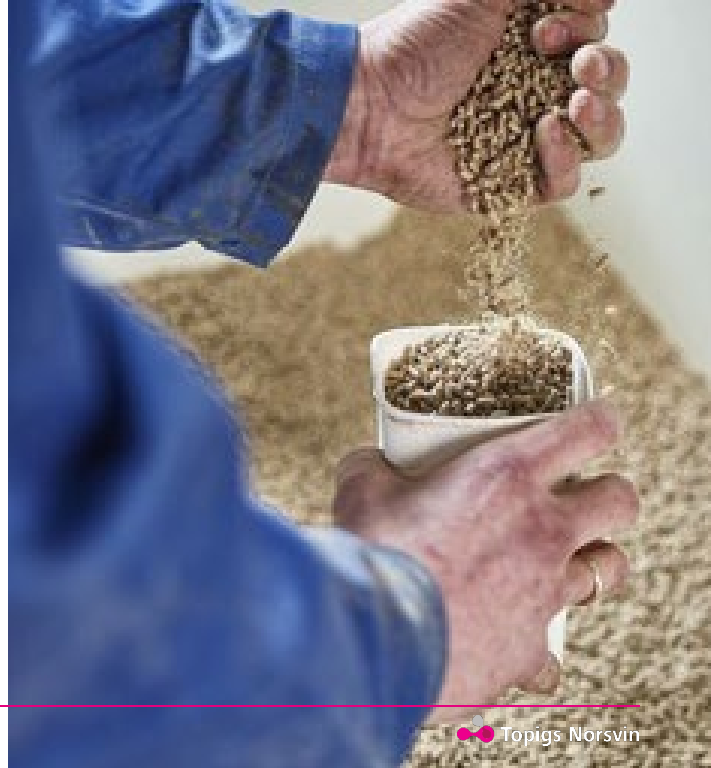
Background

Improved resource efficiency is important for:

- **The farmer**
  - feed costs
  - nutrient loss
- **The human population**
  - competition for feed resources



Efficient use of protein is important

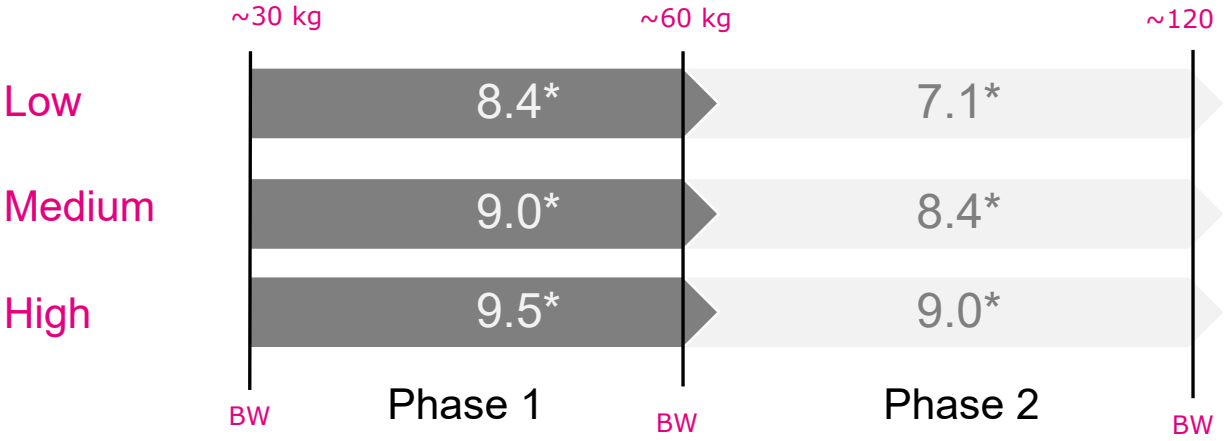
- Nitrogen is an expensive ingredient
- Inefficient use can give increased nitrogen excretion in manure
- Influences the environmental impact of pork production

Aim

- Investigate differences in performance in pigs genetically divergent for nitrogen efficiency fed diets with three different Lysin levels

Experimental design

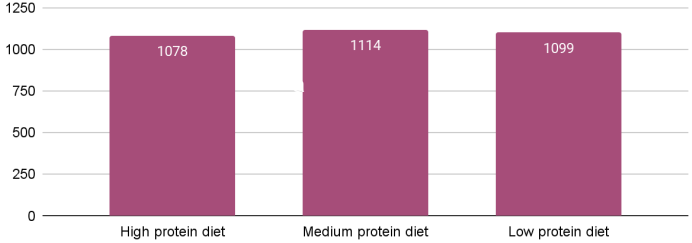
Experimental design



* Lysine content diet in g/kg. Diets contained similar energy levels (9.59 MJ NE/kg)

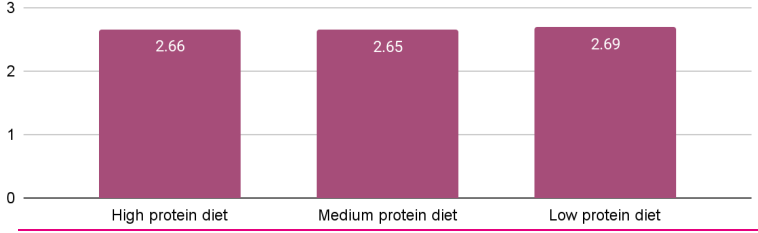
Results: Effect of diet on production traits

Average daily gain (grams) for the whole growth period



No significant difference in ADG between diet

Average daily feed intake (kg) for the whole growth period



No significant difference in ADFI between diet

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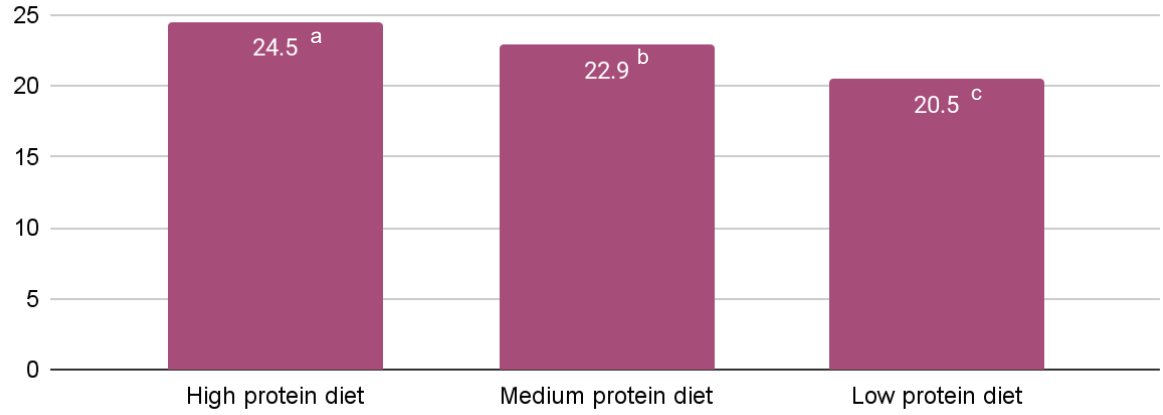
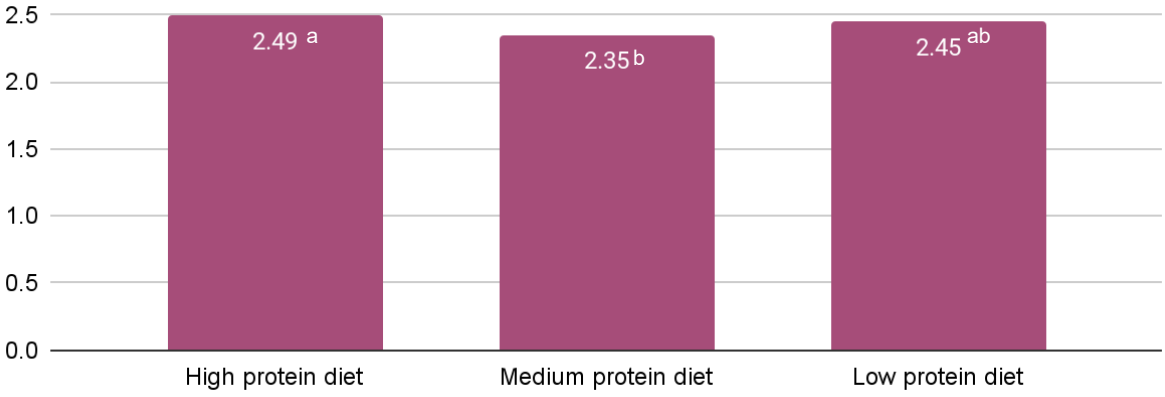
Result: Effect of diet on production traits

Average daily Lysine intake (grams) for the whole growth period



Results: Effect of diet on production traits

Feed conversion ratio (kg/kg) for the whole growth period



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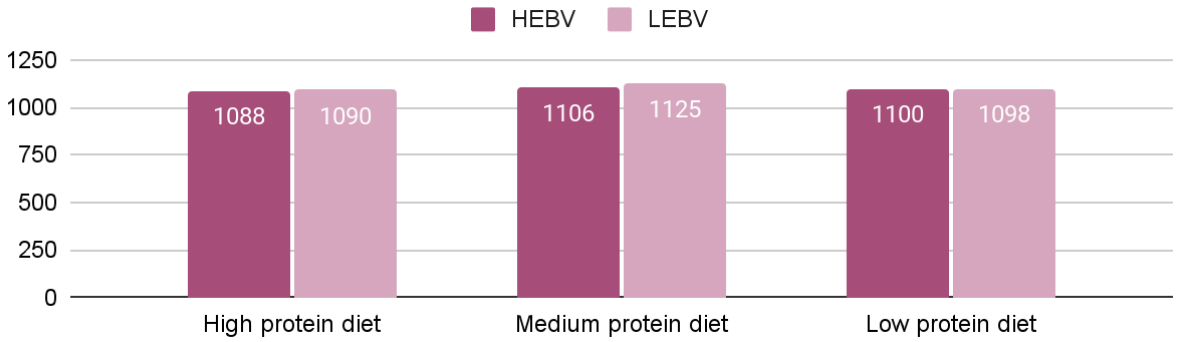
Results: No significant interaction between genetic group and diet

Average daily gain (grams) for the whole growth period



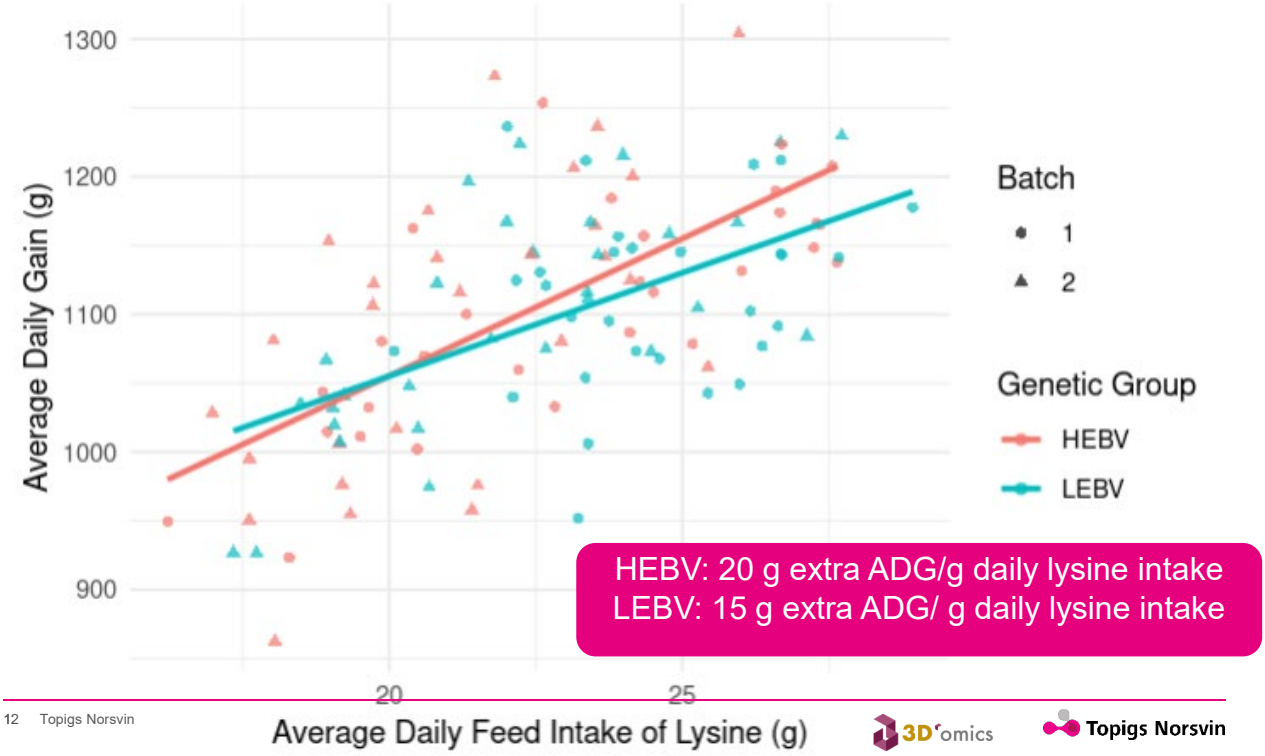
HEBV – Genetic potential for high nitrogen efficiency
LEBV – Genetic potential for low nitrogen efficiency

Results: Effect of genetic group on production traits

HEBV – Genetic potential for high nitrogen efficiency

LEBV – Genetic potential for low nitrogen efficiency

Trait	HEBV	LEBV
Average daily gain, g	1098[a]	1105[a]
Average daily feed intake, kg	2.60[a]	2.75[b]
Feed conversion ratio, kg/kg	2.35[a]	2.48[b]
Average daily lysine intake, g	22.00[a]	23.30[b]



HEBV: 20 g extra ADG/g daily lysine intake
LEBV: 15 g extra ADG/ g daily lysine intake

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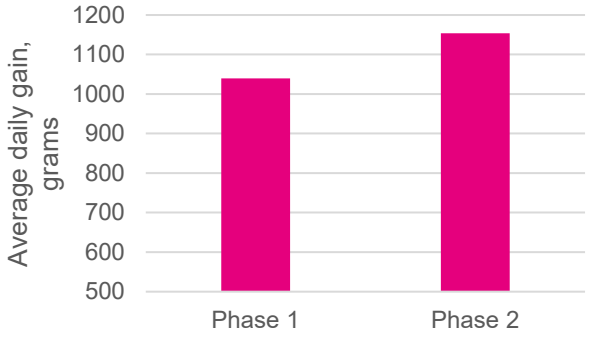
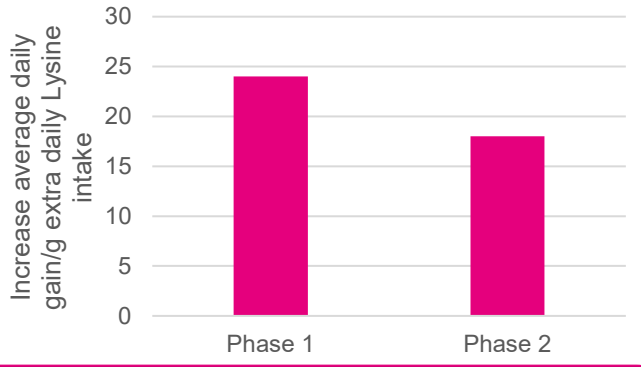
Results

Difference between phases

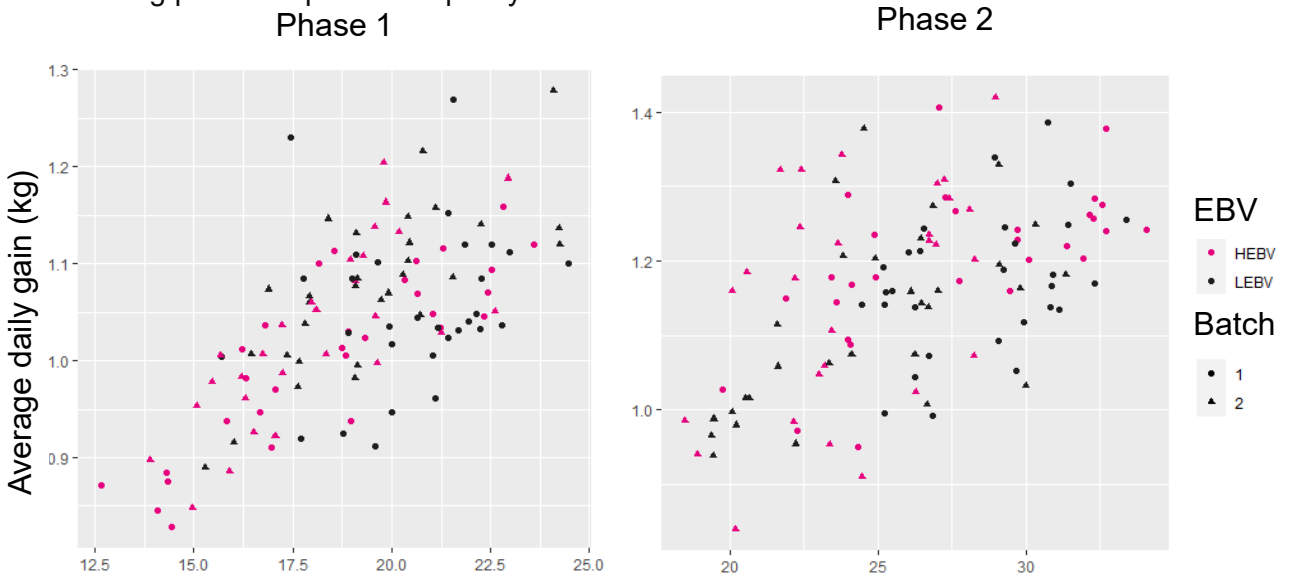




For phase 2, there was a significant difference in ADG between genetic groups, where HEBV grew 45 g more than LEBV at similar Lysine intake (p=0.01)

Results

Reaching protein deposition capacity?



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Take home message

- Regardless of the genetic group, the intermediate protein diet resulted in the highest average daily gain throughout the entire growth period.
- Pigs with high EBV for nitrogen efficiency
  - Had a lower feed intake
  - Had a better FCR
  - Had higher increase in ADG/ extra gram daily Lysine intake
- The genetic potential for growth was likely higher than tested in this experiment. This is based on the observed linear increase in average daily gain in relation to daily lysine intake across diets.
- However, we information about the animal's phenotypic nitrogen efficiency and nitrogen digestibility is still lacking and will be investigated in the future.

Thank you for your attention!