Validation of a piglet vitality score as part of a piglet vitality index for maternal pig breeds in Austria

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Austrian Concepts for Pig Breeding

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Background

- Breeding for large litters negatively affects welfare of sow and piglets

- Large litters:
  - Lower birth weights of piglets
  - Impaired vitality
  - Higher piglet mortality rates

Background

- Austrian pig breeders revise breeding goals

- **Litter Vitality Index** for routine genetic evalution:
  - Mean individual birth weights
  - Standard deviation of birth weights
  - Qualitative litter vitality score from 1 (low vitality) to 4 (high vitality) assessed by breeders

Objectives

- **Validation** of the litter vitality score assessed by breeders using preweaning mortality rate

- Estimation of **genetic parameters** for litter vitality, total number of piglets born and preweaning mortality rate.

Matherial & methods

- Stockpersons on 23 farms assessed 2,323 litters between July 2017 and June 2018
  - Litters were scored within 24 h postpartum using a four category scoring scheme

Score	Definition
1	More than 4 piglets in the litter show signs of reduced vitality*
2	3 to 4 piglets in the litter show signs of reduced vitality*
3	1 to 2 piglets in the litter show signs of reduced vitality*
4	No piglet shows signs of reduced vitality*

*__Reduced vitality__: Piglets appear weak, languid, pale, and show reduced activity and insufficient suckling

Matherial & methods

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  - Litters were scored within 24 h postpartum using a four category scoring scheme
  - Preweaning mortaliy including cause of death was recorded
- Breeders were trained twice
  - As a group in a workshop
  - Individually on each farm

Matherial & methods

- Preweaning mortality was calculated as

$$Mortality\ [\%] = \frac{number\ of\ dead\ piglets\ until\ weaning}{live{-}born\ piglets} * 100$$

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- A linear mixed model was fitted for the effect of litter vitality on preweaning mortality

Matherial & methods

- The linear mixed model:

  - **y**: % preweaning mortality
  - **Fixed effects**: farm (1-23), obstetrics (yes/no), year-season, sow breed (Large White, Landrace), litter vitality score (1-4) and parity
  - **Random effects**: sire, sow nested within farm

Matherial & methods

- Relationship between litter vitality and preweaning mortality rate
  - Spearman rank correlations

- Genetic analysis
  - Subsample of 2,900 records from 22 farms
  - Trivariate linear animal model

Results & discussion

Results	
Mean preweaning mortality rate [%]	12.6 ±9.10
Mean litter vitality score	3.64 ±0.59
Correlation between mortality rate and litter vitality score	r = -0.331

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- Medium strong negative correlation
  → litters with a higher vitality score had a lower mortality rate

Results & discussion

	Vitality Score			
	1	2	3	4
N	22	128	813	2,209
Preweaning mortality rate [%]	29.12^{a}	22.85^{ab}	15.72^{c}	7.98^{d}
SE	2.64	1.26	0.76	0.67

Results & discussion

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- Preweaning mortality rate differs significantly between litter vitality score categories

Results & discussion

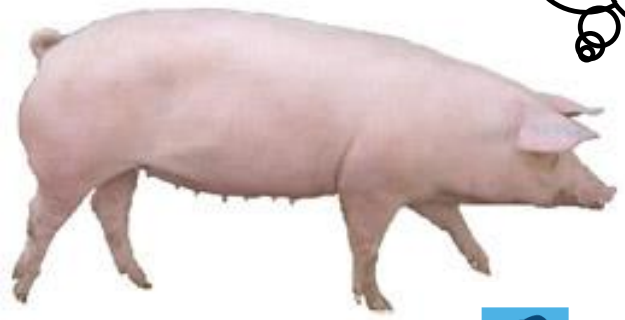
- Genetic parameters:
  - Heritabilities and genetic correlations

	Litter vitality score	Total number of piglets born	Mortality rate [%]
Litter vitality score	**0.11 ± 0.04**	-0.68 ± 0.16	-0.65 ± 0.18
Total number of piglets born		**0.19 ± 0.04**	0.59 ± 0.16
Mortality rate [%]			**0.09 ± 0.03**

Conclusions

- Results suggest that **litter vitality may be routinely recorded**
  - Given regular training of breeders
- **Genetic correlations** indicate
  - Breeding for large litters may reduce litter vitality

  whereas
  - Breeding for litter vitaliy may reduce preweaning mortality
- **Litter vitality index** available from January 2020



Questions?

Thank you for your attention!

animals

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Article

Assessment of Piglet Vitality by Farmers—Validation of A Scoring Scheme and Estimation of Associated Genetic Parameters

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Federal Ministry for Sustainability and Tourism

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