

Heritability of longevity in Landrace and Large White populations using Weibull and grouped data models

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Session: S.14 Free communications in genetics of meat animals

Abstract no.: 4337

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Introduction

Length of productive life

- Number of days between 1st farrowing and culling

In sustainable pig production:

- Economic importance
- Animal health and welfare issues

Aim of the study

- Model longevity in sows comparing continuous (Weibull) and grouped data models
- Evaluation of fixed effects
- Different genetic components to estimate genetic variances and heritability

Material and methods

Data

- 12319 Large White (26.4% censored)
- 9833 Landrace (22.3% censored)

Only sows:

- Born after 1995
- Age at 1st farrowing: 250-550 days

- Weibull model
- Grouped data model
(Prentice and Gloeckler, 1978)

Effects:

- Herd * Year
- Age at 1st farrowing
- Parity * Litter size
- Change of herd size
- Genetic component

Litter size = classes for piglets born alive
relative to annual herd mean

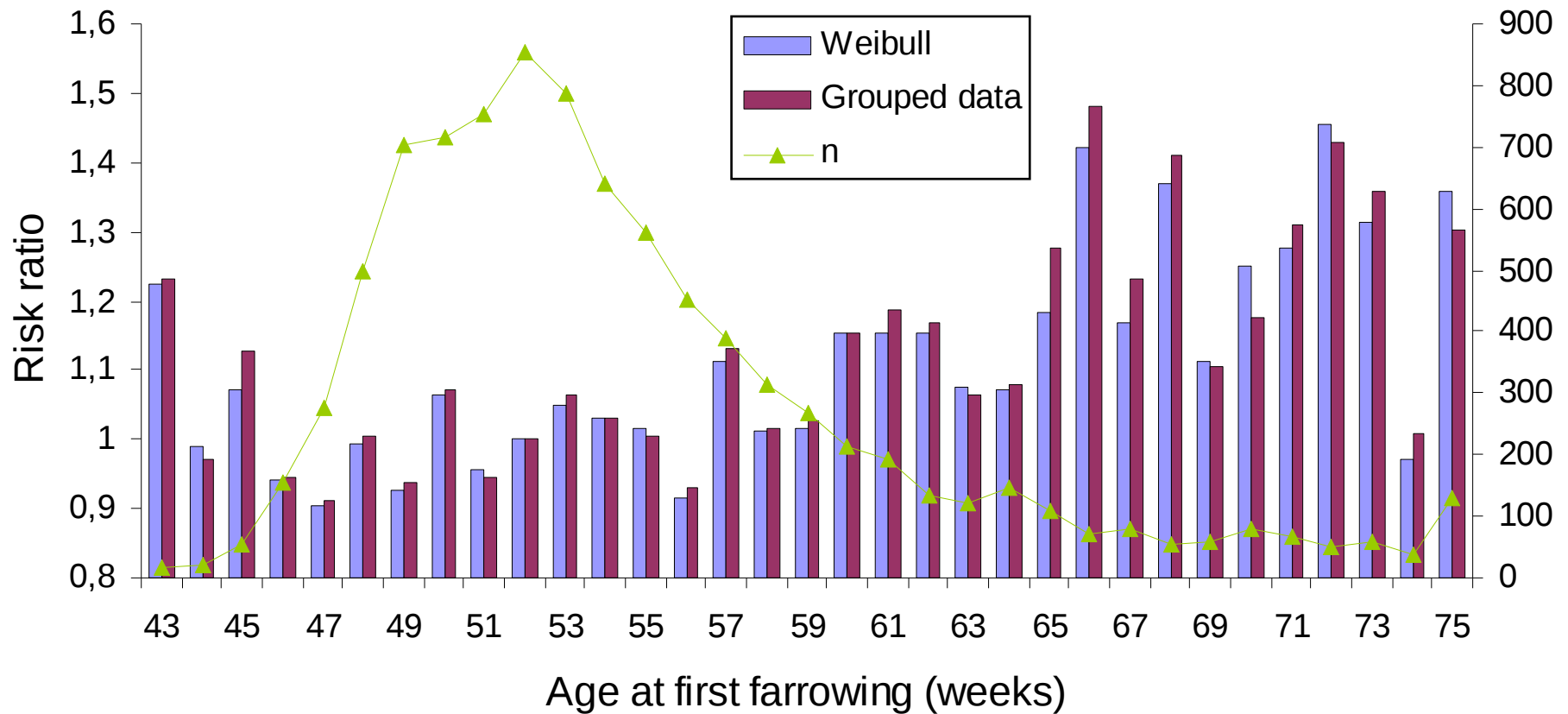
- Step 1: Piglets born alive corrected for first farrowing litter size in the whole dataset
- Step 2: Average number of piglets for each herd and year
- Step 3: Comparison of individual performance with herd mean expressed as percentage deviation

Models used – genetic component:

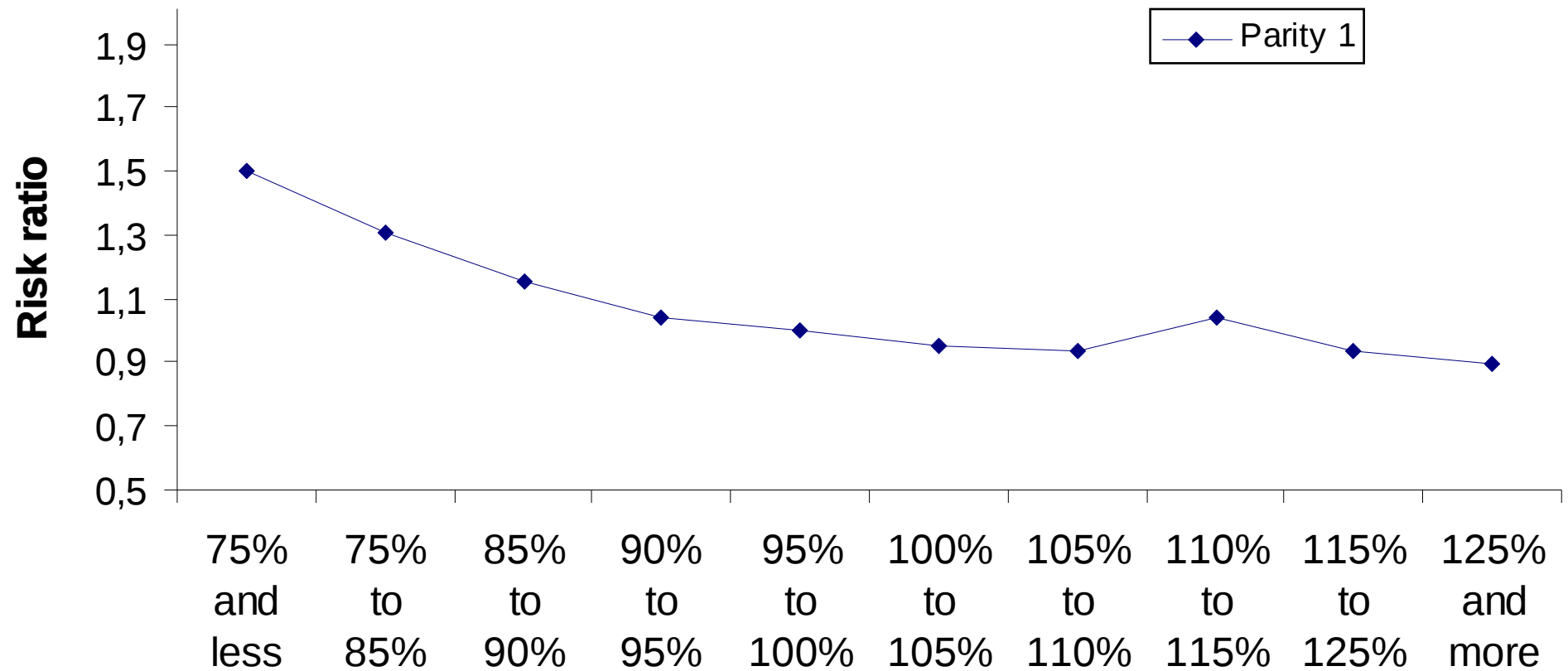
- Animal
- Sire
- Sire – Dam
- Sire – Maternal Grandsire
- Sire – Maternal Grandsire – Dam within Maternal Grandsire

Results

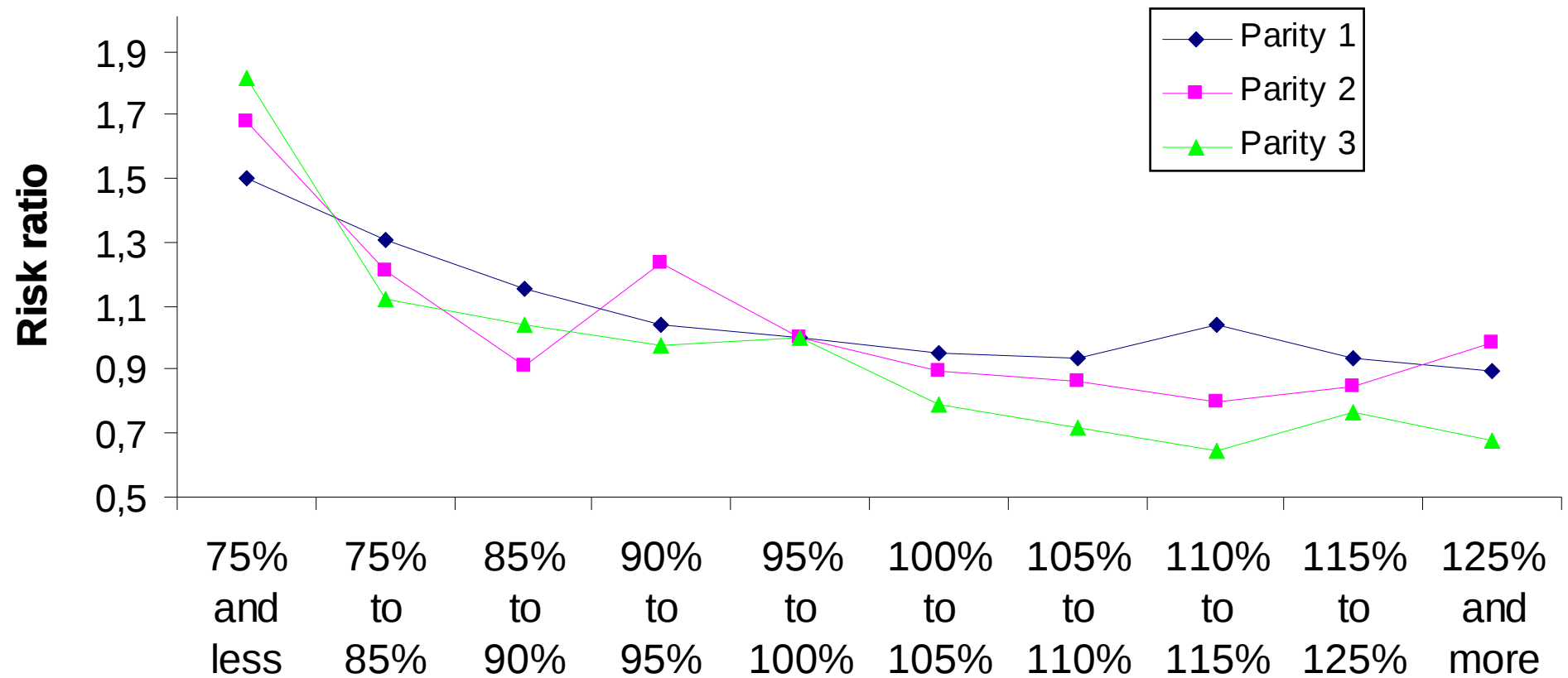
Age at first farrowing



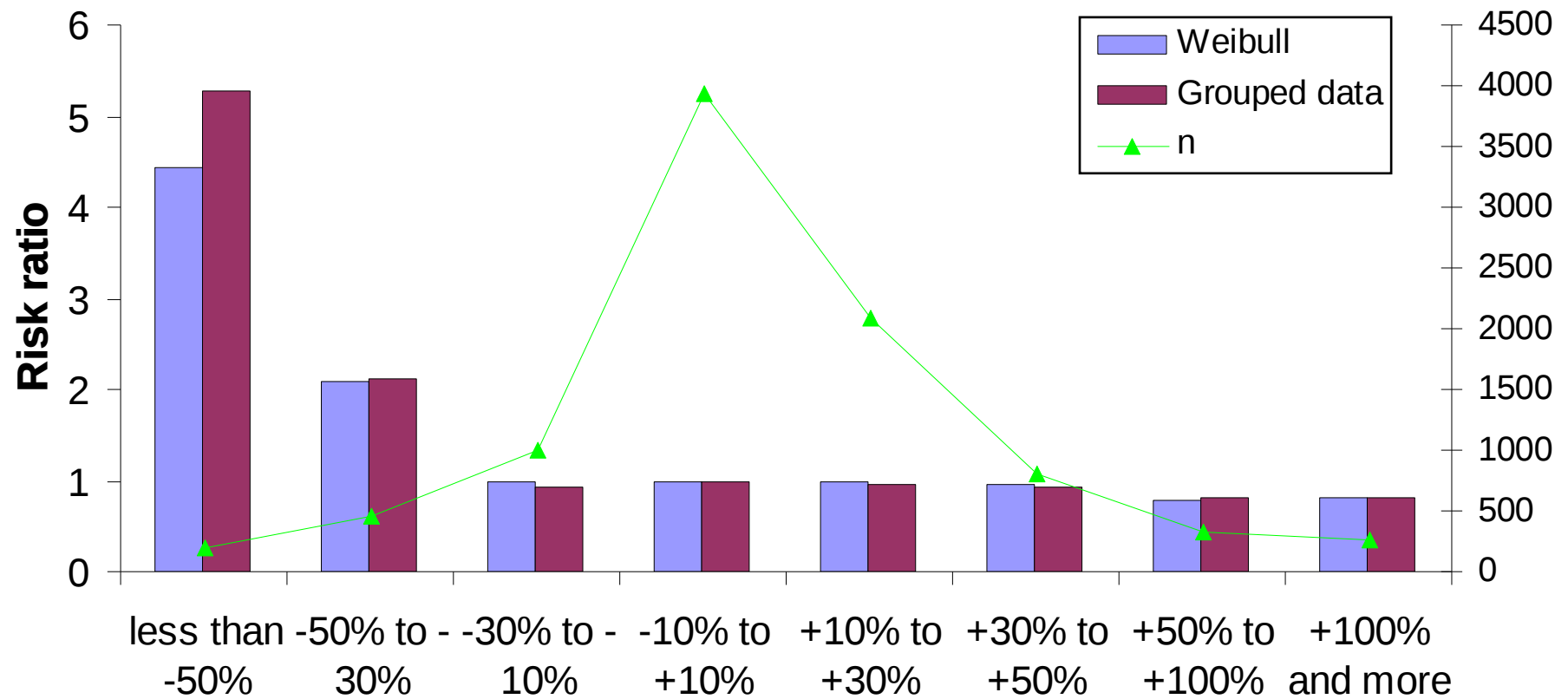
Parity * Litter size – Grouped data model



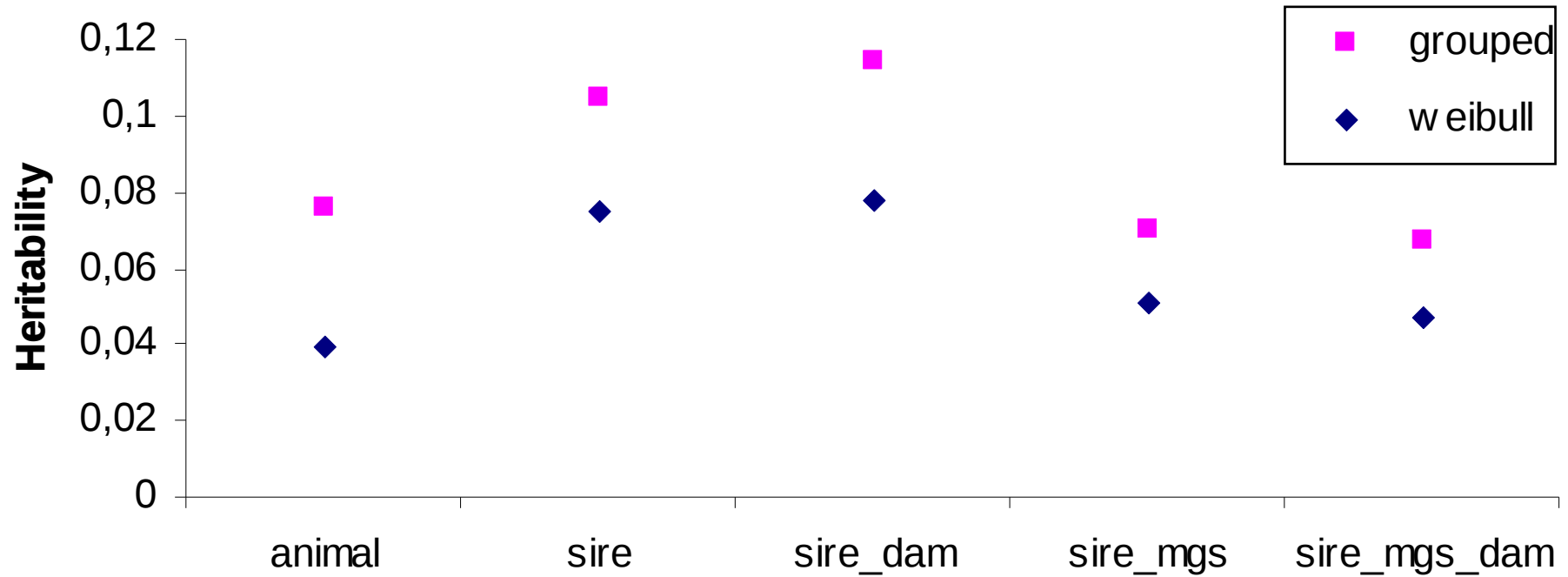
Parity * Litter size – Grouped data model



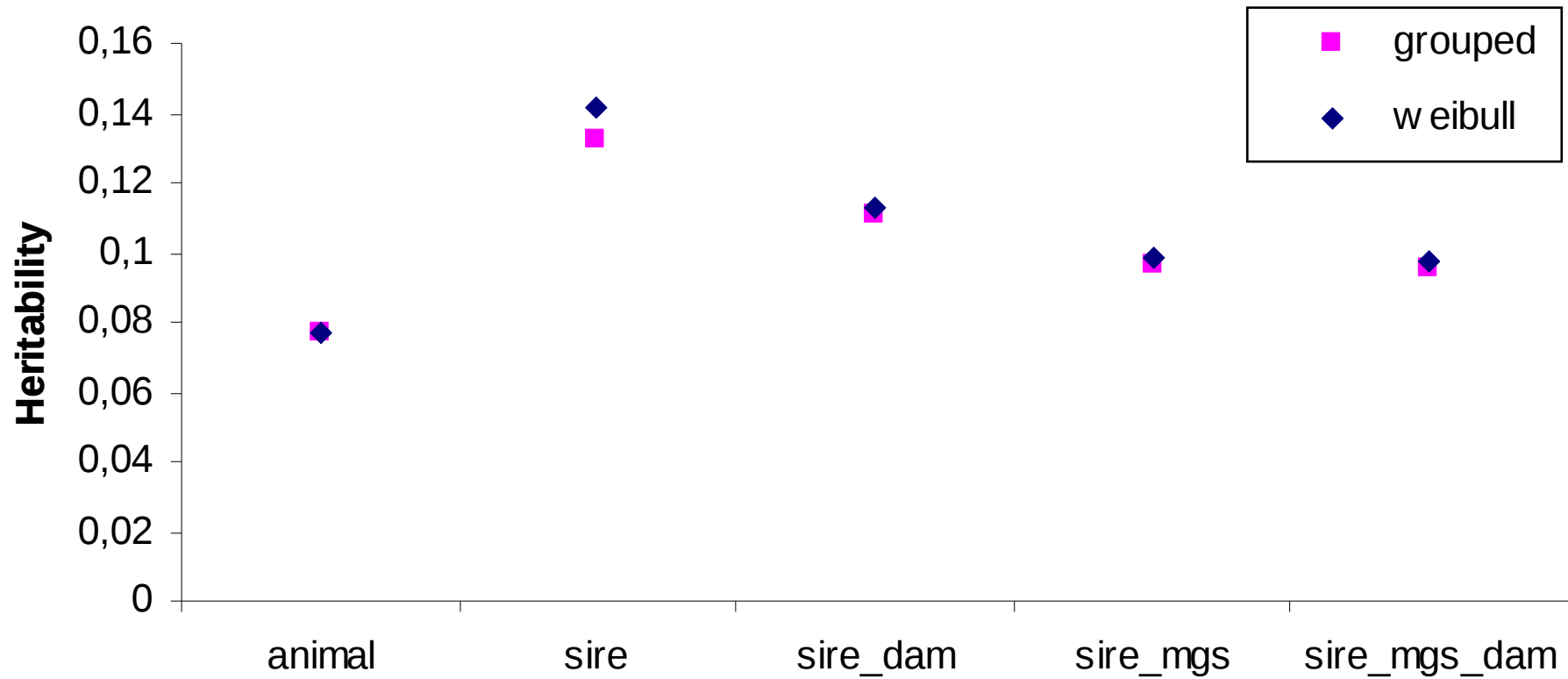
Herd size change



Grouped data vs. Weibull models in Landrace



Grouped data vs. Weibull models in Large White



Conclusions

Increased risk of culling for:

- Age at 1st farrowing less than 43 or more than 60 weeks
- Litter size below average
- Decreasing herd size

Conclusions cont.

Heritabilities

- Landrace
 - Weibull: 0.04 – 0.08
 - Grouped data: 0.07 – 0.11
- Large White
 - Weibull: 0.08 – 0.14
 - Grouped data: 0.08 – 0.13

Grouped data models

- Selection for higher number of production cycles favorable over selection for long productive life

Thanks for your attention!

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