POLITÉCNICA "Ingeniamos el futuro" | CAMPUS DE EXCELENCIA INTERNACIONAL

UNIVERSIDAD COMPLUTENSE MADRID

Session 70: Genetic parameters & GWAS (Abstract number 41391)

Disentangling paternal and maternal components of within litter birth weight variability in mice

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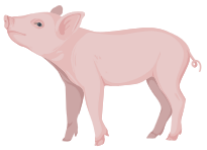
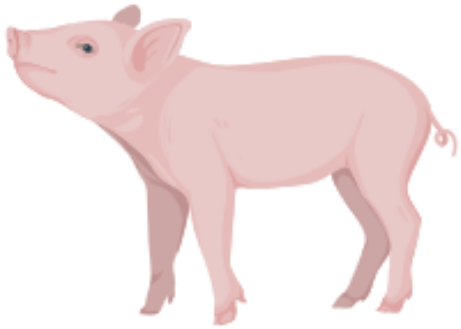
Introduction

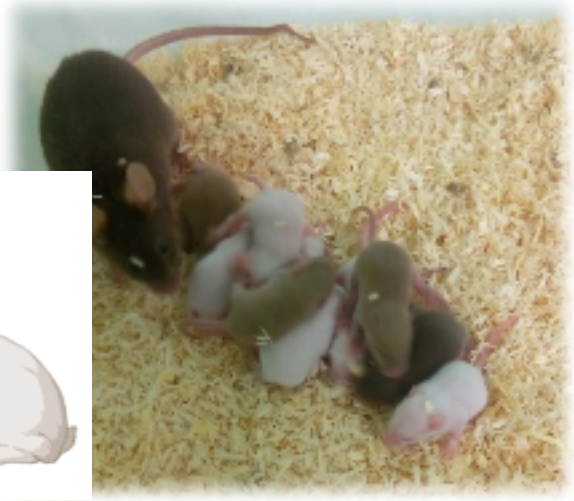
Animal breeding → Animal production ↑ Productivity, Quality, Homogeneity



HOMOGENEITY has been related to:

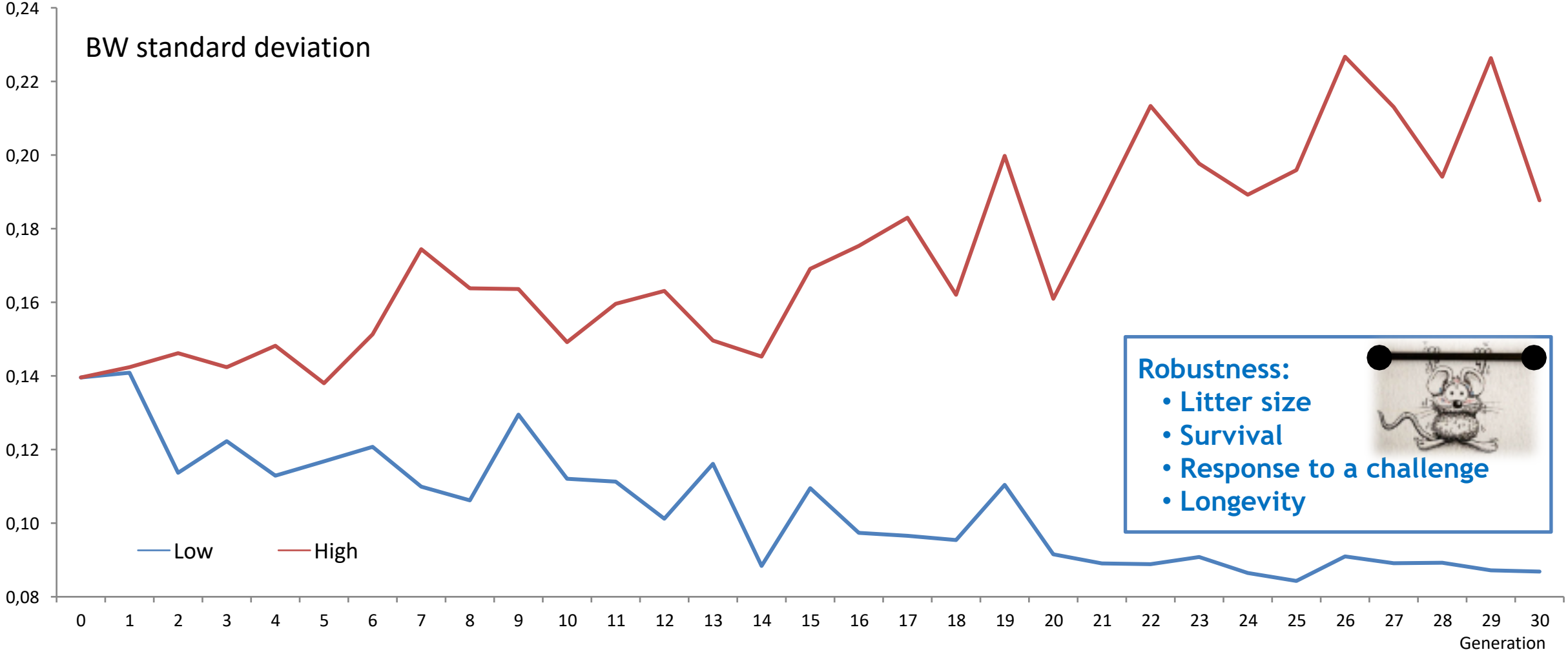
- ✓ Reduction of the production costs
- ✓
- ✓
- ✓
- ✓
- ✓ **ROBUSTNESS**





Selecting to modify **environmental variability** of some traits has been shown to be possible

Divergent selection experiment for birth weight (BW) environmental variability



JUSTIFICATION

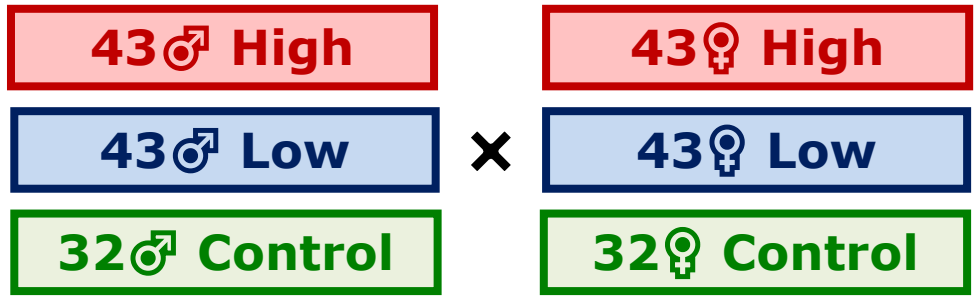
Due to one male to one female mating design, it was no possible to differenciate the paternal or the maternal determination of the performances

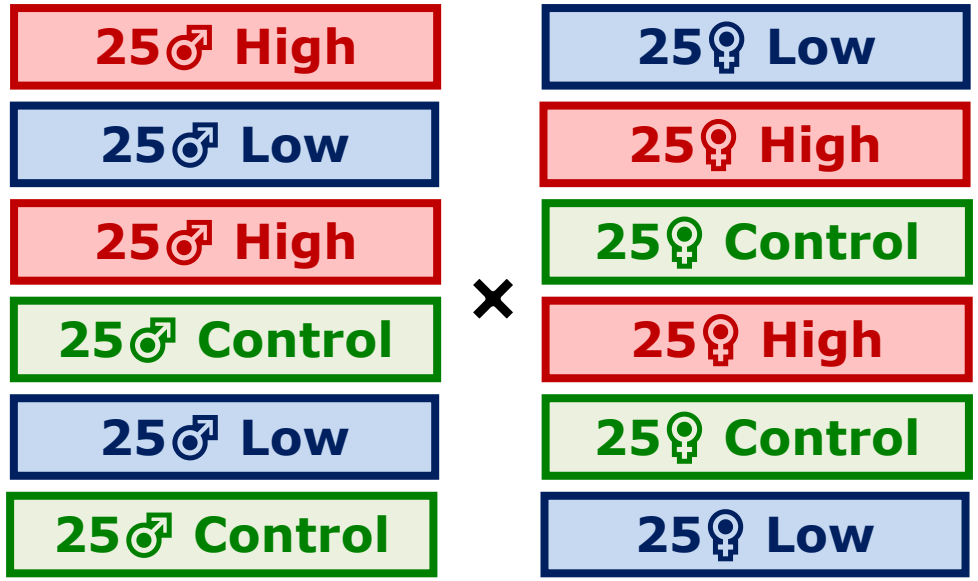
OBJECTIVE

To ascertain the maternal or the paternal nature of the genetic component of birth weight variability crossing mice selected lines between them and with the control line

EXPERIMENTAL DESIGN

- Divergent selection experiment for BW environmental variability
  - Low variability line
  - High variability line
- A non-selected population as Control line
- Matings between lines
- *GSEVM v2.0* (Ibáñez-Escriche et al., 2010)



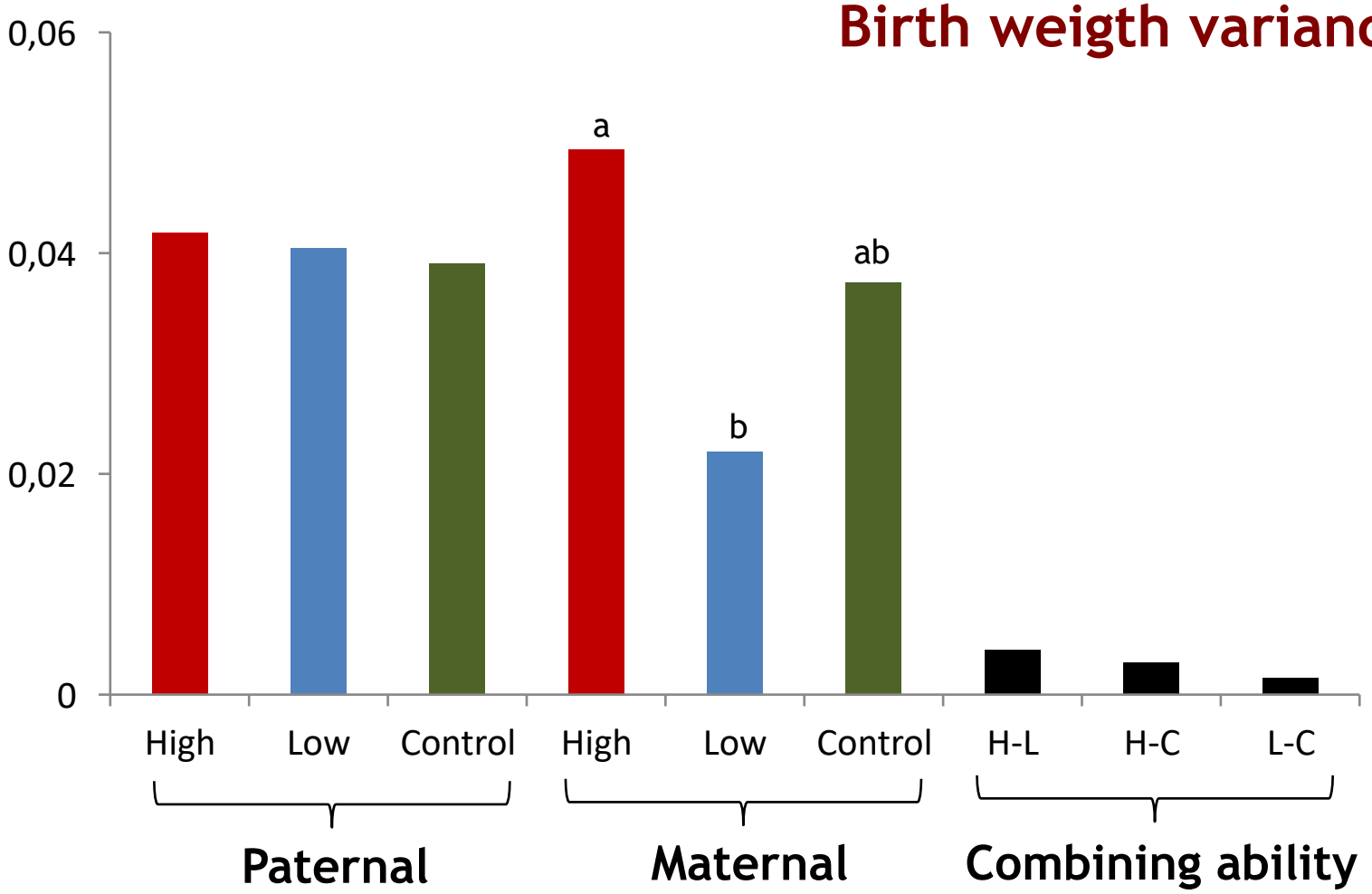


METHODS

$$y = PL_i + ML_j + SCA_{ij} + PN + sex + LS + e$$

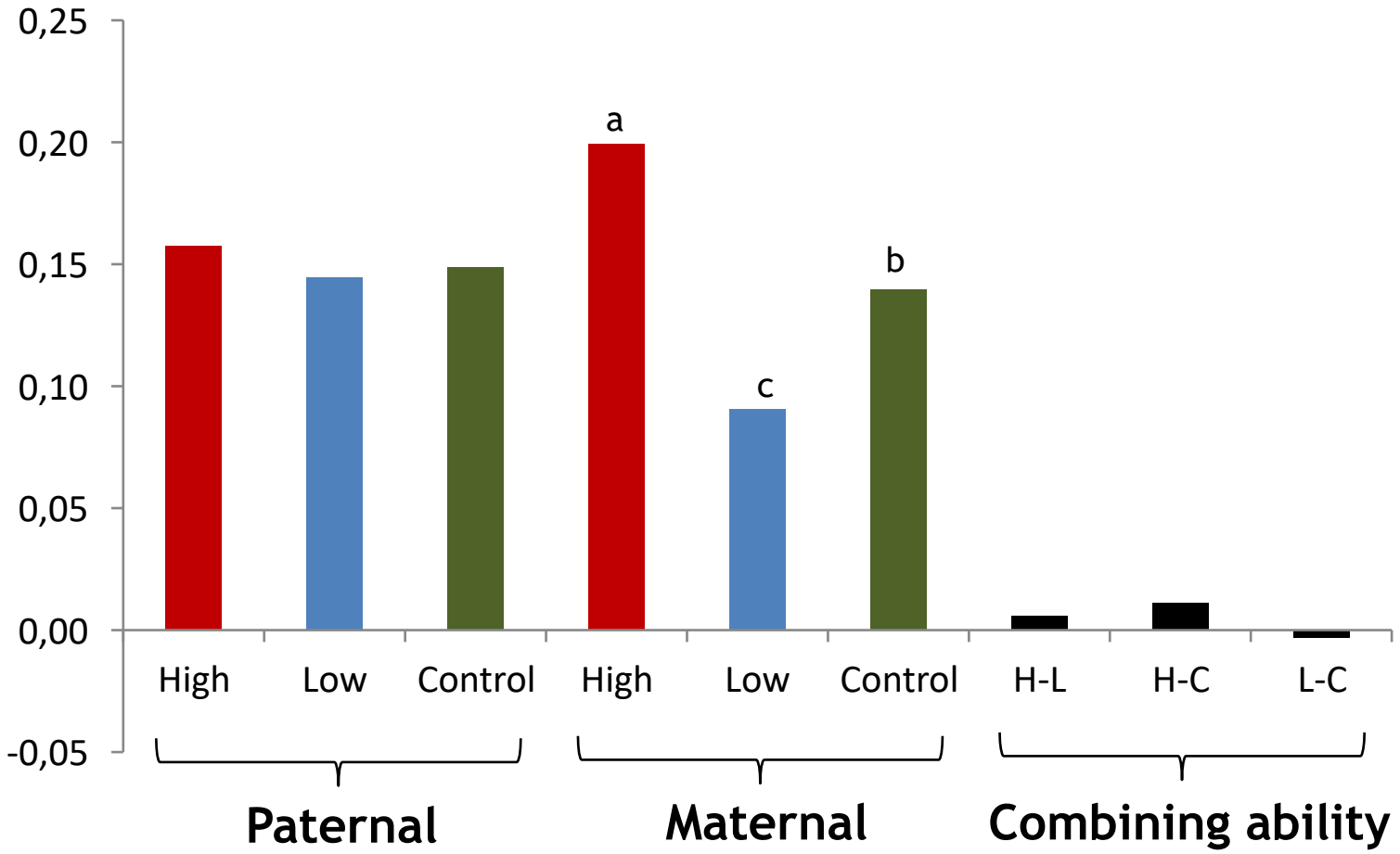
- **Traits:**
  - Birth weigth variability: variance, standard desviation and coefficient of variation
  - Birth weight: individual and mean
  - Weaning weight
  - Litter size
- **Effects** → PL: paternal line (3), ML: maternal line (3), SCA: specific combining ability (3), PN: parturition number (2), sex (3), LS: litter size (16)
- **TM Software** (Legarra, 2008)

Variability traits: Birth weigth variance



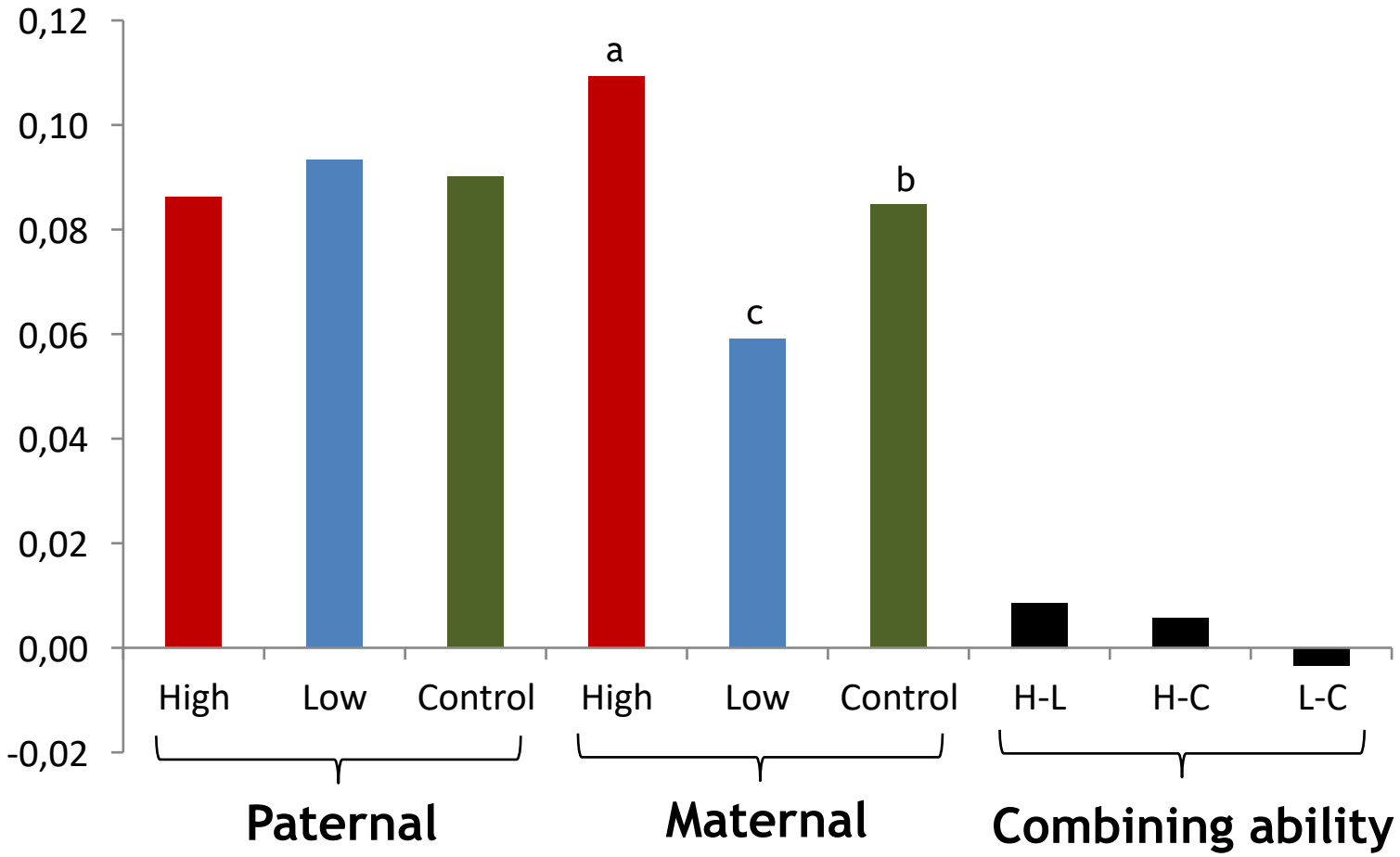
Maternal significant differences between Low and High lines

Variability traits: Birth weight standard deviation



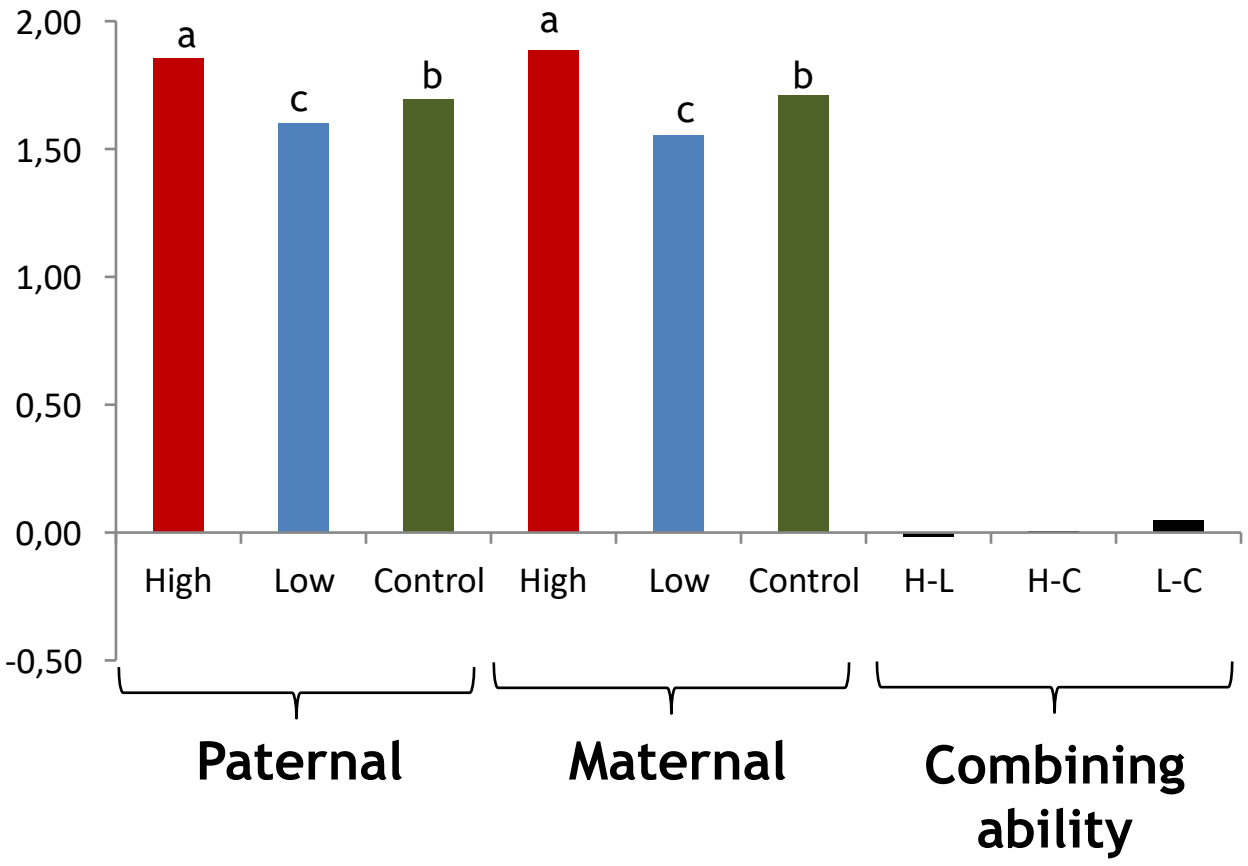
Maternal significant differences between the three lines

Variability traits: Birth weight coefficient of variation

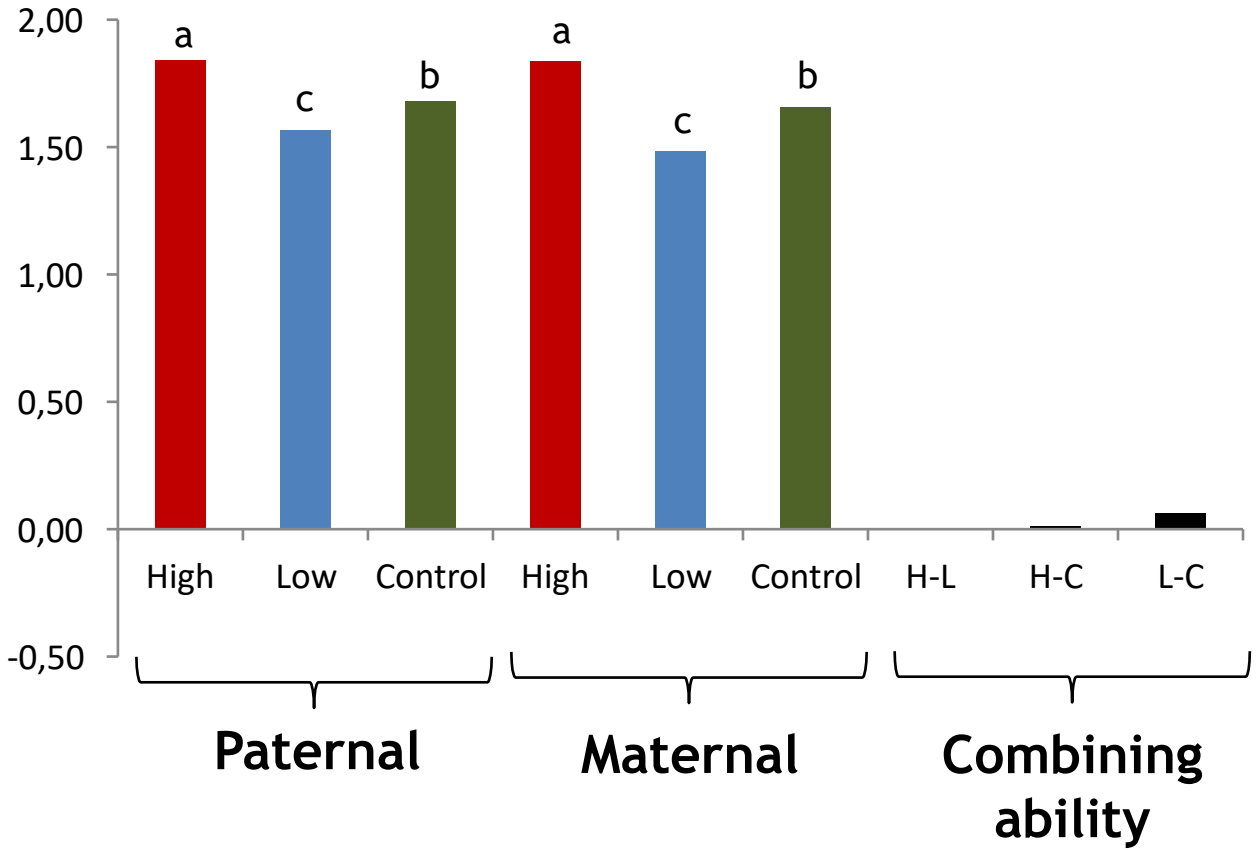


Maternal significant differences between the three lines

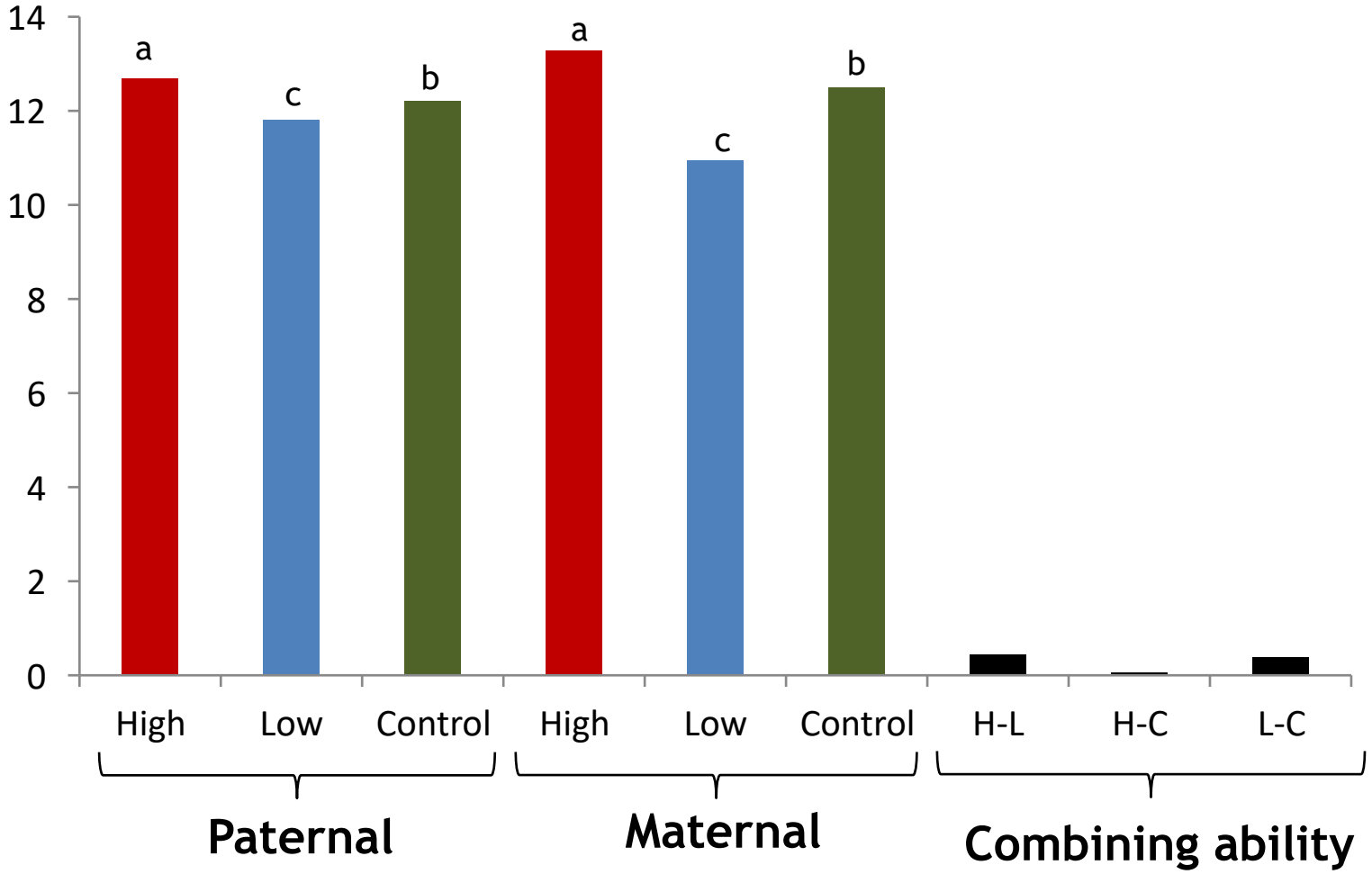
Individual birth weigth



Mean birth weigth

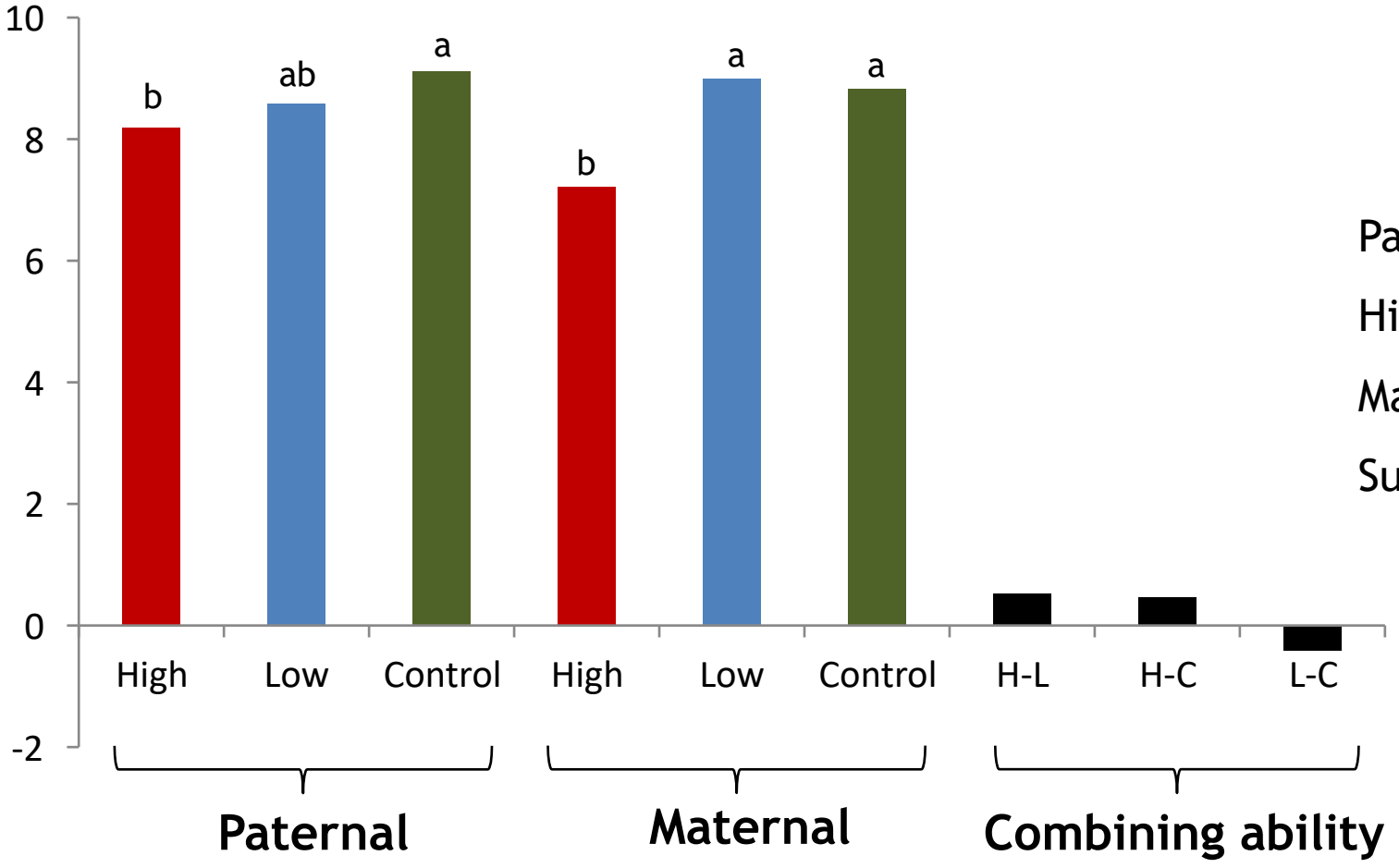


Weaning weight



Paternal and Maternal significant differences between the three lines

Litter size

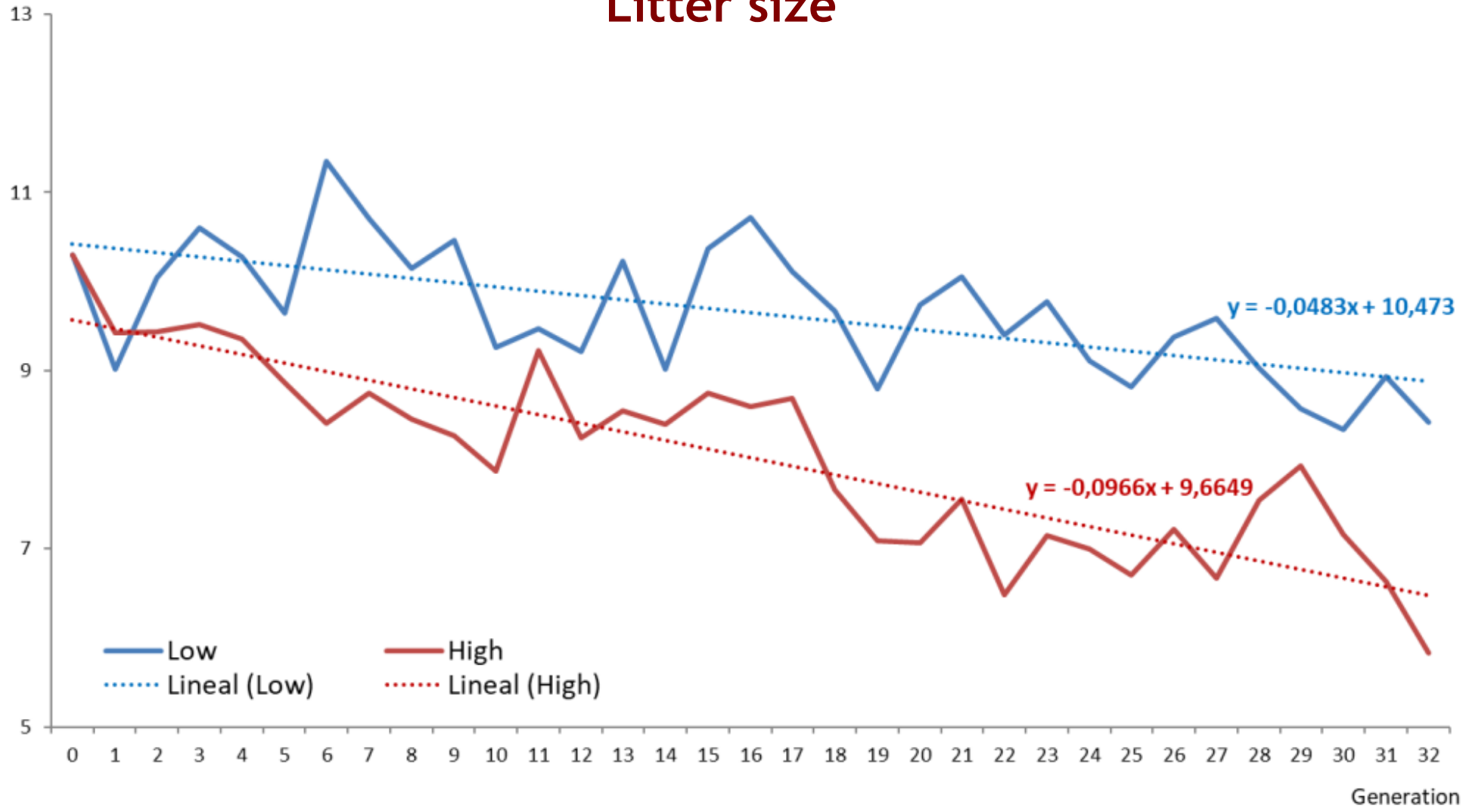


Paternal significant differences between High and Control Line

Maternal significant differences

Superiority of Control line

Litter size


13
11
9
7
5
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
Generation
y = -0,0483x + 10,473
y = -0,0966x + 9,6649
Low
High
Lineal (Low)
Lineal (High)

Conclusion

This analysis confirms that:

- These results showed that variability within litter is a maternal trait
- Heterosis effect was no relevant

Thanks for your attention

To a Mouse
(Robert Burns Poem)
Alloway, South Ayrshire, Scotland

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