

# How to improve breeding values prediction for Feed Conversion Ratio in case of incomplete longitudinal body weights

A simulation study

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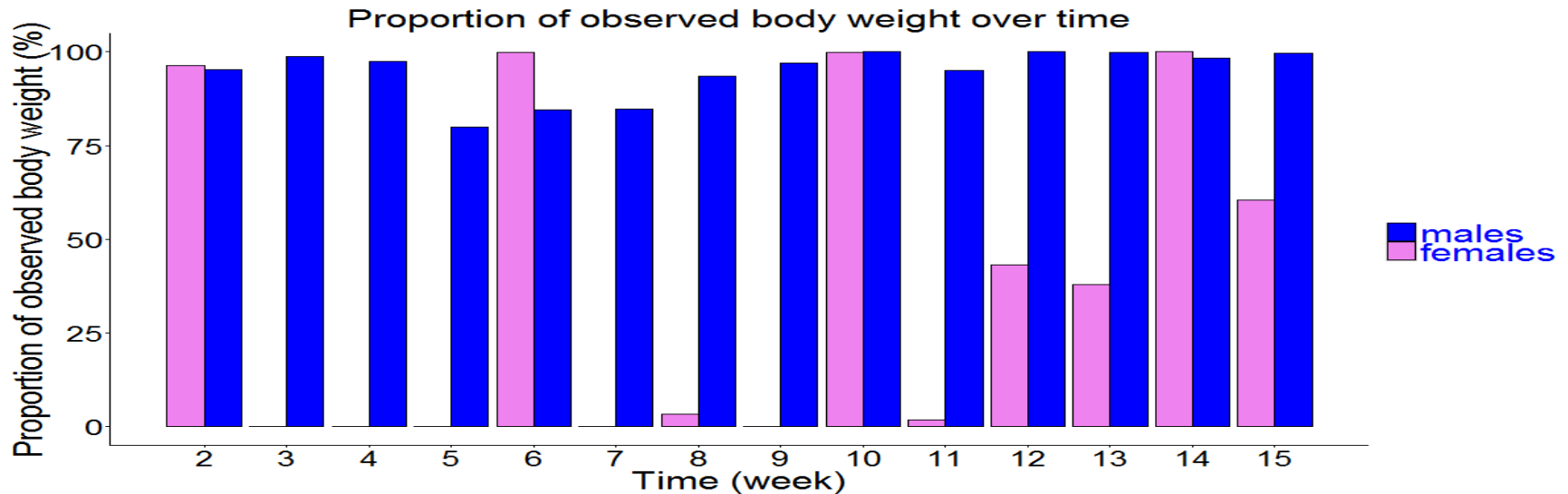
# Context

Repeated data over time  
Feed intake, Body weight,  
Feed efficiency  
= **longitudinal data**



Improve genetic of feed efficiency

## ❑ Missing body weight records



missing FCR for some animals

# The problem

Estimation of variance components becomes erratic when some records are missing (*Nobre et al., 2003*)

- ❑ Do missing BW data have an impact on the estimation of genetic parameters for longitudinal FCR?
- ❑ How to improve them?



# Data analysis

1286 males  $i$ , 14 weeks  $j$  of observation

$FI_{ij}$ ,  $BW_{ij}$  (missing data was negligible)

$$ADG_{ij} = \frac{BW_{ij+2} - BW_{ij-2}}{age_{ij+2} - age_{ij-2}}$$

Observed

$Obser\_FCR_{ij} = FI_{ij} / ADG_{ij}$   
**12% missing**

4 week-period

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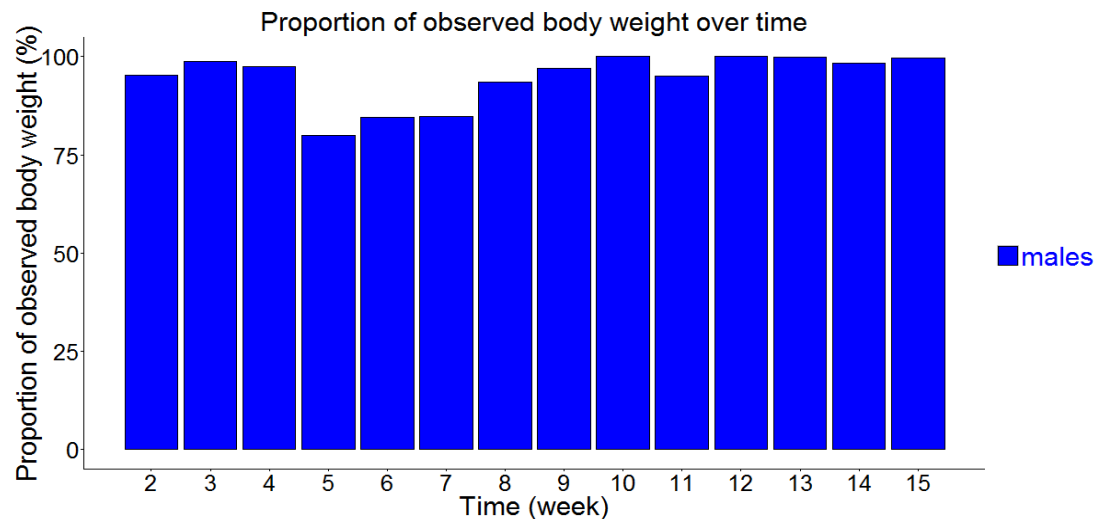
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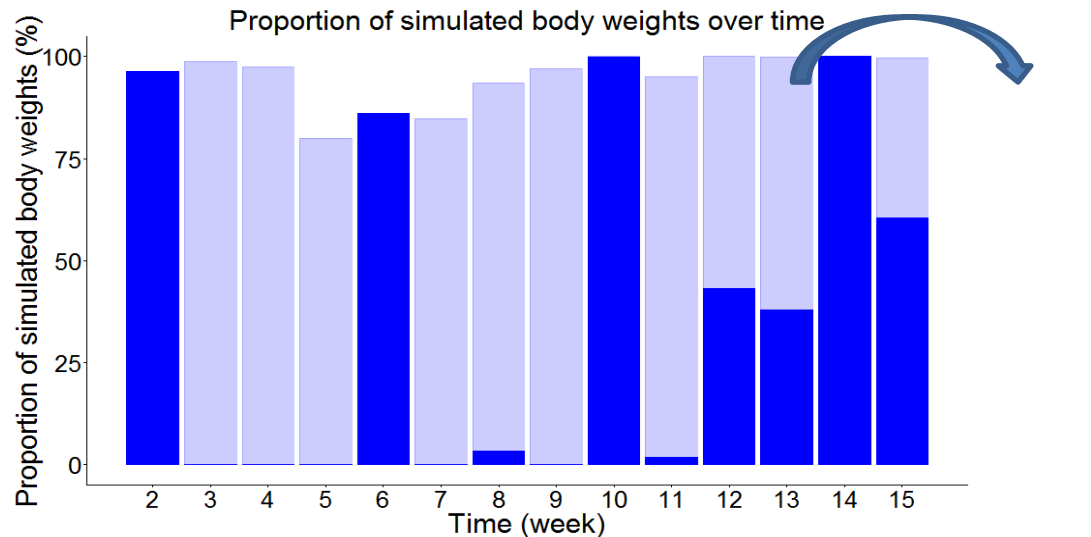
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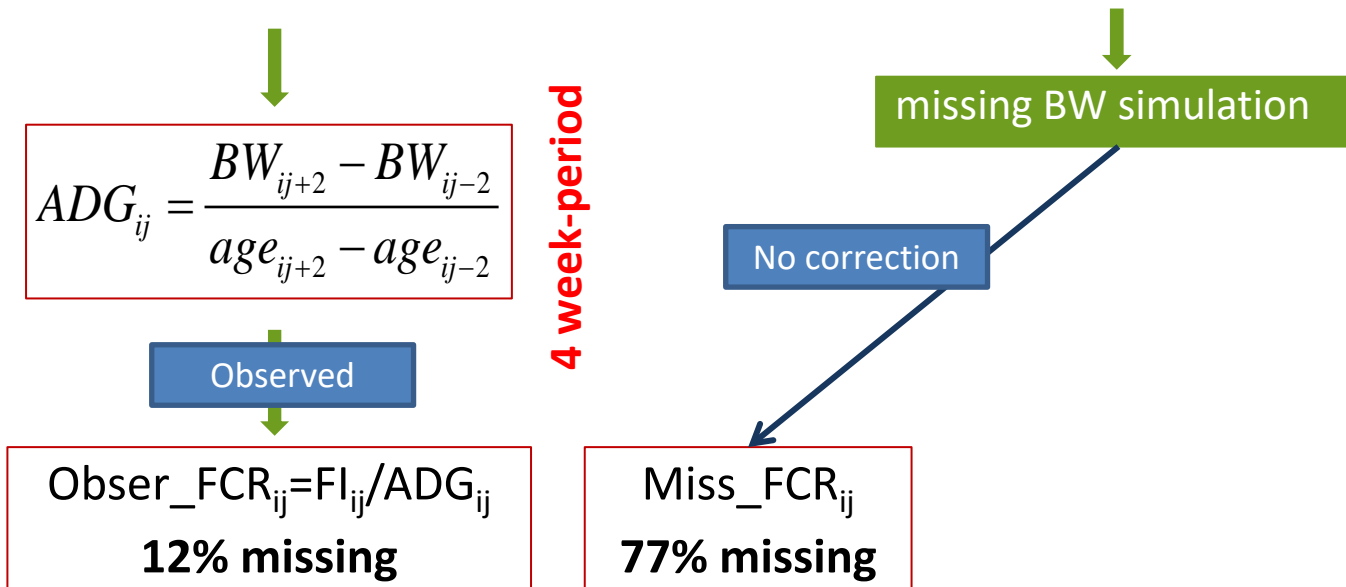


removed

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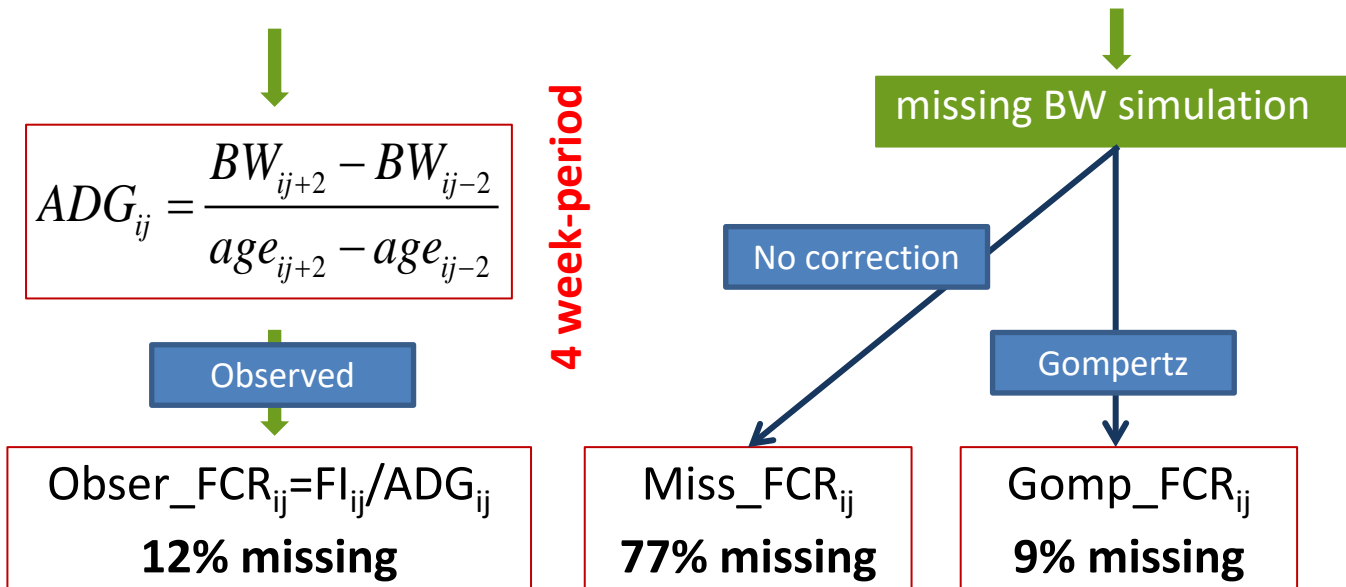
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No correction

$Miss\_FCR_{ij}$   
77% missing

Gompertz

$Gomp\_FCR_{ij}$   
9% missing

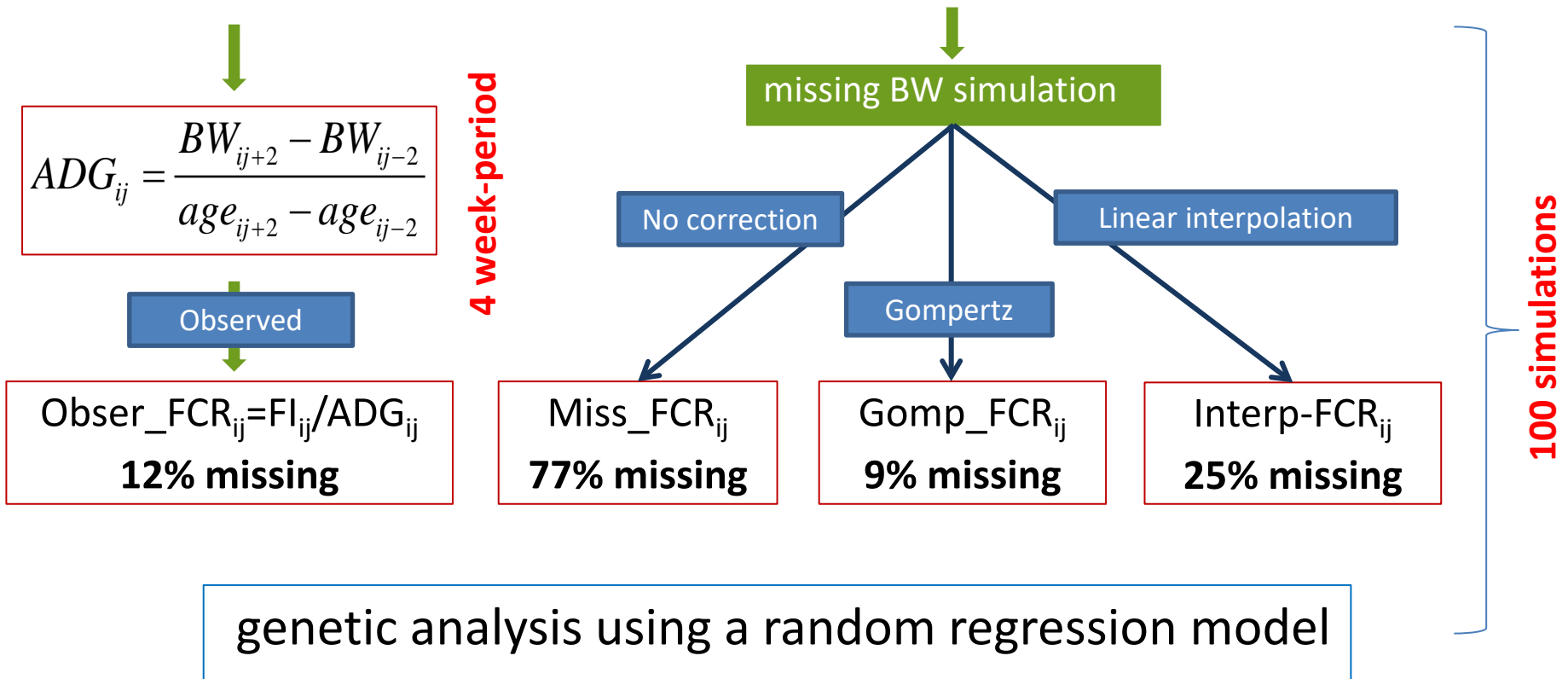
Linear interpolation

$Interp\_FCR_{ij}$   
25% missing

# Data analysis

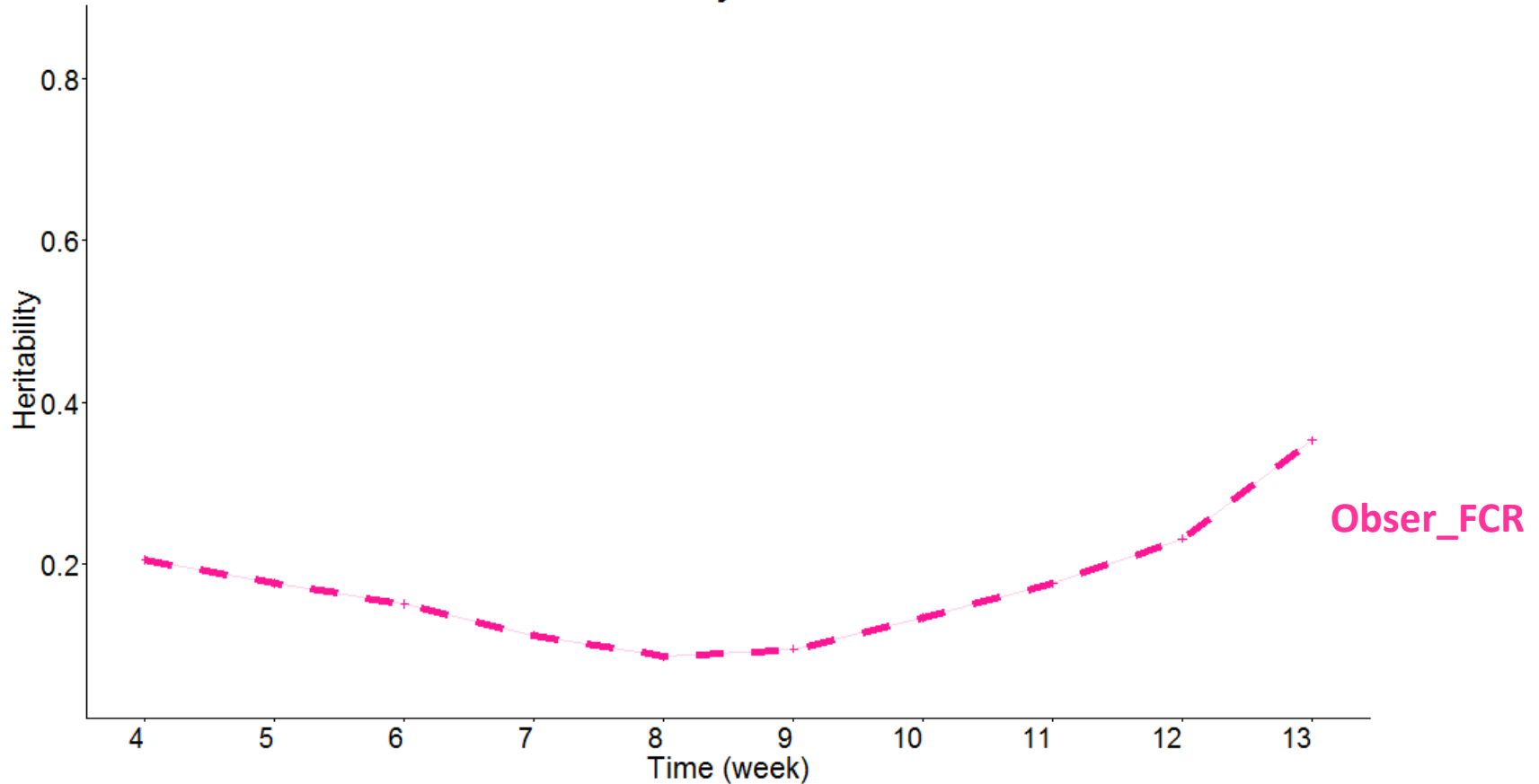
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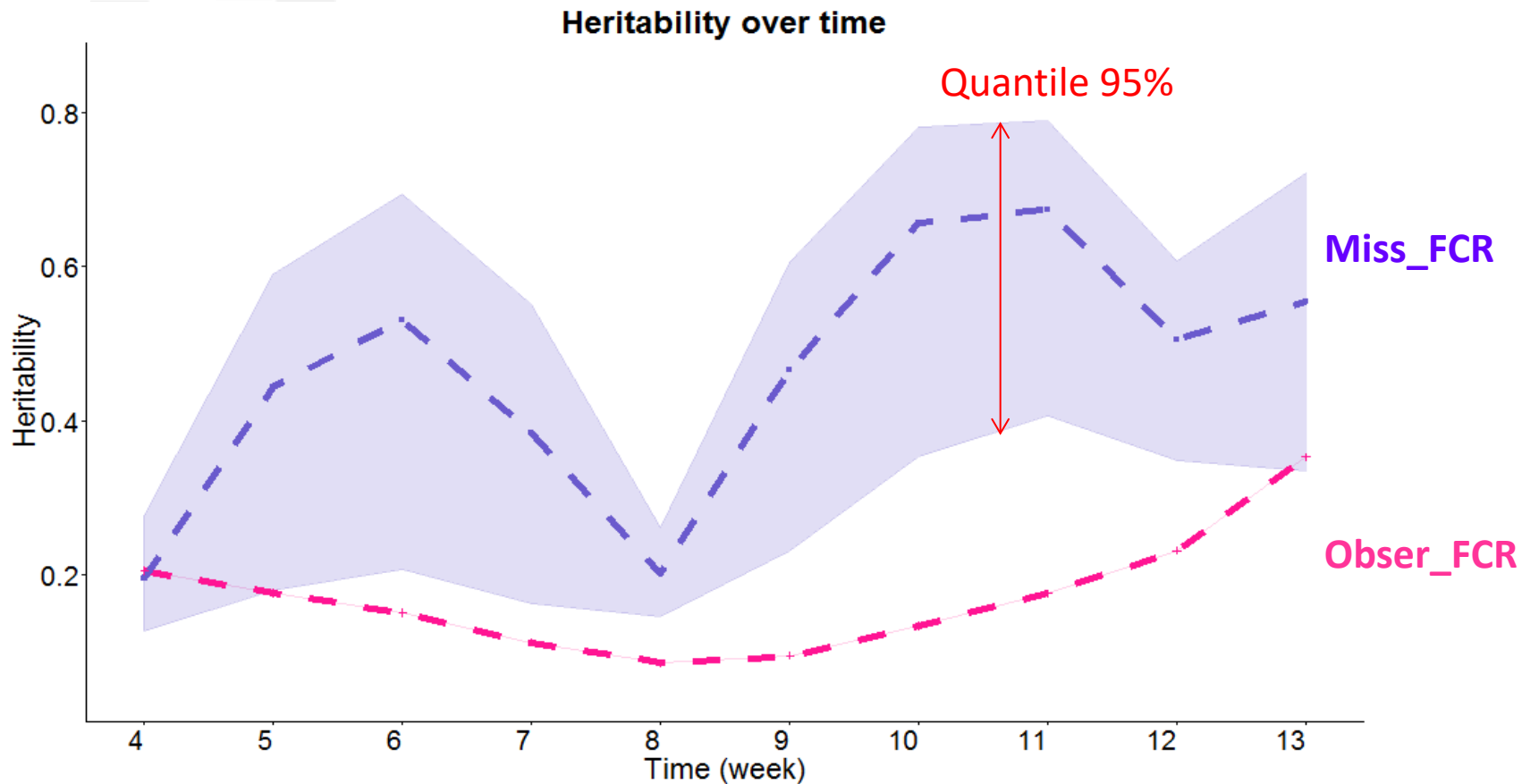
# Results 1 : Heritability

Heritability over time



12% = % missing FCR due to : missing BW + outlier values (FCR)

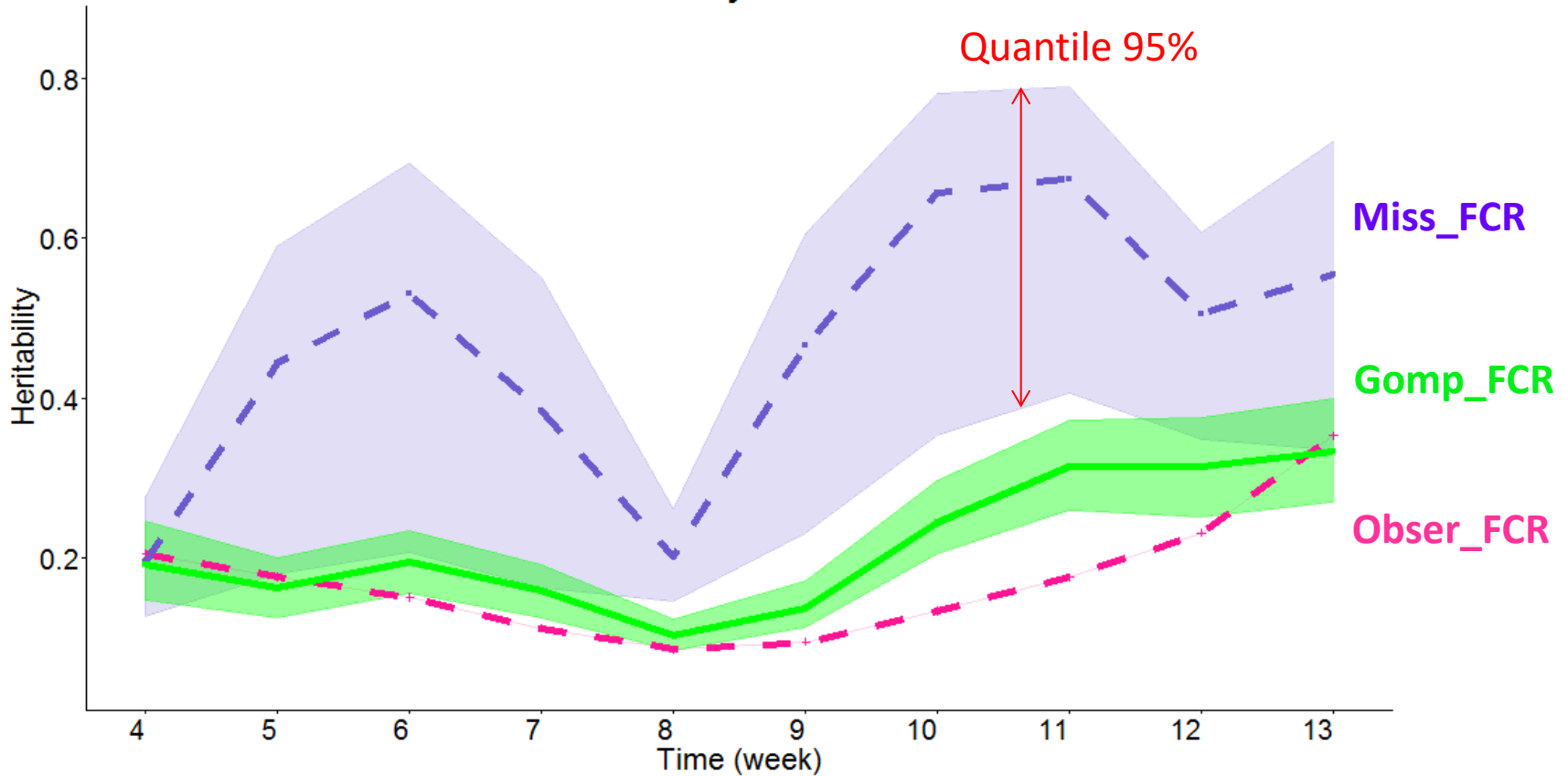
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Missing values → overestimation for heritability

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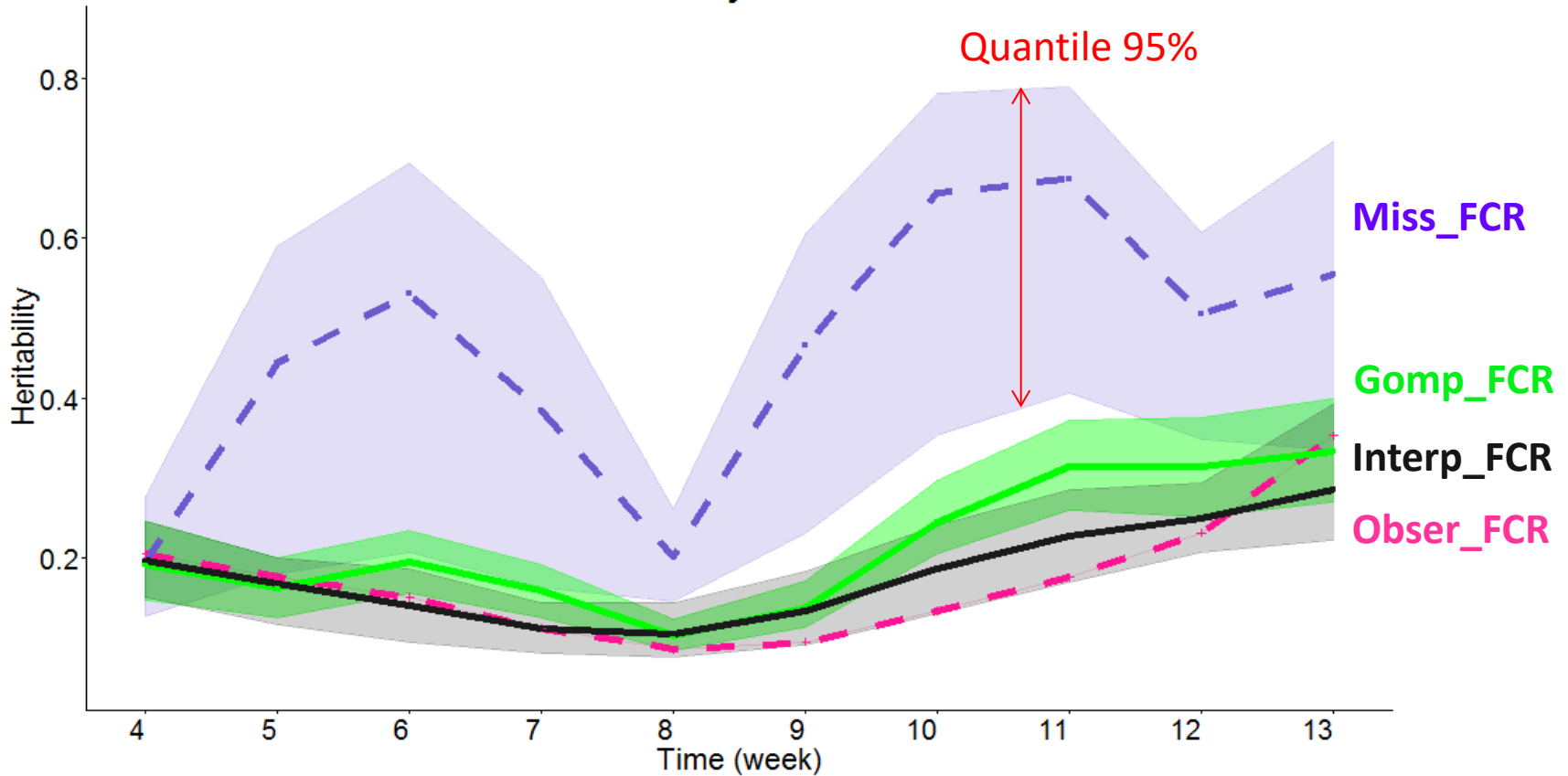
Heritability over time



- Missing values → overestimation for heritability
- Predicting BW improves the estimation

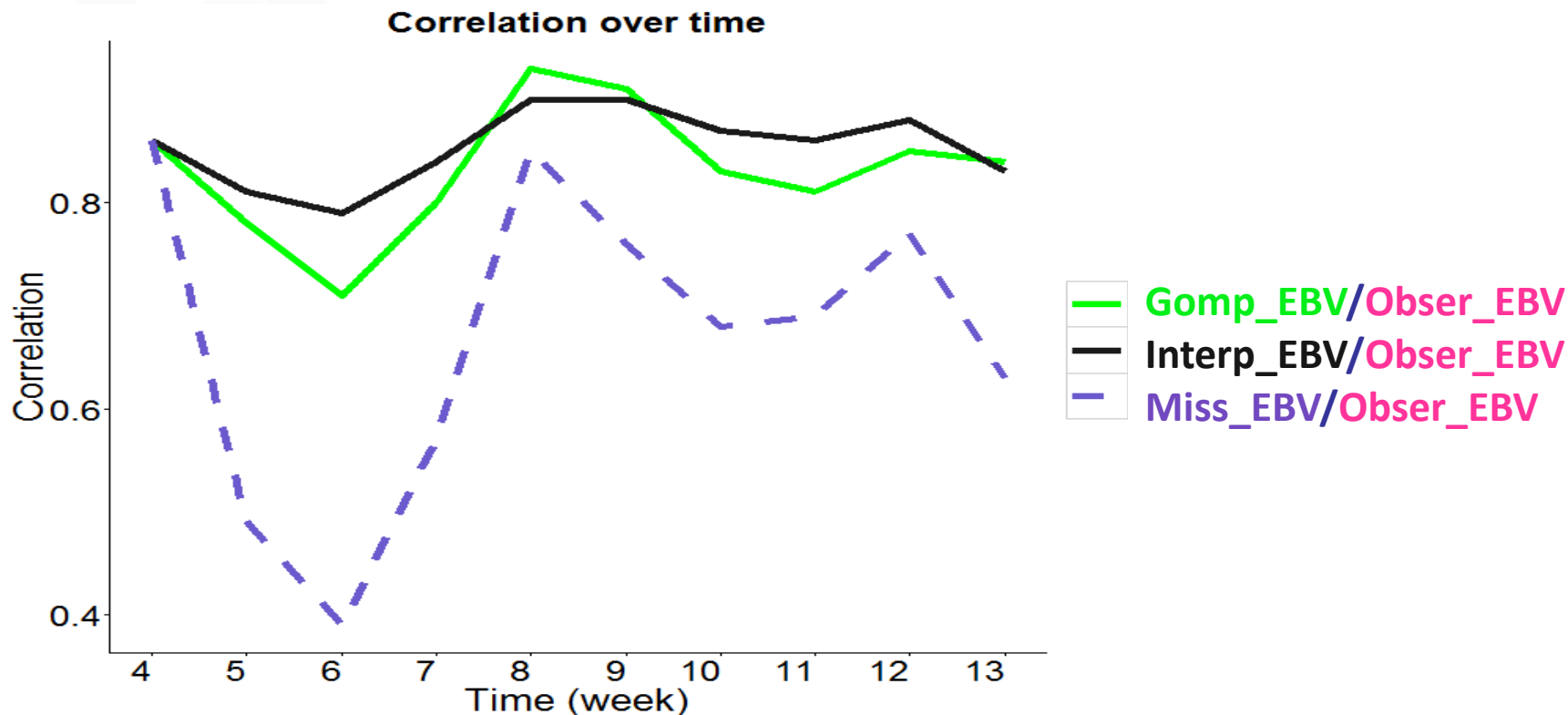
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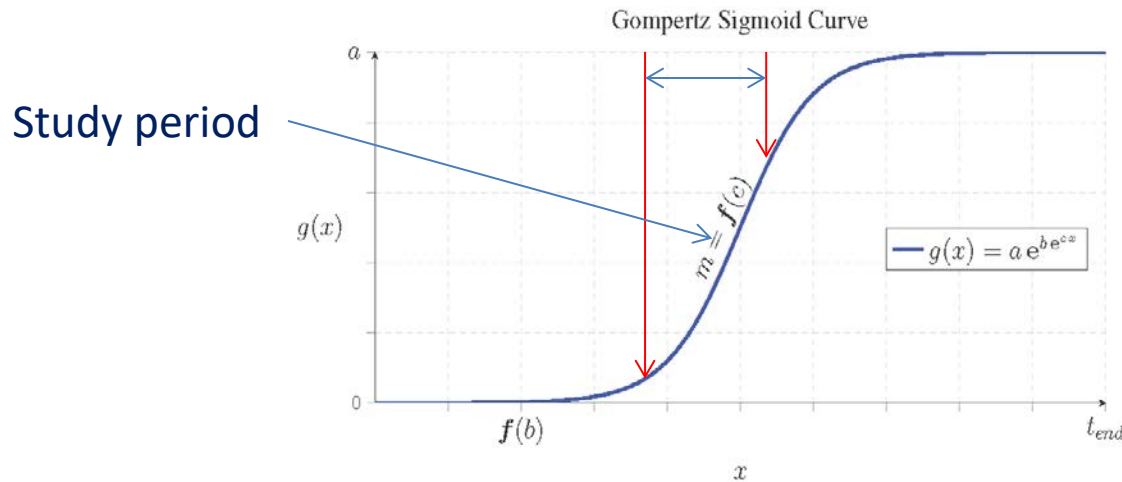
## Results 2: Correlation among EBV for FCR over 10 weeks (week 4 to week 13)



- Missing values → poor correlations with obser\_FCR
- Predicting BW improves the correlations

# Summary and Discussion

- Missing FCR (due to missing BW) →
  - ❖ bias  $h^2$
  - ❖ poor EBV prediction
- Predict BW (Gompertz, quasi linear interpolation)
  - ❖ improve the estimations of genetic parameters for longitudinal FCR
  - ❖ Linear interpolation > Gompertz : BW not in the sigmoid part of the curve







# Take home message

It is possible to improve the estimations for longitudinal FCR by predicting the missing BW



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