

First Steps to Model Milk Urea in a Management Perspective

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Objectives

Use of milk recording could be extended to **practical management tools** for all producers.

Milk urea could reflect e.g. imbalance in diet.

➔ Provide feeding management advices by **modeling milk urea**

Approach

Milk urea concentration (mg/l) is routinely measured by Mid Infrared Spectrometry in Walloon Region.

➔ 2,536,395 records (first 3 lactations, from 2001 to 2006)

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3 steps

- 1) Selection of an appropriate **model**
- 2) Estimation of **variance components**
REML on 6 herd- based random sub-data sets
- 3) Prediction of **future test-day milk urea** concentration
application of the model on data of January 2007

Model Used

Objective: compare **predicted** and **observed** milk urea concentration

Classical fixed HTD
(Mayeres *et al.*, 2004.
JDS. **88**:3688-3699)

➔ { Fixed herd – year
Fixed herd – month
Random HTD

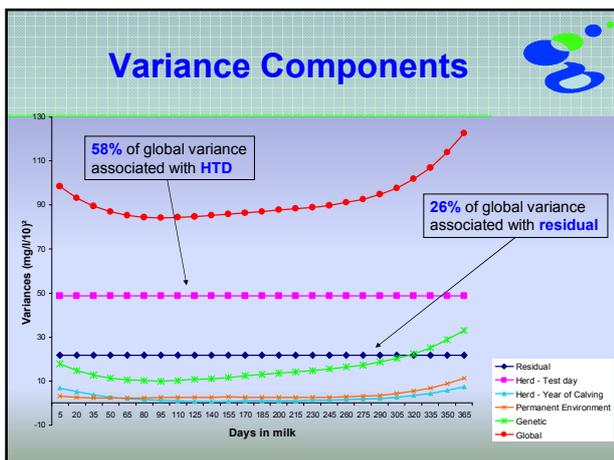
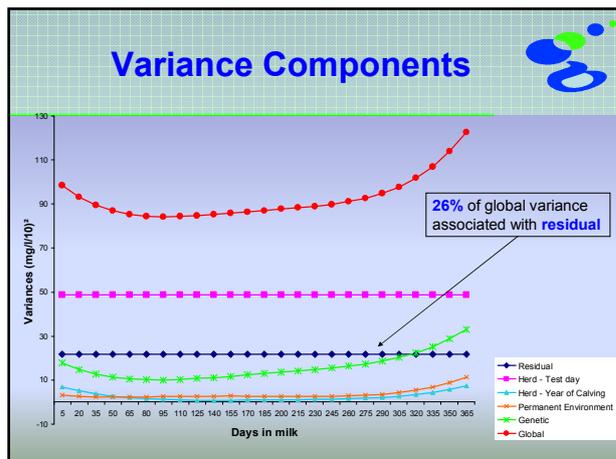
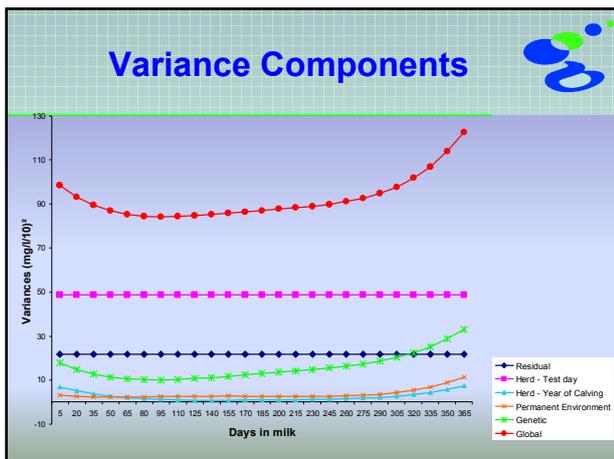
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➔ { Fixed herd – year
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+ { Fixed class of DIM – parity – age at calving - breed
Random herd - period of calving
Random permanent environment
Random additive genetic effect } Regression curves modeled with 2nd order Legendre polynomials



Heritabilities

Lactation	Heritabilities
First	0.13
Second	0.15
Third	0.16

→ Moderate heritabilities
 → Similar to Stoop et al.: **0.14** (2007. JDS. 90:1981-1986)
 → Lower than others studies : from **0.22** to **0.44** for 1st lactation (Miglior et al., 2007. JDS. 90:2468-2479; Wood et al., 2003. JDS. 86:2462-2469; Mitchell et al., JDS. 88:4434-4440)

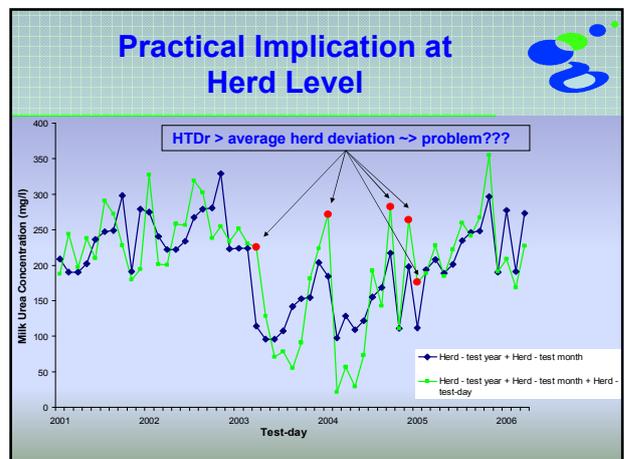
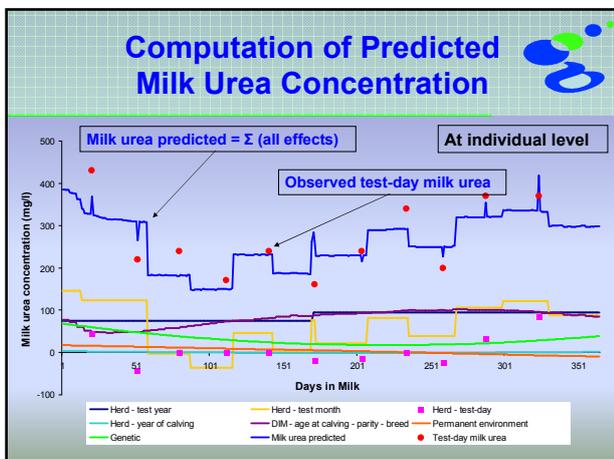
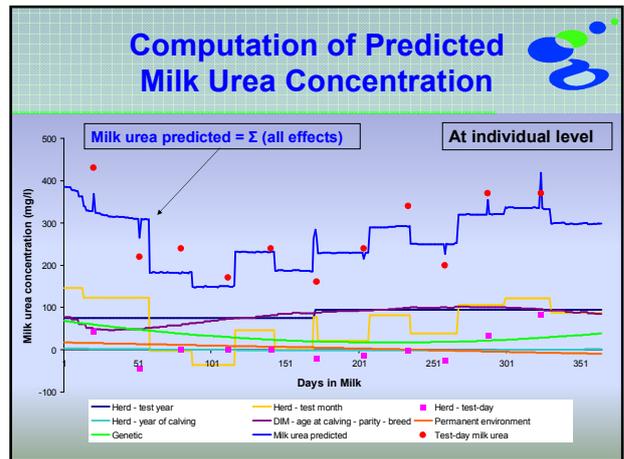
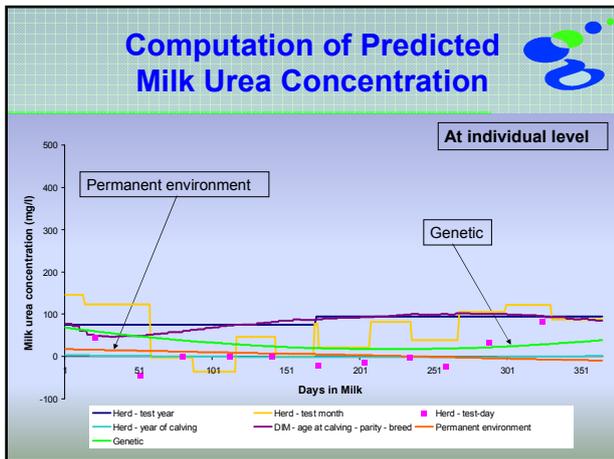
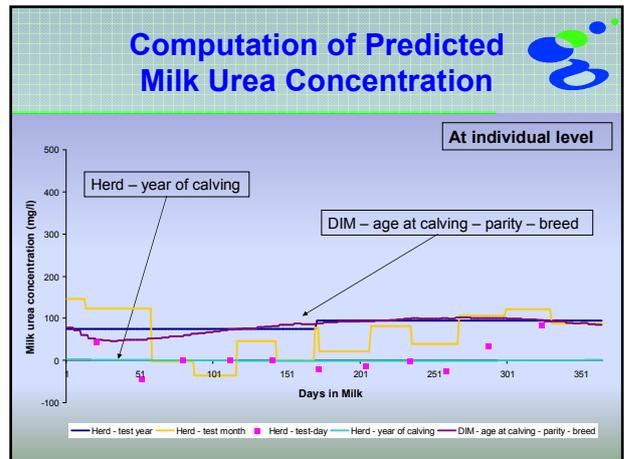
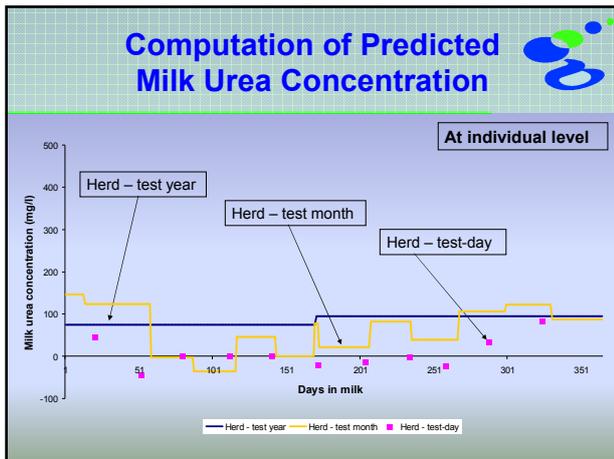
Computation of Predicted Milk Urea Concentration

Milk urea predicted = Σ (estimates for all corresponding effects) except HTD effect

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→ Allow predicting milk urea concentration for all possible DIM



Prediction of Future Test-day Milk Urea Concentration



→ On data **not used** for the solutions estimation (January 2007)

Comparison of predicted and observed milk urea concentration

Lactation	Prediction Error = (Prediction – Observation)	Correlation Prediction/Observation
First	-12.82 ± 84.12	0.48
Second	-12.74 ± 82.27	0.55
Third	-12.03 ± 83.57	0.53

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Our model is **not optimal for prediction**

To do...



Modeling improvement



(co) variances structures linking successive test-days

Practical implementation for the producers



Advices about “dietary energy:protein ratio”

- at herd level
- by parity groups
- by DIM groups

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Thank you for your attention

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