A simple modelling approach of regulations in energy partitioning for lactating female: application to the dairy goat

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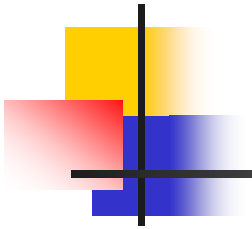
Animal = regulated system

2 types of regulations

Homeostasis & **Homeorhesis**

Individual survival

Species fitness



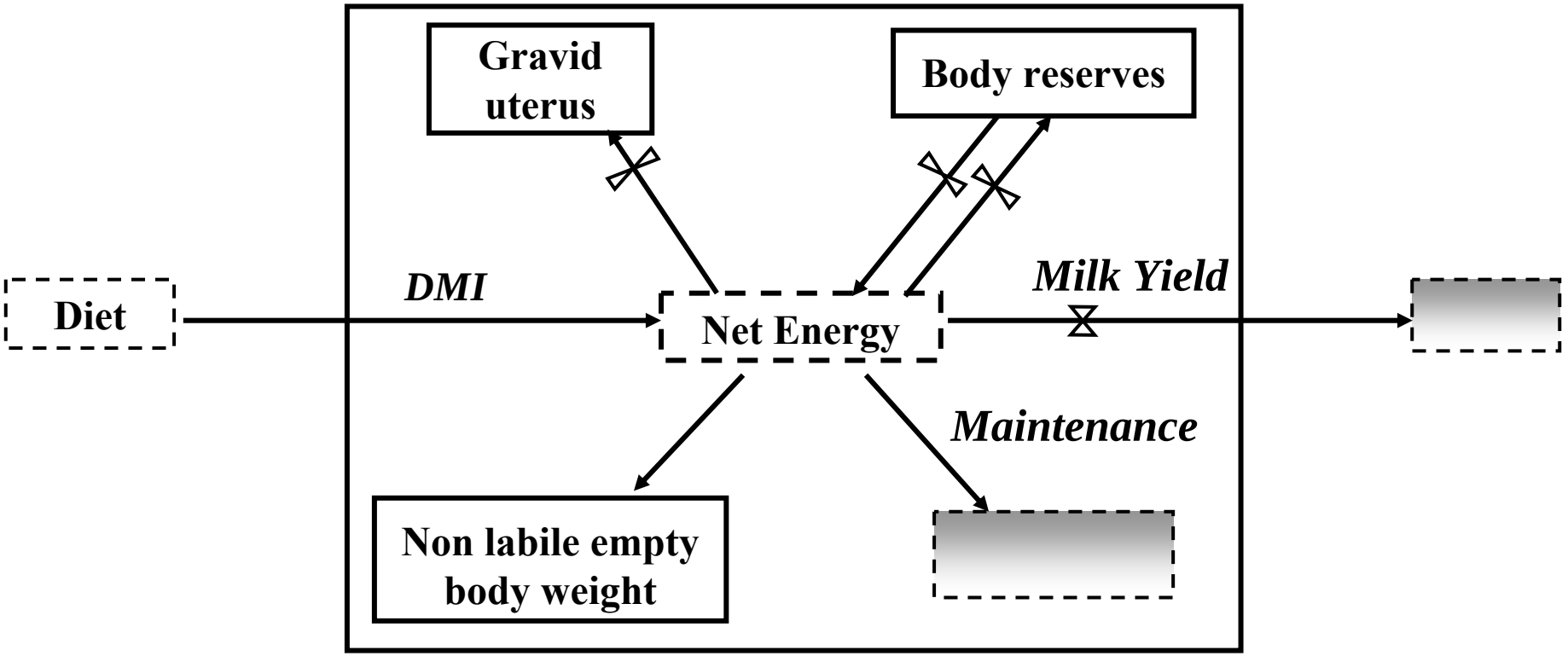
Outline

- Model principles
- Presentation of the 3 sub-systems
- Simulation results & validation

Model principles

- Simulating changes in **BW**, **DMI** and **MY** throughout **productive life**
- Driven by theoretical representation of **homeorhesis**
- Based on **3 sub-systems**

Operating sub-system

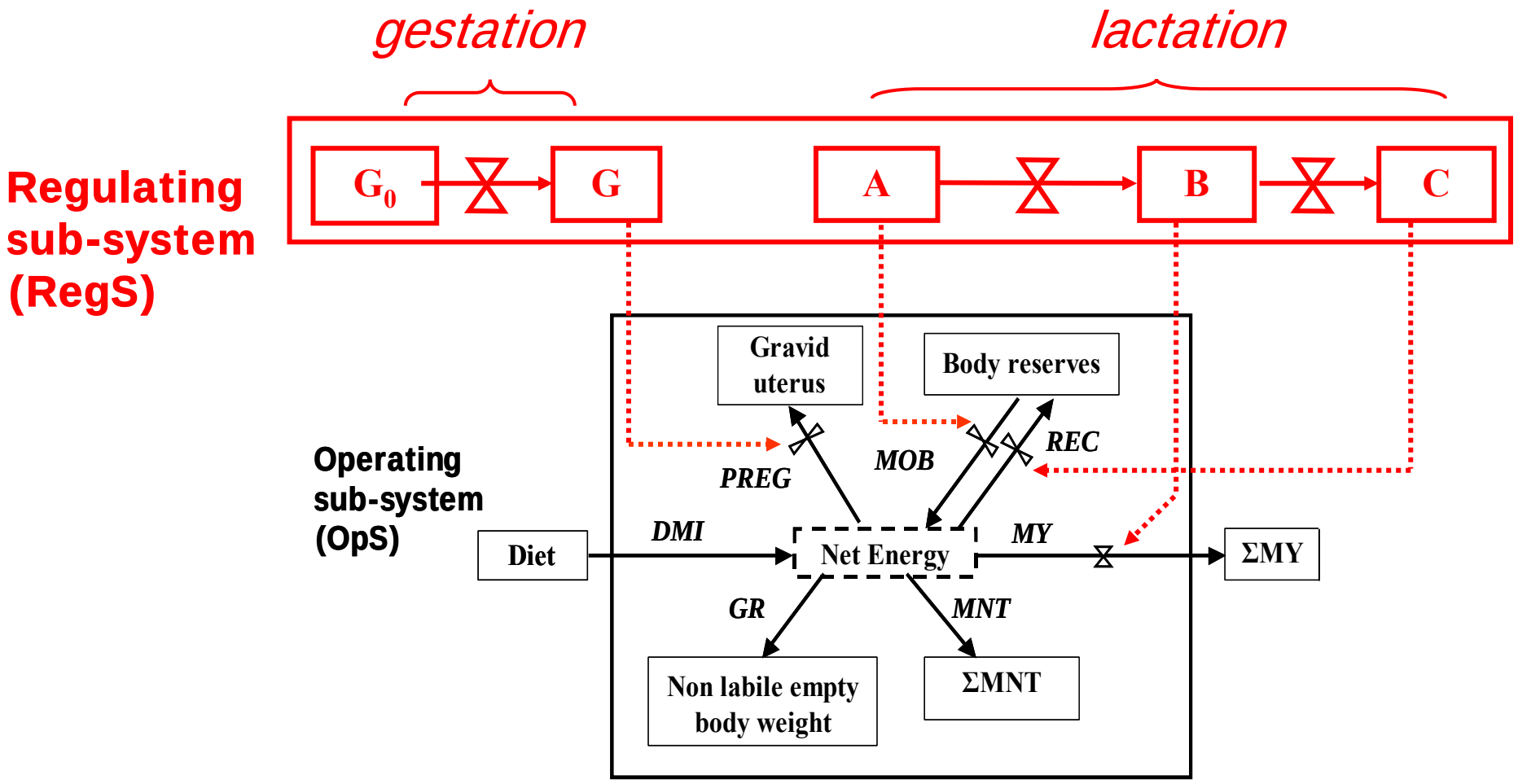


Operating sub-system

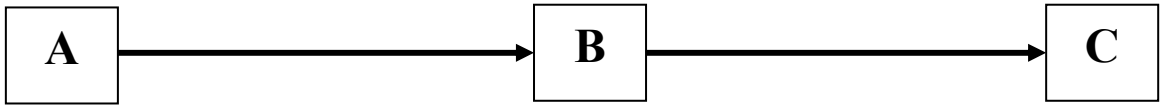
Energetic requirements linked to physiological flows

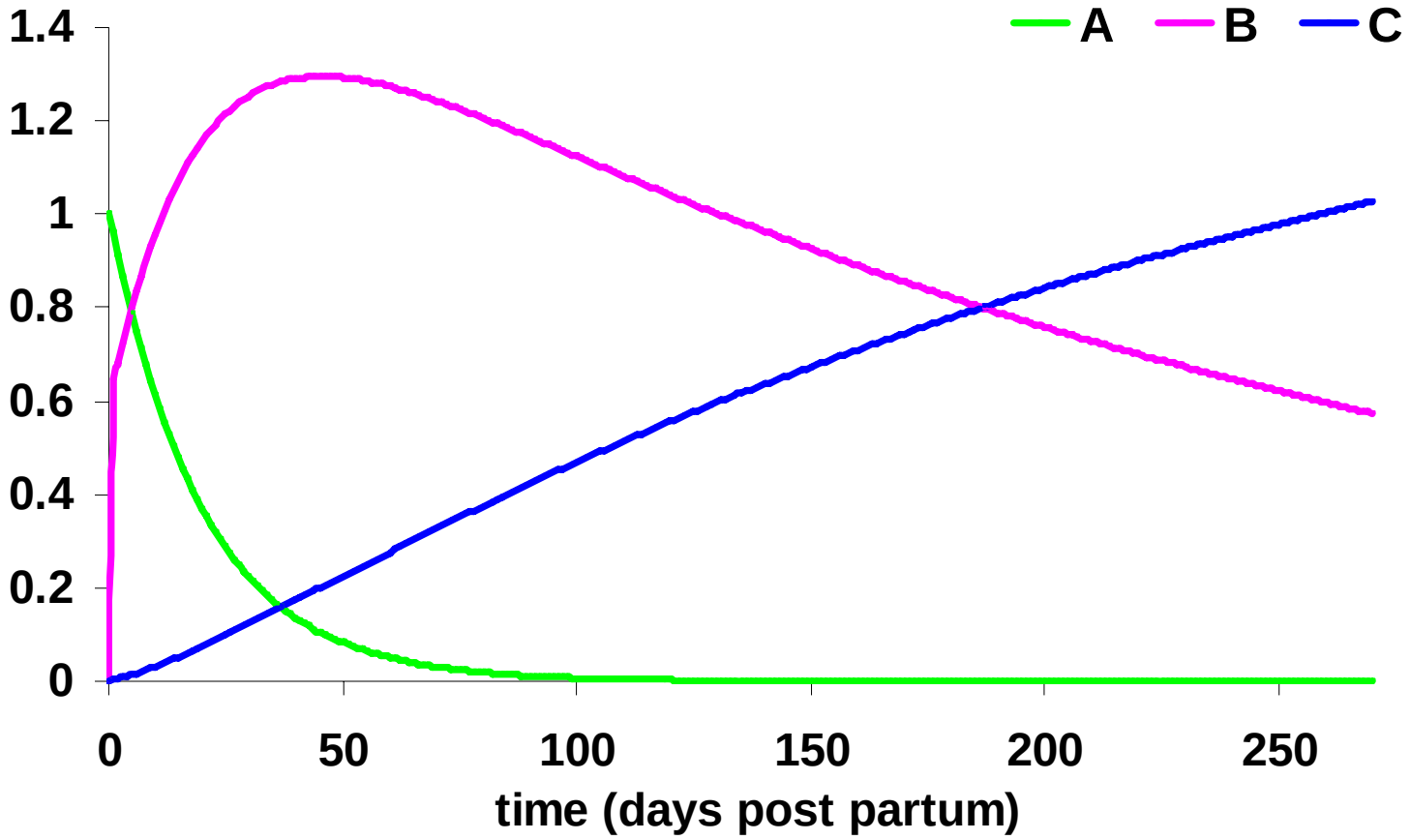
Balance between energetic INPUTS and OUTPUTS

Regulating sub-system

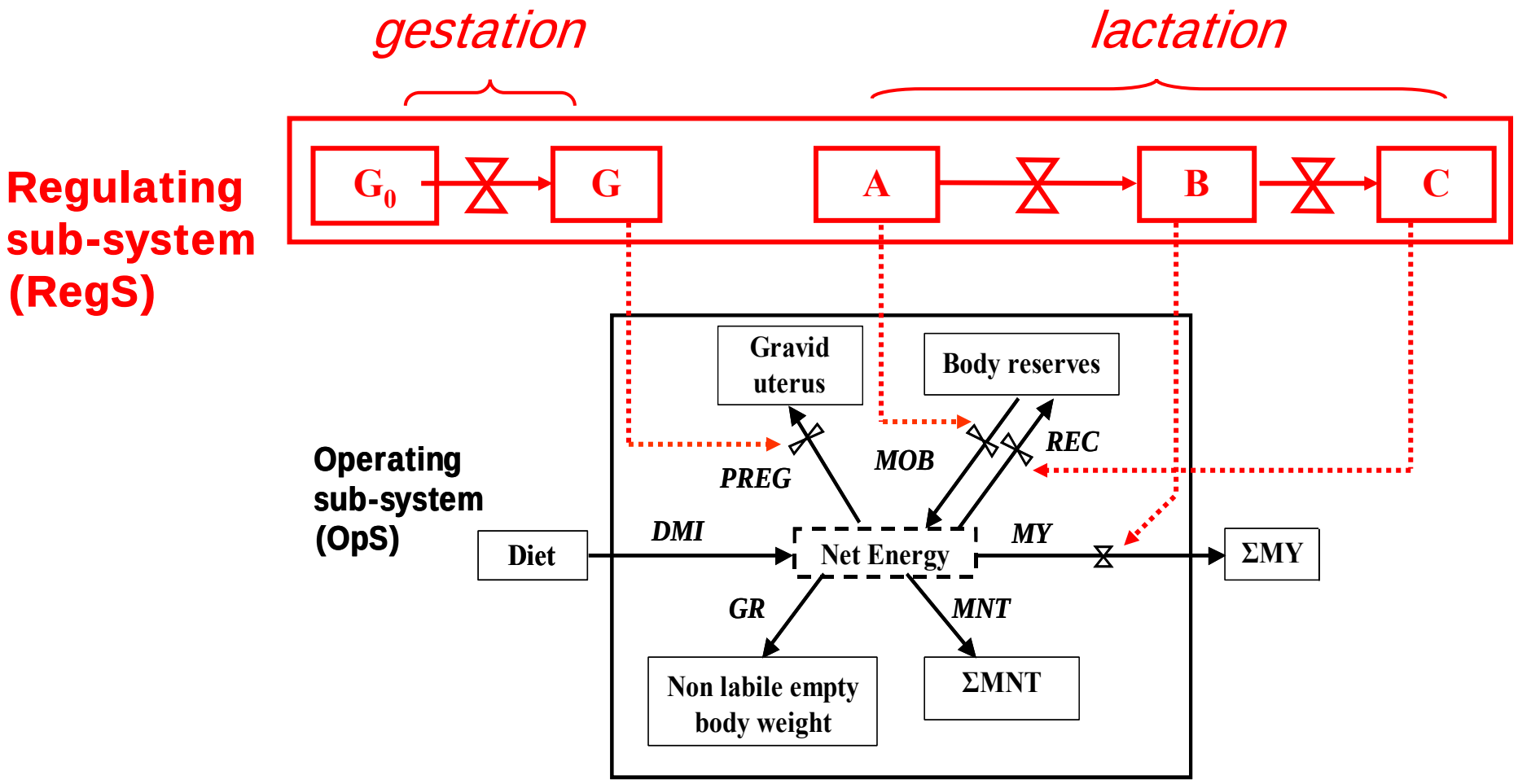


« Motor » of lactation



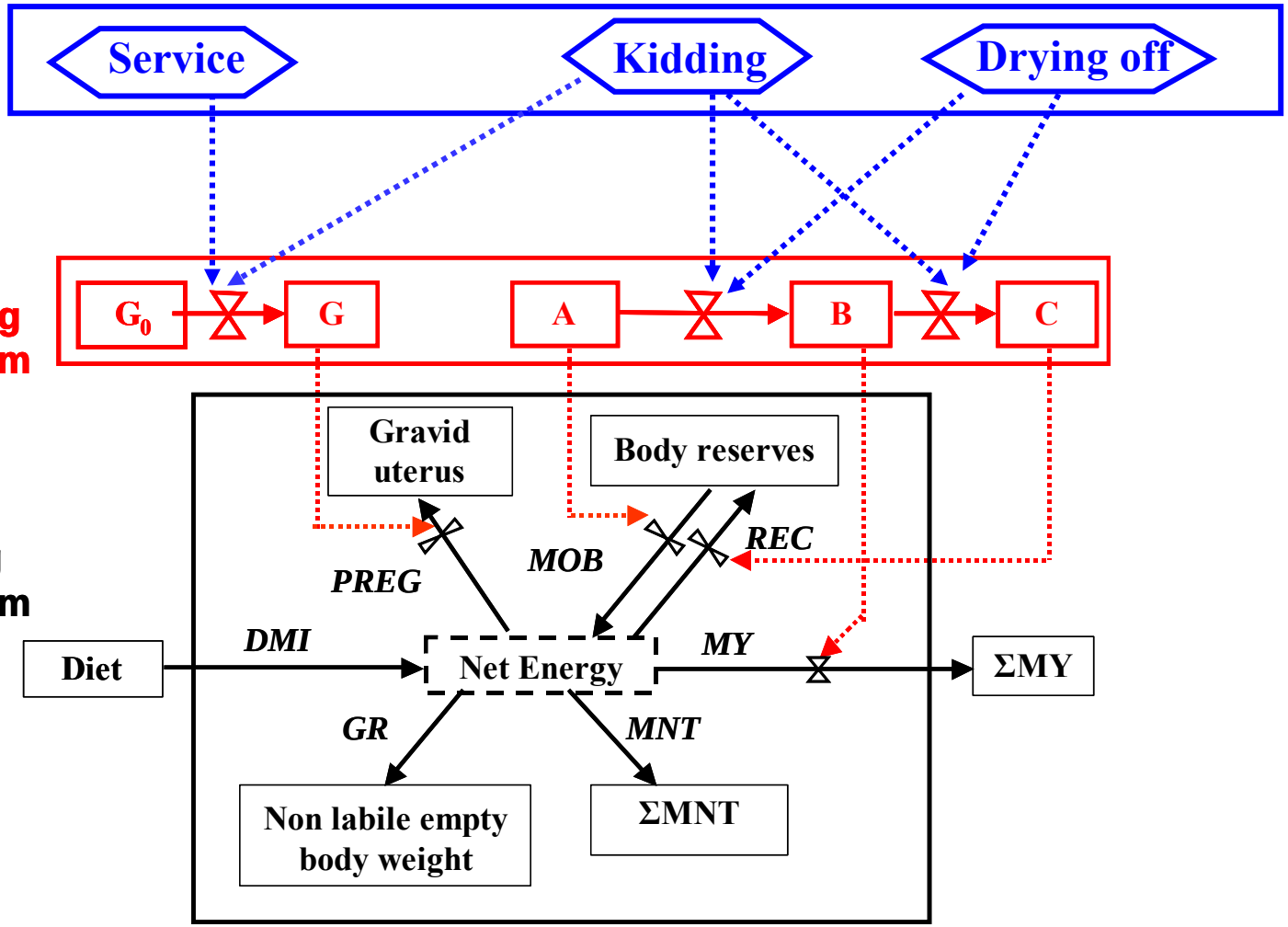


Regulating sub-system

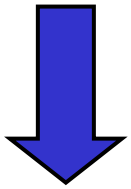


Reproductive events sub-system

Reproductive events sub-system (RepS)



Simulation results

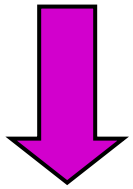


60 kg at maturity

Production pot.= 4.8 kg

5 breeding cycles

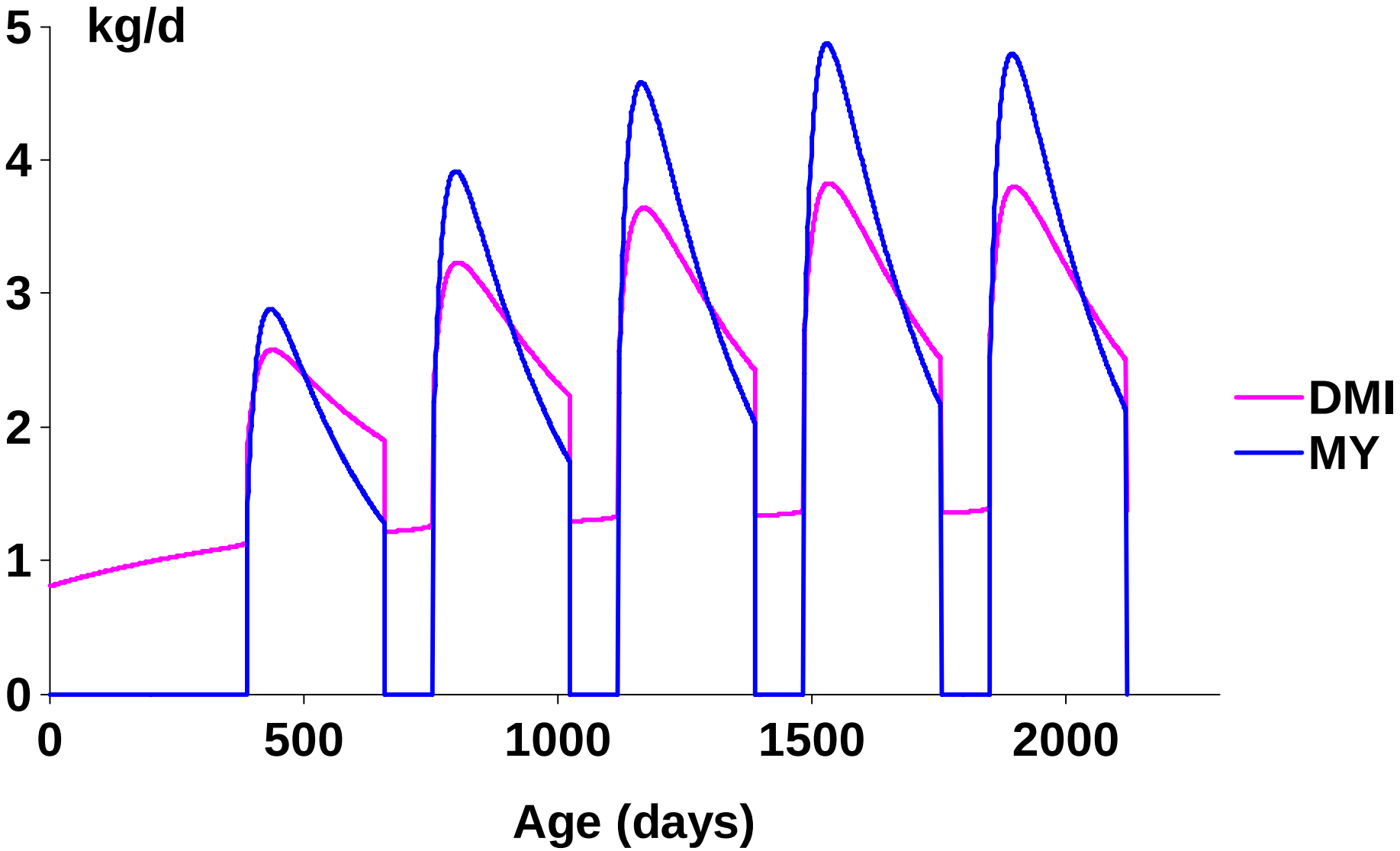
External validation



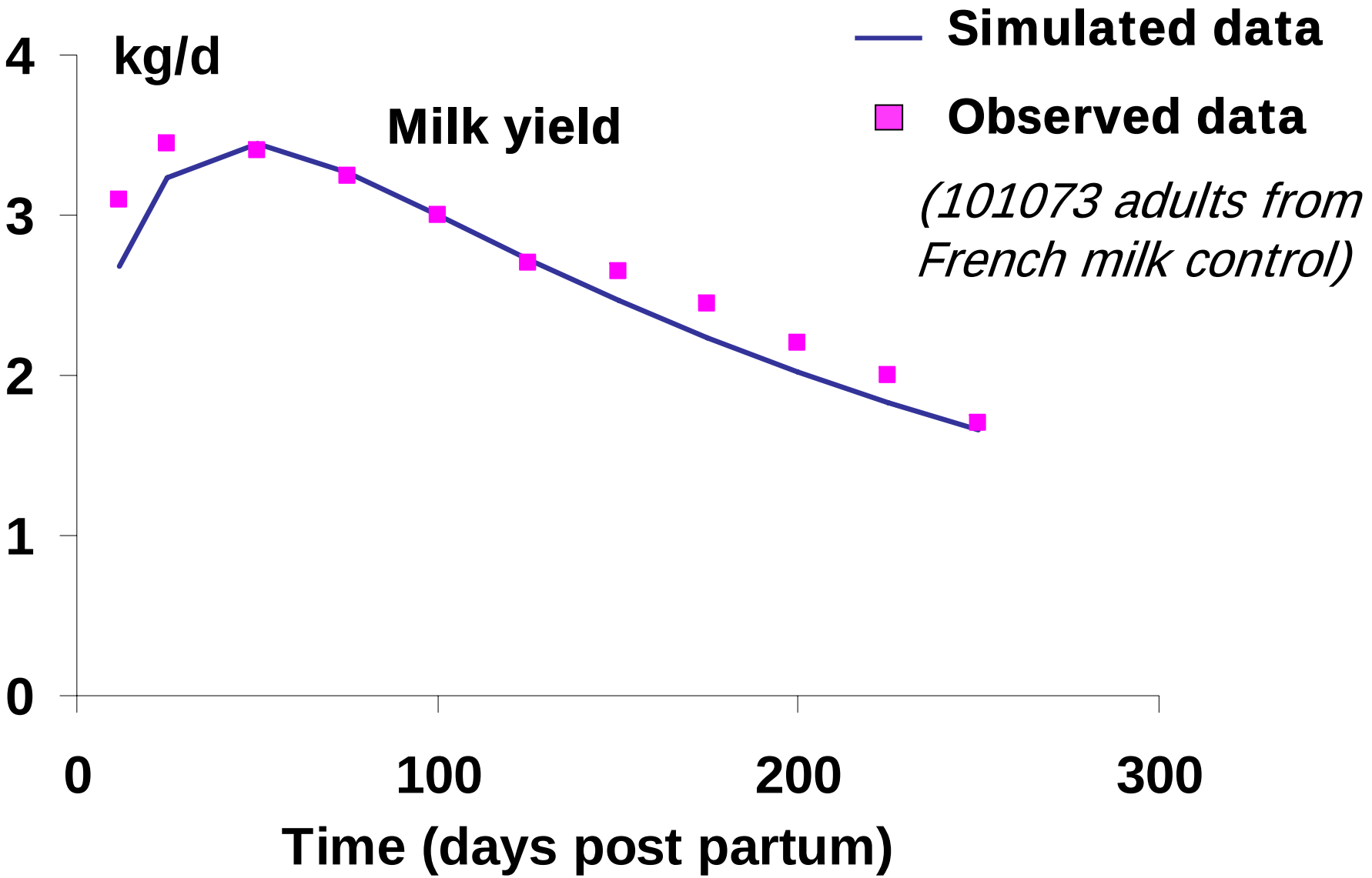
French Milk Control

INRA UMR PNA flock

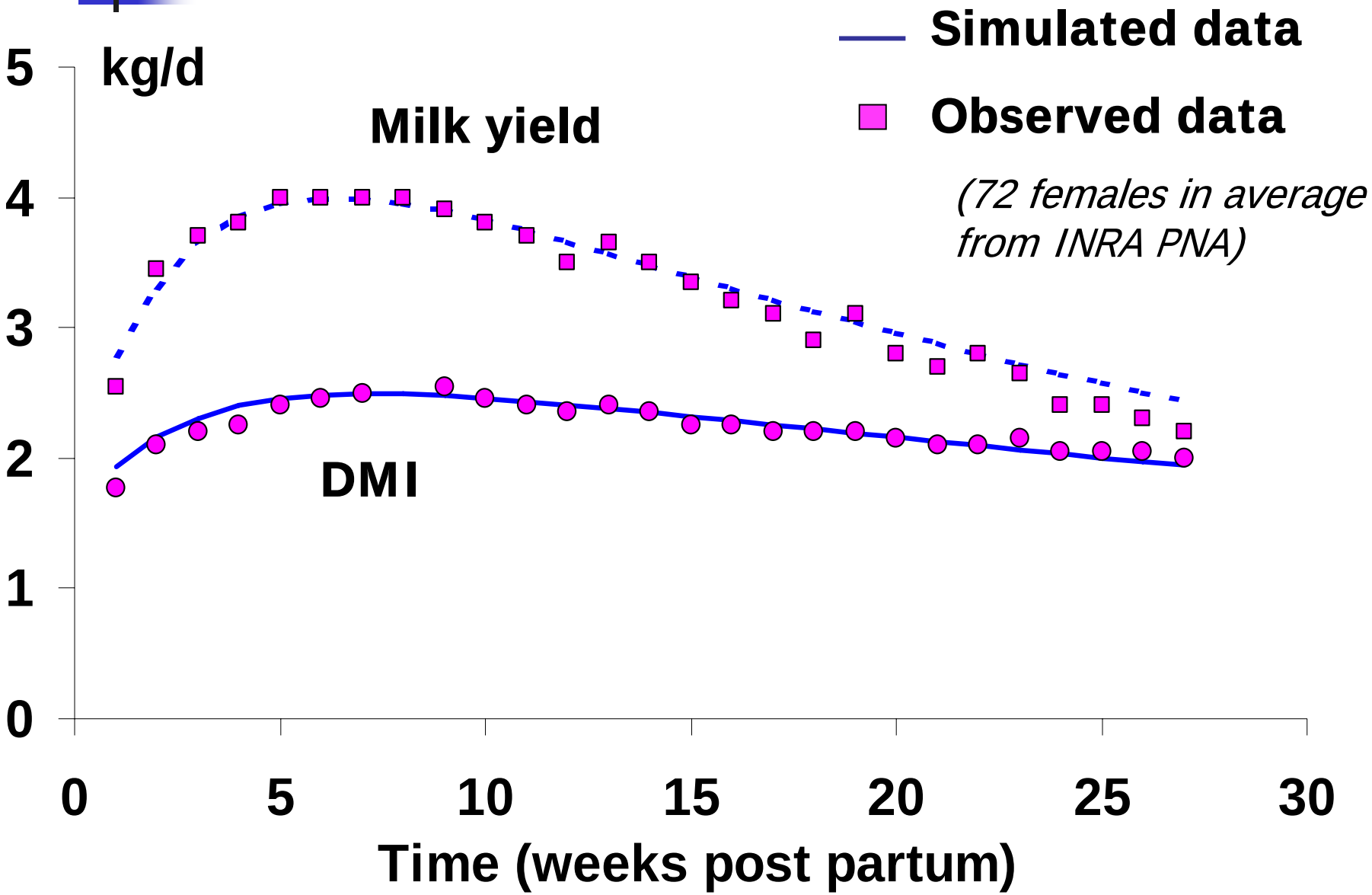
Results: productive life



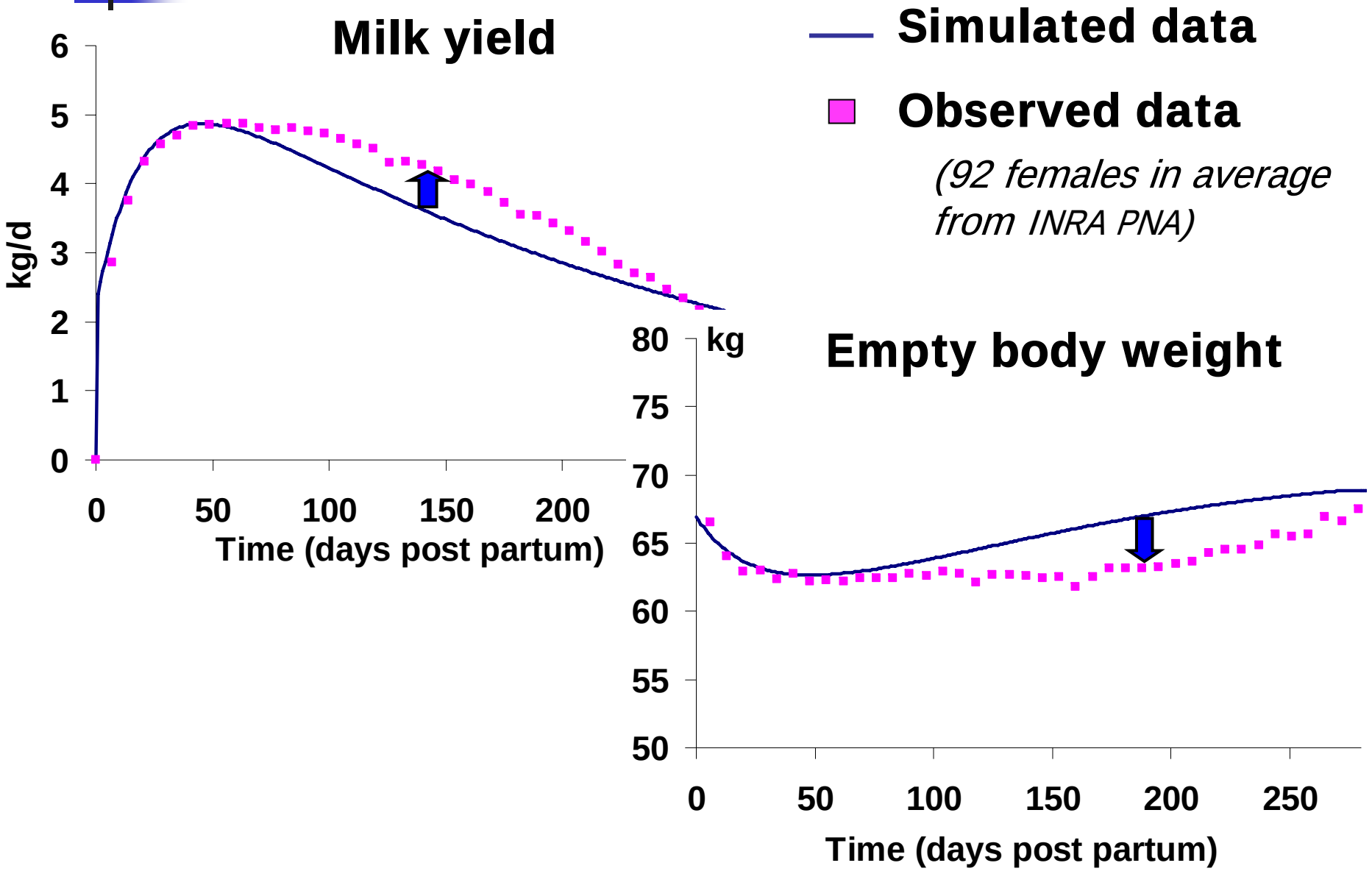
Results: external validation



Results: external validation



Results: validation



Conclusion

- Relevance of model in predicting performances throughout productive life
- Validation of the minimal representation of energy partitioning regulations
- Perspective of integrating animal model in a herd simulator

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