

Adapting the feed, the animal and the feeding techniques to improve the efficiency and sustainability of monogastric livestock production systems



Detection and characterization of the response of growing pigs to perturbations by using feed intake (A modelling approach)

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1. Introduction

Robustness:

- Attempts were made:
 - Heat Tolerance¹
 - Disease resistance²
- Includes multiple elements^{3, 4}:
 - Response to and recover from perturbations
- Complex & difficult to quantify

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¹Renaudeau et al., 2012, ²Guy et al., 2012, ³N.C. Friggens et al., 2017, ⁴I.G. Colditz and B.C. Hine, 2016 robust pigs



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Daily feed intake can be recorded automatically and frequently



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- 1. Introduction
- Objectives:
- Develop a generic model to:
 - Detect perturbations
 - Quantify the response:
 - Resistance
 - Resilience
 - Uses daily feed intake as (the only) response variable





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2. Detecting perturbations



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Fit a quadratic function to CFI data 250 TATALATINA CALIFIC CONTRACT Cumulative feed intake, kg 200 150 100 50 0 80 100 120 140 160 180 200 Age, d



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2. Detecting perturbations

Temporarily exclude data with negative residuals



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2. Detecting perturbations

Fit again the quadratic function to new dataset





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2. Detecting perturbations

Temporarily exclude data with negative residuals





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2. Detecting perturbations

Fit again the quadratic function to new dataset





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2. Detecting perturbations

Temporarily exclude data with negative residuals





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2. Detecting perturbations

Fit again the quadratic function to new dataset (Stop)





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Fit the chosen function to all data





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3. Modelling the response to a perturbation





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3. Modelling the response to a perturbation





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3. Modelling the response to a perturbation





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3. Modelling the response to a perturbation Results:





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3. Modelling the response to a perturbation Results:





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4. Discussion and conclusion

The model:

- Is able to detect perturbations from changes in feed intake
- Quantifies resistance and resilience

The future?

- Compare the response of pigs in the same environment
- Estimate heritability of resistance and resilience



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Discover **FeedUtiliGene** an innovative Decision Support System for monogastric livestock production

THANK YOU FOR YOUR ATTENTION <u>hieu.nguyen-ba@inra.fr</u>