Automated warning system based on feeding behaviour
Lessons learned in pigs.
Also relevant for dairy?!

Jarissa Maselyne, Wouter Saeys, Annelies Van Nuffel
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Outline

A. What are we doing with pigs?
B. Steps to take during research on animal feeding behaviour:
   1. What is (affecting) feeding?
   2. How to measure it?
   3. How to express it?
   4. What about meals?

Warning system for pigs

Online early warning system for health, welfare and productivity problems

ALARM for problems

Synergistic control

Differentiate normal from abnormal variation

Feeding pattern individual pig

RFID
Warning system for pigs

Feeding pattern individual pig

Synergistic control

Differentiation normal from abnormal variation

ALARM for problems

Online early warning system for health, welfare and productivity problems
European PigWise project 2011-2013

PhD 2011-2015

“Automated monitoring of individual fattening pigs”
Effects on feeding behaviour

- Feed
- Feeding system
- Breed
- Health, weight...
- Environment
- Housing system
Effects on feeding behaviour

Feed

Breed

Health, weight...

Feeding system

Environment

Housing system
Feeding = flexible

Variety of influencing factors

+ differences between individuals

-> design experiments wisely...

-> large inter- and intra-individual variation

⇒ Monitor individual animals & take normal variation into account
Sensors to measure feeding behaviour

Especially designed feeders

RFID added to commercial feeders

- €€€
- Feed intake recorded
- Different feeding behaviour?

- €€
- No feed intake recorded
- Simulate farm conditions
- Adoption by farmers easier?

Sensors to measure feeding behaviour

Figures from Insentec B.V., Azizi (2008), Braun et al (2013), CowManager B.V.
Choice sensor?

- No effect on feeding behaviour?
- What do you want to measure?
- On-farm conditions?
- Cost?
- Settings? Measurement frequency!
- Data-analysis necessary?

=> Choose correct sensor for your application & validate properly
Units of feeding behaviour

Registrations / feeding visits / meals / chews / ...

e.g. with the PigWise RFID sensor:

Meals

Feeding visits

Left ear tag

RFID raw data

Right ear tag

Time [hh:mm]
**Choice unit?**

- Importance?

- **Per unit also ≠ variables:**
  - Bout size, frequency, duration, interbout interval, rate of eating, ...

- Meals are best unit for analysis of short-term feeding behaviour (satiety, prandial correlations, treatments) (Tolkamp et al, 1999)

=> best choice for problem detection = unknown!
Meal determination

Log survivorship function

- Visual breakpoint
- Mixed distribution models
- Drinking-explicit method
- ...

Triple Gaussian models

Starting probability of feeding

Variety of methods

• Wide variety of techniques
  – feeding is random vs. satiety, prandial drinking vs. no prandial drinking, etc.
  – not all methods have correct assumptions or are objective!

• Link with real behaviour?

=> uniformity and validation of methods is necessary!
Conclusion

1. Understand feeding
   • A lot of influences & large inter and intra-individual variation

2. Choose the correct sensor
   • Take into account your application & validate!

3. Choose the correct unit
   • Raw data: not yet manipulated / visits: true feeding duration / meals: most stable measure

4. Choose a method for meal determination
   • Use method with correct assumptions

More info:
Pig = dairy??

“Dutch farm becomes World’s first to sell cheese made of pig milk”
“First-ever pig’s milk cheese on sale at a staggering price”
Thank you!!!

jarissa.maselyne@ilvo.vlaanderen.be
wouter.saeys@biw.kuleuven.be
annelies.vannuffel@ilvo.vlaanderen.be