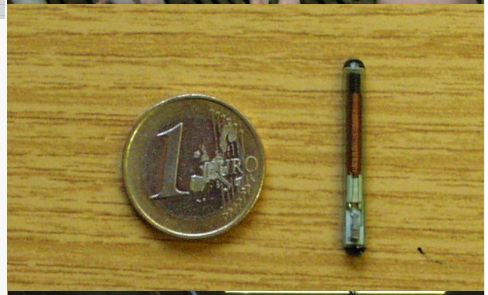
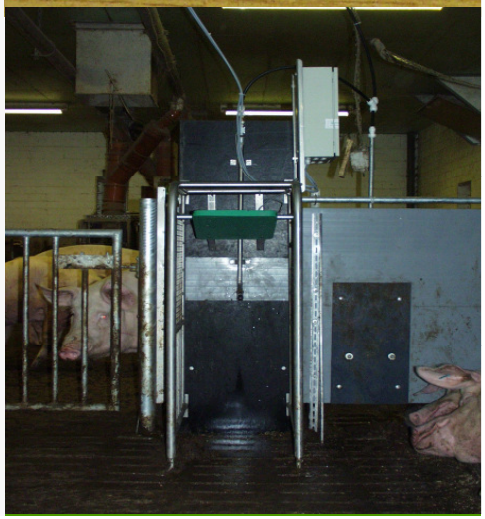
Faculty of Agricultural and Nutritional Science

Christian-Albrechts-Universität zu Kiel
Institut für Tierzucht und Tierhaltung

Temperature, water intake and eating rank of sows for health- and fertility monitoring





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Introduction

- Total number of swine breeding farms decreased
- Total number of sows is constant
- Average number of sows per farm increased
- Farmers‘ income is determined by small shifts in farm performance
- Aim of the present study:
  - Investigate the body temperature, water intake and feed intake pattern for gestating and lactating sows for health- and fertility monitoring

Data description

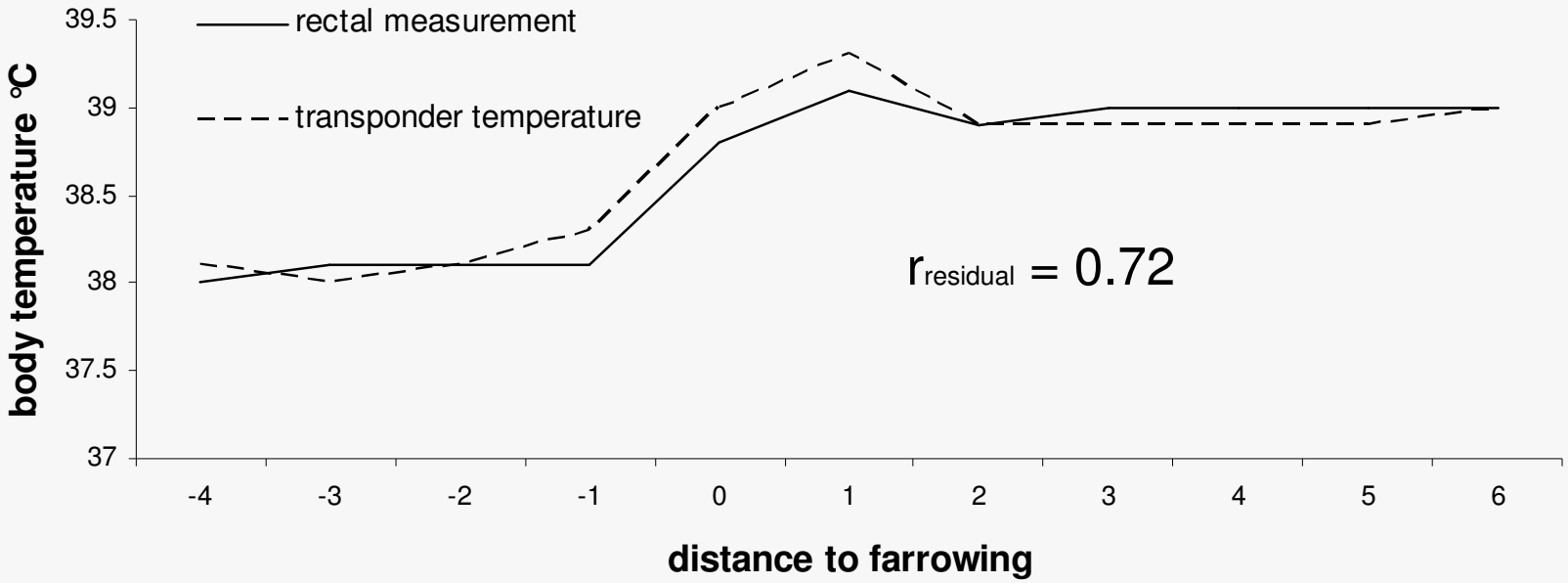
- Research farm Hohenschulen of the University of Kiel

  120 productive sows
  - Lactating sows: farrowing crates
  - Pregnant sows: grouped housed
- Data collection (April 2007 – June 2008)
  - Measurement of body temperature
  - Individual feed intake
  - Daily health- and fertility monitoring
  - Individual water intake of pregnant and lactating sows

Data recording

Body temperature

- Transponder for temperature measurement were injected in the neck (68 sows, n=16,049)
- Rectal measurement during the farrowing period (105 sows, n=2,987)



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Data recording

Water intake

Pregnant sows (104 sows, n=10,530)

- Visit recorder
- Identification of sow by ear transponder
- Recording of amount of water, sow number, beginning and ending of water intake

Lactating sows (105 sows, n=3,035)

- Daily recording of water intake

Data recording

Mean($\bar{x}$), standard deviation (s), minimum (min) and maximum (max) of water-, feed intake, body temperature and litter performance during lactation

trait	$\bar{x}$	s	min	max
Water intake	24.8	11.8	0	69.5
Feed intake	5.2	2.0	0.2	9.5
Transponder temperature	38.8	1.4	31.8	44.1
Live born piglets	11.3	3.0	2	18
Weaning piglets	9.8	2.8	2	17

Model

$$y_{ijkl} = \mu + LNR_i + FP_j + LD_k + c_l + b * x_{ijkl} + e_{ijkl}$$

y_{ijkl} = observation of water intake, feed intake*, transponder temperature*

LNR_i = fixed effect of the i-th parity class (i=1,.., 3)

FP_j = fixed effect of the j-th farrowing period (j=1,..,10)

LD_k = fixed effect of the k-th day of lactation (k=1,…,25)

c_l = random effect of the l-th sow (l=1,.., 105)

b = regression coefficient of the room temperature

e_{ijkl} = random error

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e_{ijkl} = random error and the covariance has been modelled with the SP(EXP)-structure, where the covariance is estimated as:

$$* \ \mathrm{cov}[Y_{t1}, Y_{t2}] = \sigma_e^2 * \exp^{(-(d_{t1,t2}/p))}$$

Results

Effect of parity class, room temperature for feed-, water intake and temperature

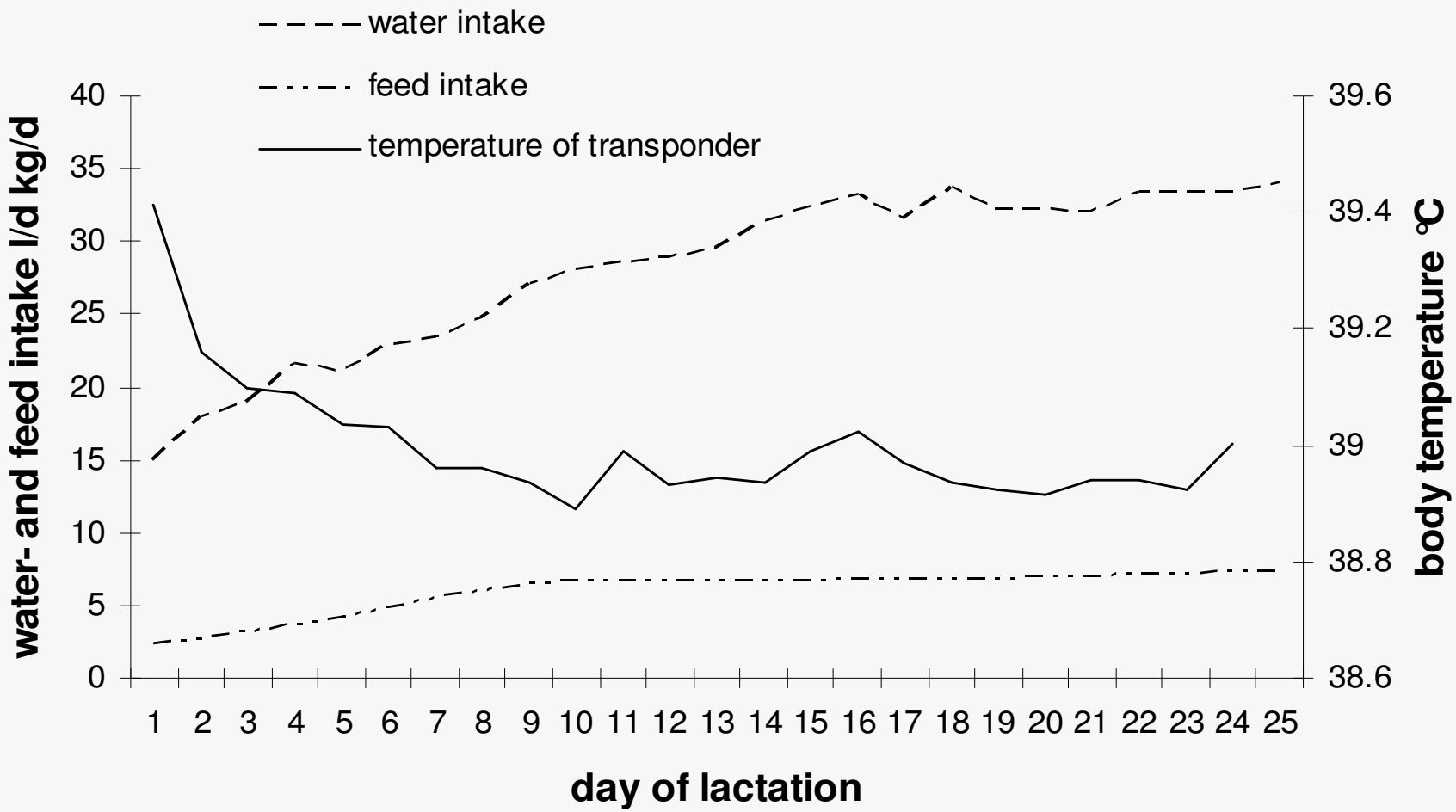
	Parity class			Room temperature	Repeat-ability	Auto-correlation
	1.	2.	3.			
Feed intake	5.8	6.1	5.8	0.02[2)]	0.06	0.78
Water intake	26.6[a)1]	30.2[b]	27.0[a]	1.0[3)]	0.58	-
Tem-perature	38.5	38.9	38.4	0.03[3)]	0.89	0.32

1) Values with different superscript are different (P<0.05)

2) P> 0.05, 3) P< 0.05

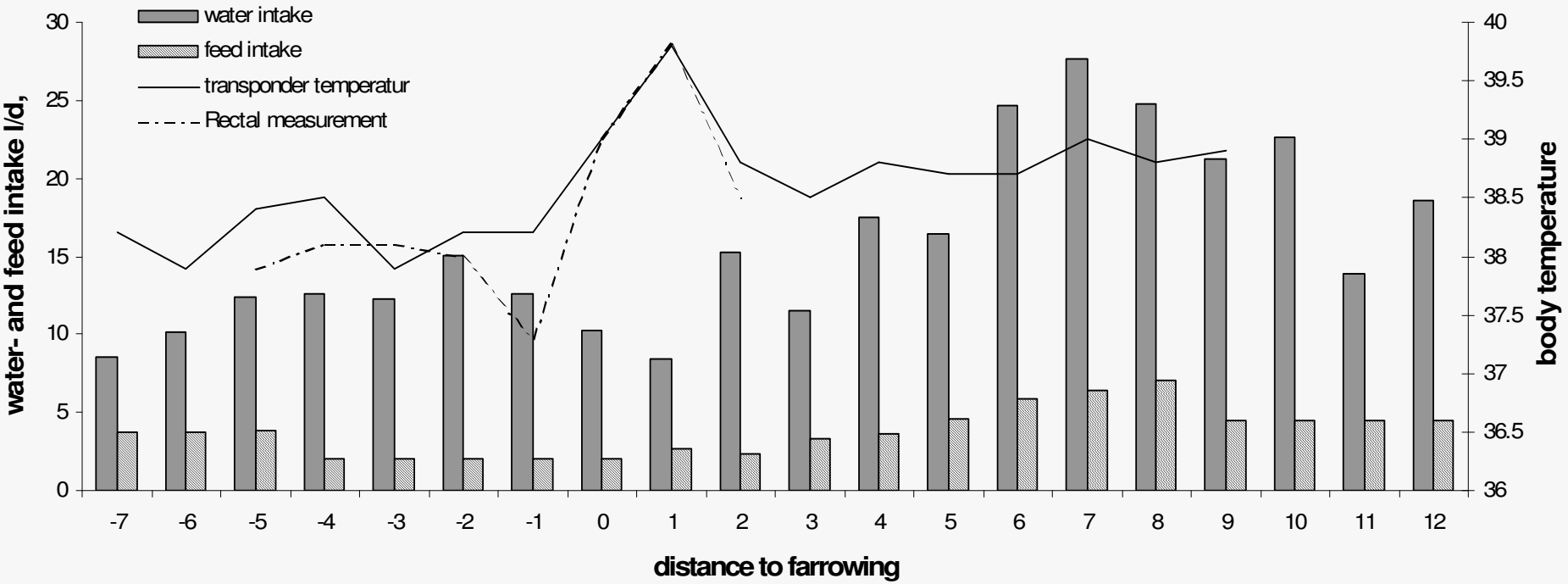
Results

Water-, feed intake and body temperature depending of the day of lactation (LSM)



Results

Example of sow 14882



Treatments against MMA

Conclusion

Temperature

- residual correlation among rectal and transponder measurement ($r_{residual}$ = 0.72)
- sufficient accuracy of the measurement
- larger variation (s= 1,4℃) (transponder temperature)

Water intake

- increasing pattern after farrowing, water intake remained constant during pregnancy
- in the second parity water intake was increased
- high variation (water wastage)

Statistical analysis of feed intake and body temperature

- error covariance structure (autocorrelation) had to be considered in the model (random effect sow)

Health- and fertility monitoring

- developing a method for health- and fertility disorders using water-, feed intake and transponder temperature

Thank you for your attention

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