

session 51; skruse@tierzucht.uni-kiel.de

Faculty of Agricultural and Nutritional Science

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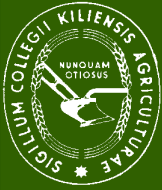
Institut für Tierzucht und Tierhaltung

Water and feed intake and eating rank of pregnant sows

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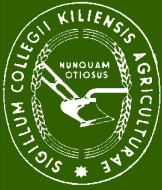
Introduction

- 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:**
 - **To investigate water and feed intake and eating rank of pregnant sows**



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)
 - Individual feed intake
 - Individual water intake



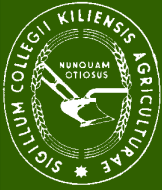
Data recording

Water intake

Pregnant sows (90 sows, $n=8,378$)

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





Material and Method

Eating rank (*rank*)

- 90 sows (n = 8,355)

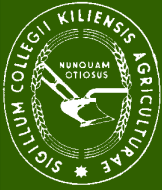
$$rank_{ESF} = \left(\frac{ESF}{(N_t + 1)} \right)$$

$$rank = \log \left(\frac{rank_{ESF}}{(1 - rank_{ESF})} \right) * (-1)$$

ESF = first record with feed intake at Electronic Sow Feeder

N_t = Number of sows in the group on day t

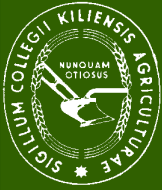
modified by Cornou et al, 2008



Data recording

Mean ($\bar{x}$), standard deviation (s), minimum (min) and maximum (max) of water, feed intake and eating rank

trait	$\bar{x}$	s	min	max
water intake (l/d)	16.7	10.1	0	59.4
feed intake (kg/d)	2.9	0.6	0	5.2
eating rank	0.0	1.5	-3.4	3.5



Model

$$y_{ijkl} = \mu + TT_i + PC_j + \sum_{m=1}^2 b_{jm} * x_{ijklm}(d) + s_k + e_{ijkl}$$

y_{ijkl} = observation of water intake, feed intake

TT_i = fixed effect of the i -th test day ($i=1, \dots, 435$)

PC_j = fixed effect of the j -th parity class ($j=1, \dots, 3$)

b_{jm} = regression coefficients of the day of pregnancy (dp)
within parity class

S_k = random effect of the k -th sow ($k=1, \dots, 90$)

e_{ijkl} = random error

with $x_{ijkl1}(d) = dp$, $x_{ijkl2}(d) = dp^2$

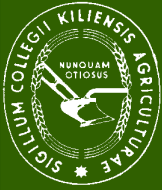


Results

Effect of parity class, the repeatability (w) and the autocorrelation (ρ) for feed, water intake and eating rank

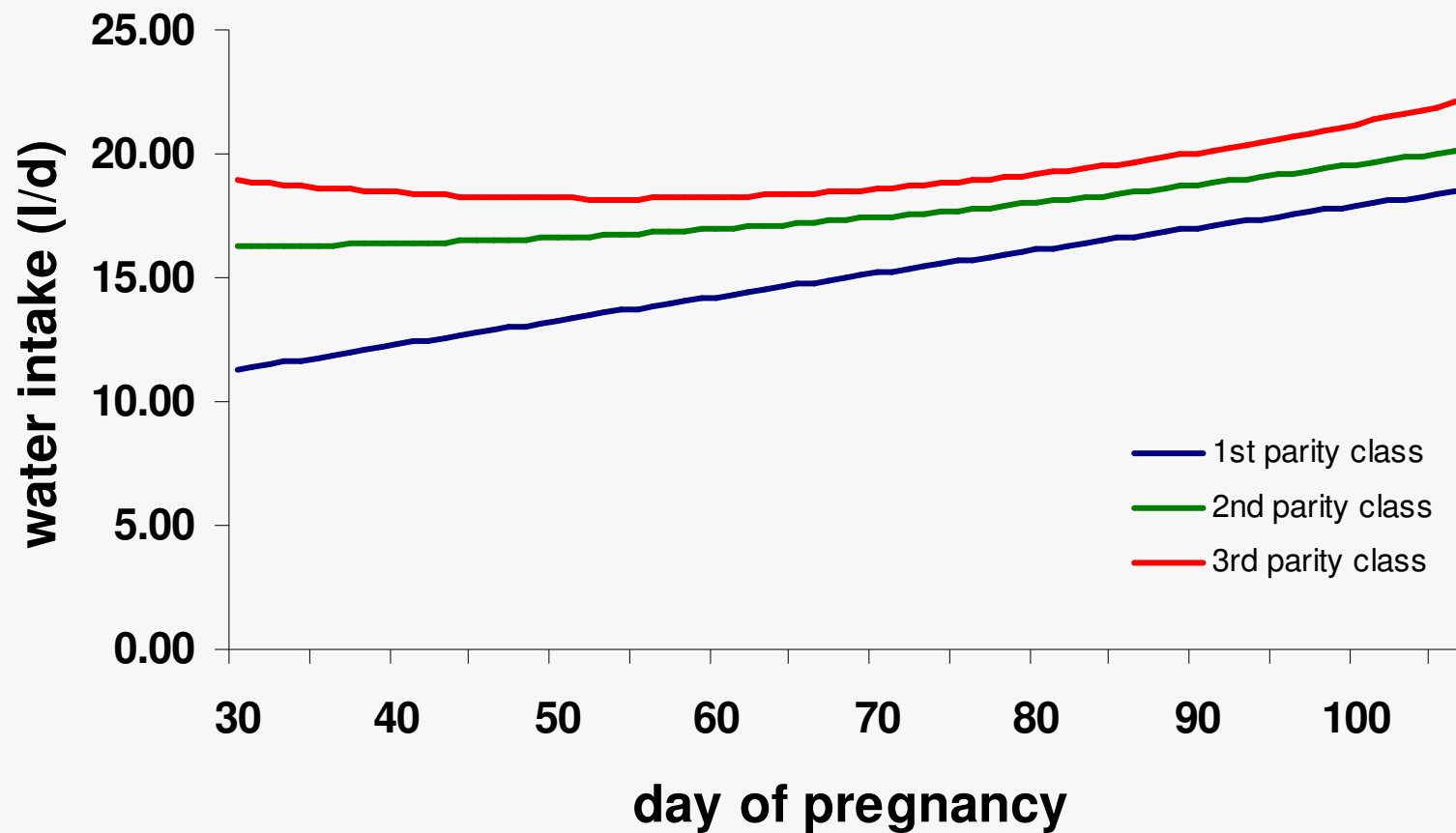
	Parity class			w	ρ
	1.	2.	3.		
water intake	14.8 ^{a1)}	17.5 ^b	19.0 ^b	0.73	0.53
feed intake	2.96	2.92	2.85	0.54	0.53
eating rank	-0.78	0.00	0.04	0.64	0.43

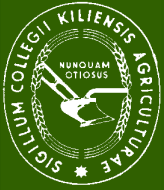
1) Values with different superscript are different ($P < 0.05$)



Results

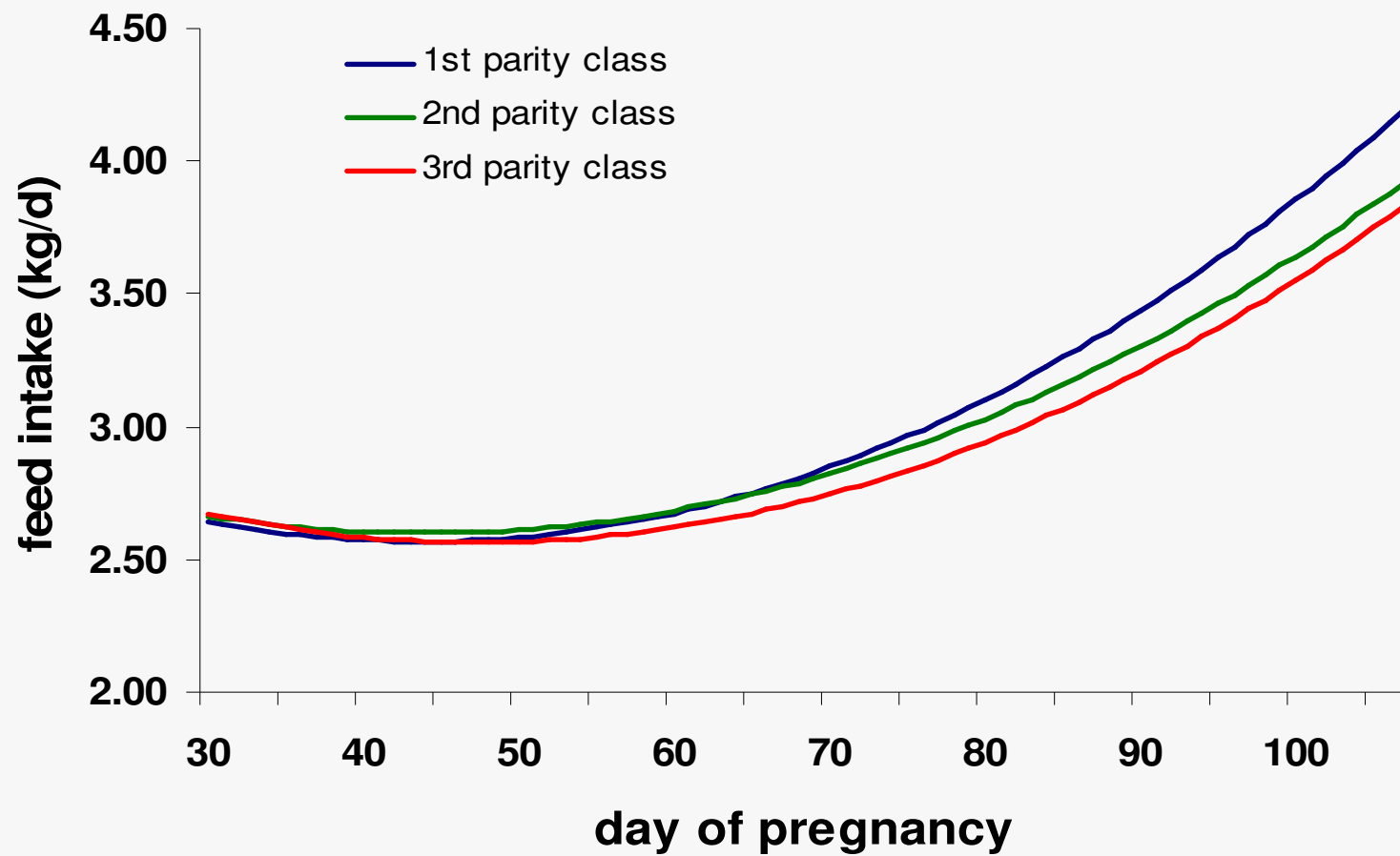
Estimated water intake depending on day of pregnancy

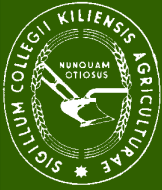




Results

Estimated feed intake depending on day of pregnancy

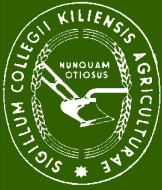




Results

Estimated eating rank depending on time in sow group

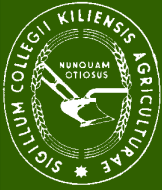




Results

Correlation between sow effects of water, feed intake and eating rank

traits	feed intake	eating rank
water intake	0.30	0.23
feed intake		0.05



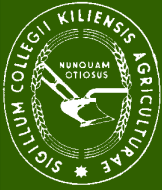
Conclusion

Recorded traits

- high variation of water intake (water wastage)
- surveillance of water wastage using video taping and visiting durations
- low variation of feed intake due to restricted feeding
- water to feed ratio decreased
- substitution of low feed demand by water during early pregnancy
- constant eating rank for adjacent days
- variation of the eating rank could indicate health disorders

Health- and fertility monitoring

development of a method to detect health and fertility disorders using water and feed intake and eating rank



Thank you for your attention

