

Drinking behaviour of suckler cows during transition period

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Introduction

- The transition period of cows is associated with a number of physiological changes (increasing demands of the foetus, the development of mammary gland, the initiation of milk synthesis), metabolic, and nutritional changes.
- Water is the most important nutrient for cattle. The changes in drinking behaviour of cows during transition period can be expected. A sensor-based automatic recording of water intake enables to study this on individual animals.

Aim of the study

- Evaluation of drinking behaviour of suckler cows of two dual-purpose breeds during transition period in winter period



Material and Methods

Animals, housing, and feeding

- German Yellow and German Simmental cows (altogether n=22)
- Cows were stocked with other animals of suckler-cow herd (heifers, calves and young cattle) separately according to the breeds in loose cold housing systems, calving animals few days around calving in calving pen
- The average number of animals was 35.2±8.0 and 44.8±9.6 by German Yellow and German Simmental breed, resp.
- Feeding once daily (between 0700 and 0800 h) with grass silage and hay (intended to provide *ad libitum* intake)

Water supply and recording of water intake

- Water supply:** with at least two individual drinking bowls (DB) (Model S41A Texas Trading® (maximal flow rate: 11.4 l/min, maximal volume: 1.9 l)) by both breeds and one in calving pen of both breeds, each DB was fitted with inline flow meters (DIOTECH®)
- Animal identification at DB:** using electronic ear tags (Daisy 530, AGRIDENT®) and an antenna, fixed left on U-form frame around the DB

- The data recording:** during three phases (two weeks before calving (day -14 to -1), at calving day (day 0) and two weeks after calving (day 1 to 14)) within one winter indoor period (November-April)
- Recording as one drinking event:** when at least one impulse was recorded by flow meter and the interruption in drinking was not longer than 5 s
- Definition of two separate drinking bouts:** when more than 2.5 min were spent without drinking

Recorded data and data analysis

- Recorded data:** registration number of drinking animal, number of DB, amount of free water intake, duration of drinking, and time of drinking event
- Statistical data evaluation:** repeated measure tests (Friedman test or one way ANOVA) with applying of Tukey's adjustment for multiple comparison (SigmaPlot®) at $P < 0.05$ were used to test the effect of phase of transition period or day during the phase before and after calving



Results

Effect of phase of transition period on evaluated parameters:

Items	Phase			P-values
	Before calving (day -14 to -1)	Calving day (day 0)	After calving (day 1 to 14)	
Daily free water intake (l)	32.9 15.8 (27.7) ^a	33.3 13.1 (29.9) ^a	48.3 20.7 (41.4) ^b	< 0.05 ²
Daily duration of drinking (min)	9.0 6.8 (6.8) ^a	6.7 4.1 (5.3) ^a	11.1 9.0 (8.4) ^b	< 0.05 ²
Drinking rate (l/min)	3.7 1.1 (3.4) ^a	4.9 1.5 (5.0) ^b	4.4 1.3 (4.1) ^b	< 0.05 ²
Daily number of drinking events	14.1 12.4 (10.9)	13.0 10.2 (10.0)	14.8 10.9 (11.5)	ns ¹
Daily number of drinking bouts	7.0 4.6 (5.3) ^a	8.9 6.4 (7.0) ^b	9.1 5.1 (7.3) ^b	< 0.05 ²
Water intake per drinking event (l)	3.2 1.6 (2.7) ^a	3.6 2.0 (3.6) ^{ab}	3.9 1.5 (3.9) ^b	< 0.05 ¹
Water intake per drinking bouts (l)	5.4 2.0 (5.3) ^{ab}	4.9 2.7 (3.9) ^a	5.9 2.0 (5.8) ^b	< 0.05 ¹

The data are presented as means±SD (in brackets median)

ns $P > 0.05$

¹ parametric test; ² non-parametric test

^{a,b} The phases with different superscript letters in the same row differ significantly ($P < 0.05$)

- The phase of transition period had a significant effect ($P < 0.05$) on all tested parameters except daily number of drinking events. However, only drinking rate and daily number of drinking bouts differed significantly before calving and at calving day. Daily water intake, daily duration of drinking and water intake per drinking event changed significantly (increased) only after calving.

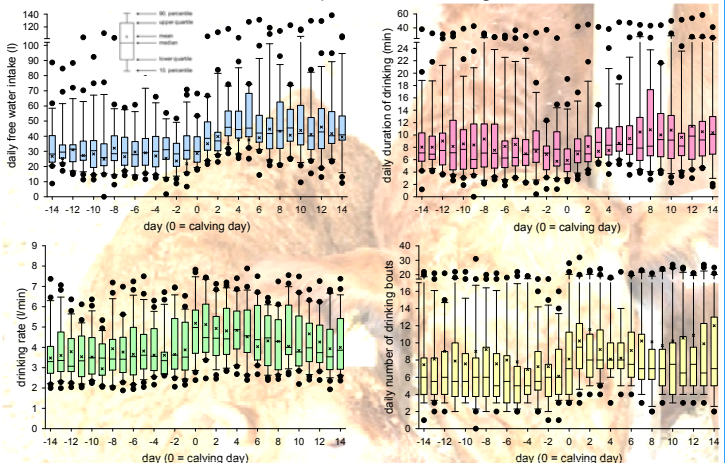
- Interesting is increased drinking rate at calving day (and also during first few days after calving). It can be that maternal behaviour (perhaps effort of dams to let the new born calves without care the least time as possible) caused this effect in the first postpartum days.

→ Behaviour changes in drinking could be observed mostly after calving

In conclusion:

• No changes in drinking behaviour could be observed before calving signalling forthcoming calving. The changes in drinking behaviour after calving can be assigned to the increase in water requirement due to start of lactation. But also maternal behaviour could modify the drinking behaviour in first days after calving.

The behaviour of some selected parameters during observed time frame:



- Before calving, the day had no significant effect ($P > 0.05$) on any of tested parameters except of drinking rate (however, also by drinking rate without a clear trend).

→ It is not possible to recognise forthcoming calving

- After calving, the day had significant effect ($P \leq 0.05$) on daily duration of drinking, drinking rate, and water intake per drinking event and per drinking bouts. Whereas drinking rate seems to decrease with increasing day after calving, the other three parameters seem to increase (mainly during first few days after calving).