

56th EAAP meeting, 08.06.05



M6.2

New behaviour based developments to collect health information in dairy cattle farming

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Treatment incidence/prevalence of diseases in German organic dairy farming



Treatment incidence/prevalence of diseases in German organic dairy farming; n = 50 farms, 2001/2002

	mean	min	max
Clinical mastitis [%]	33.4	1	101
Lameness [%]	17.6	0	53

Brinkmann et al. 2004

General trend:

- Reduced productive life span
- Increase in disease related culling reasons

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3

Content



- 1 Background
- 2 Approaches to early disease detection based on behavioural parameters
 - Feeding behaviour
 - Lameness detection
- 3 Conclusions

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Costs of disease



€ per case		direct	indirect	total
Acute mastitis	average case	170	91	261
	mild	114	-	114
	severe	297	220	517
Lameness	average	133	219	352
	sole ulcer	170	390	560
	interdigital dermatitis	83	78	161

Kossabati et al. 1997

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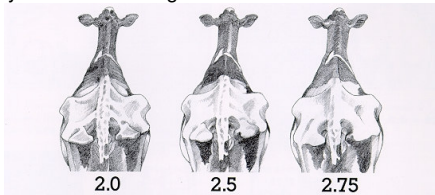
4

Background



Traditional health related informations

- Observation, clinical signs, milk yield
- Milk testing records (somatic cell count, urea content etc.)
- Body condition scoring



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5

Content



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- 2 **Approaches to early disease detection based on behavioural parameters**
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Early detection of disease



Behaviour changes may indicate animals at risk, but:

- Less time available per animal with increasing herd sizes
- Subtle changes in the beginning (?)
- Uncertainty of subjective judgements/diagnoses

→ automatic measurement of behavioural indicators as promising tool

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Feeding behaviour as early predictor of disease



- Low intake pre partum increases disease occurrence in dairy cows
- Feed intake reflected in feeding behaviour (Forbes 1995)
- Feeding behaviour predicts morbidity in beef cattle (Quimby et al. 2001)



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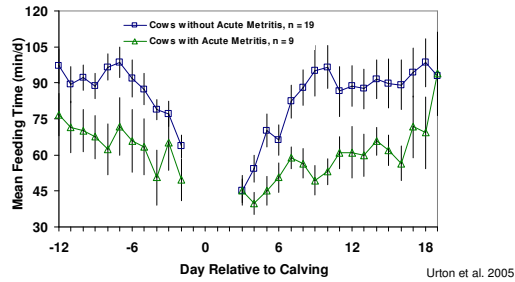
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8

Feeding behaviour as early predictor of disease



Mean presence at the feed bunk for healthy and metritic COWS



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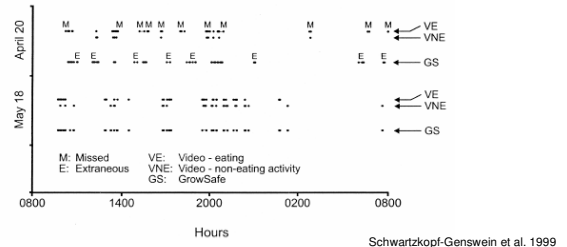
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9

Feeding monitoring



Reliability of GrowSafe® radiofrequency system in feedlot beef cattle (overall $r^2 = .96$)



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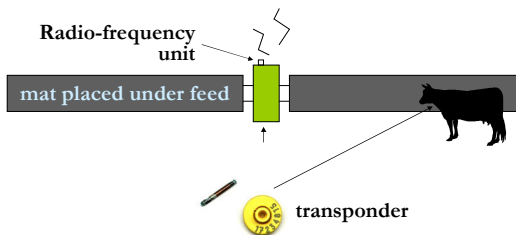
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11

Monitoring of presence at feed bunk



GrowSafe® radiofrequency system



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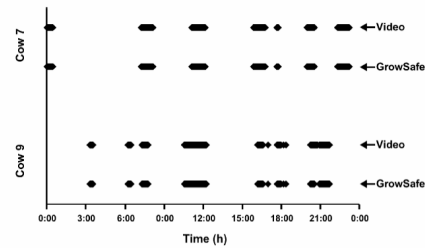
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10

Feeding monitoring



Reliability of GrowSafe® radiofrequency system in dairy cows



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12

Rumination as early predictor of disease



Rumination affected by

- rumen function (pH, structure of the diet etc.)
- resting behaviour (cow comfort)

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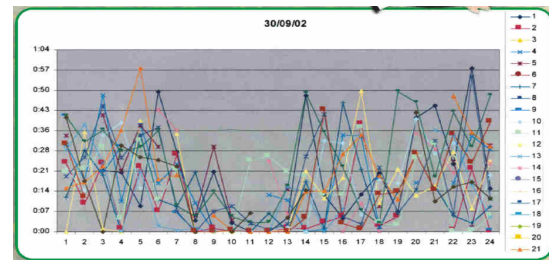
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13

Rumination monitoring – prototype system



Rumination distribution throughout the day



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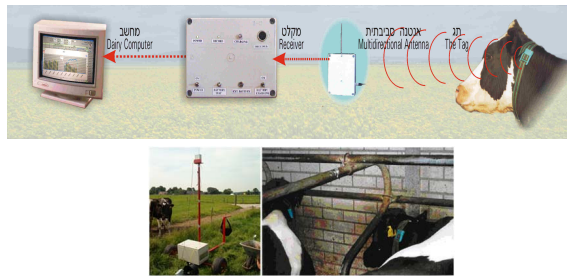
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15

Rumination monitoring – prototype system



- VocalTag®- acoustic signals originating from chewing activity



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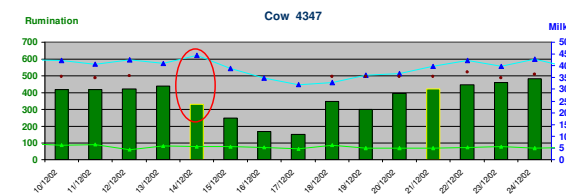
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14

Early detection of disease - rumination



Clinical ketosis



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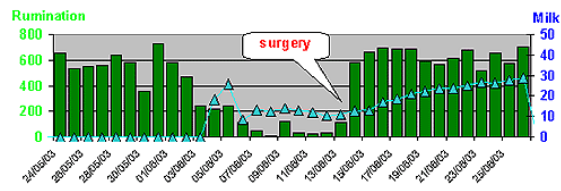
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16

Early detection of disease - rumination



Abomasal displacement



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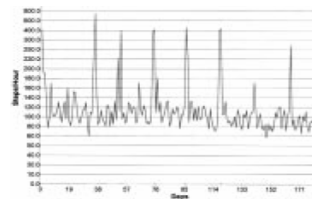
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17

Lameness: activity levels



- Pedometers (e.g. used for heat detection)
→ low sensitivity for lameness (Zimmermann 2001)



Brehme et al. 2004



www.icerobotics.com

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19

Lameness detection



- Farmers recognize only about 25% of clinical lameness cases (Whay et al. 2002)
- Gait scoring = too subjective?
- Potential approaches for automatic detection:
 - activity levels
 - pressure plate measurements (weight distribution)
 - force plate measurements (ground reaction force)
 - kinetic gait analysis

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18

Lameness: reaction force detection



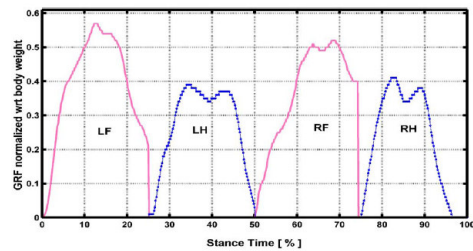
- Animals walk freely on two parallel force plates
- Measures
 - Ground force reaction
 - Limb/floor contact positions

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20

Reaction force detection



Tasch et al. 2003

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21

Lameness: reaction force detection



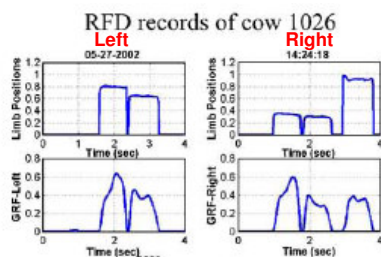
- Only scarce reliability data available at the moment
- 'Sufficient' sensitivity based on rather small sample sizes (Tasch 2004)
- Current work should provide better insight into reliability (e.g. WelfareQuality/Lelystad)

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23

Lameness: reaction force detection



Tasch et al. 2003

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22