VALIDATION OF A DEVICE FOR AUTOMATICALLY MEASURING OF LYING BEHAVIOUR IN DAIRY COWS
OBJECTIVES FOR THE VALIDATION

- Using the device in my experiments
- Cheaper than other devices
- The Device has not been validated before
- Can it be used for research
- Focus on slatted floors vs deep bedding
WHY IS LYING BEHAVIOUR IMPORTANT

- Lying down is a behavioural need
- Limited time for lying down
- If lowered for longer time it can reduce the welfare of the cow
- Welfare indicator
THE VALIDATED DEVICE

- Af iTag II, Afimilk, Israel
- Steps, lying time, standing time, lying bouts
- In praxis used for heat detection
- Attached to hind leg
- 3D accelerometer
- Long distance transmission
- Data in intervals of 15 min send hourly
- Daily lying calculated from algorithm
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<th>TagID</th>
<th>GroupNum</th>
<th>EndTime</th>
<th>StartTime</th>
<th>Steps</th>
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<th>LyingTime</th>
<th>StandingTime</th>
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THE AFITAGII IN USE
VALIDATION IN 2 STEPS

1. Comparison with direct observations

2. Comparison with Icequbes (IceRobots, UK)

Performed at Danish Cattle Research Centre, Aarhus University
- Automatic milking system
- Free cow traffic
DIRECT OBSERVATIONS

- 20 lactating cows on slatted floor
- 20 dry cows on deep bedding
- 10 Jersey from 1 section
- 10 Holstein from 1 section
- Both primi- and multiparous
DIRECT OBSERVATIONS - METHOD

- Scan sampling every minute
- Total of 2 hours/cow
- Lying/not lying
- 2 observers
- Differed in time of day
- Differed in stage of lactation
Direct observations - Lying time

- Lying time in min/2 hours
- Strong positive correlation
- $r = 0.98$

![Graph showing lying time correlation](image-url)
## DIRECT OBSERVATIONS - LYING BOUTS

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<thead>
<tr>
<th>Slatted floors</th>
<th>Mean</th>
<th>Min</th>
<th>Max</th>
<th>Deep bedding</th>
<th>Mean</th>
<th>Min</th>
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Positive predictive value = 0.96

Positive predictive value = 0.85
COMPARISON WITH OTHER DEVICE

- Icequbes (IceRobots, UK)
- 21 lactating cows
- Both Jersey and Holstein
- Both primi- and multiparous
- Total of 698 days (6 - 43 days)
- Exclusion of 14% of data in total
  - Icequbes = 5%
  - AfiTag = 9%
COMPARISON WITH OTHER DEVICE – LYING TIME

- Daily lying time in minutes
- Strong positive correlation
- $r = 0.95$
- Mean lying time
  - AfiTag = 11.0 hours/day
  - Icequbes = 11.2 hours/day
COMPARISON WITH OTHER DEVICE – LYING BOUTS

- Daily frequency of lying bouts
- Strong positive correlation
- $r = 0.94$
- Mean lying bouts
  - AfiTag = 12.4 number/day
  - Icequbes = 12.7 number/day
PRACTICAL IMPLICATIONS

- Skin lesions - Hair loss to wounds
- Total of 155 cows
- Device moved 60 times
- More incidents with Holstein than Jersey
- Preventive actions
TO SUM UP

✓ High correlation for lying time and lying bouts with direct observations
✓ High correlation between AfiTagII and Icequbes

- Problems with skin lesions
  Need for further development of the design
QUESTIONS