

Cow monitoring technology

Revealing her secrets to unlock her true potential

Evine van Riemsdijk | Balchem Real Science Lecture Series
April 4th, 2023



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Balchem Real Science Lecture Series

Content


1. Cow monitoring development
2. Reveal her secrets
3. Practical application on the farm
4. Data driven strategies with experts
5. Success by connecting the dots
6. Match the technology to your goals



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Cow monitoring development








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Cow monitoring development

45+ years in dairy farming


RFID
Identification & basics for PLF

Automation
Efficiency & consistency



Information
Informed decision making



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Cow monitoring development

Identification is the basics for PLF

- Feeding
- Milking + recording + separation
- Sorting + routing
- Monitoring + locating

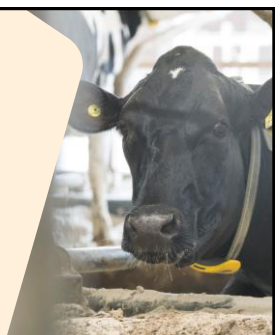
Know who she is, where she is, what she does, 24/7

- Individual monitoring while in a group
 - *Manage by exception*
- Work routinely and minimize disturbance in the group
 - *Let cows be cows*

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Reveal her secrets

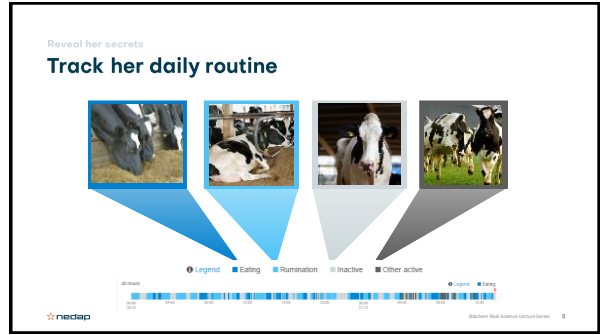


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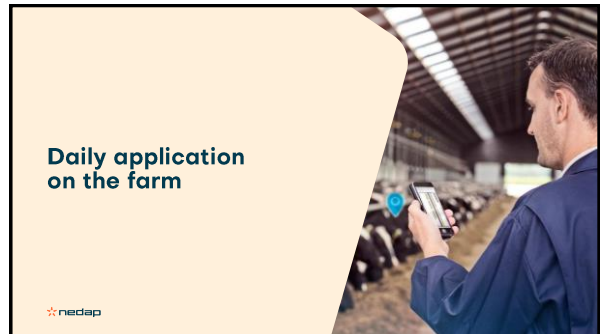
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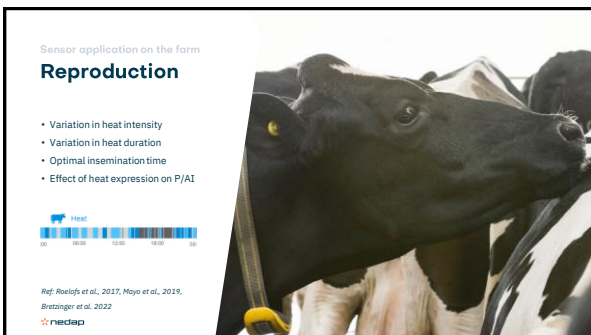
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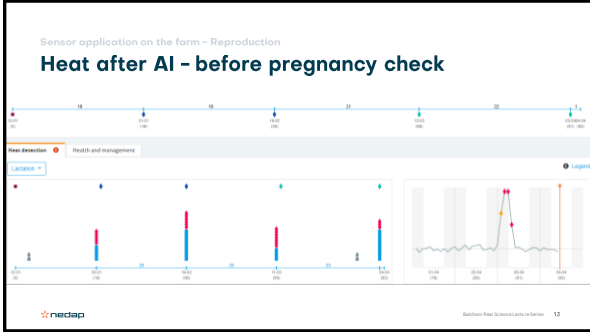
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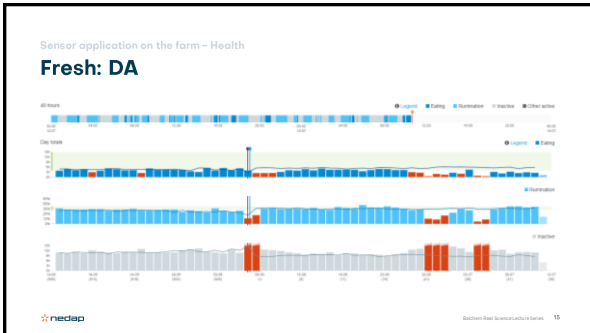
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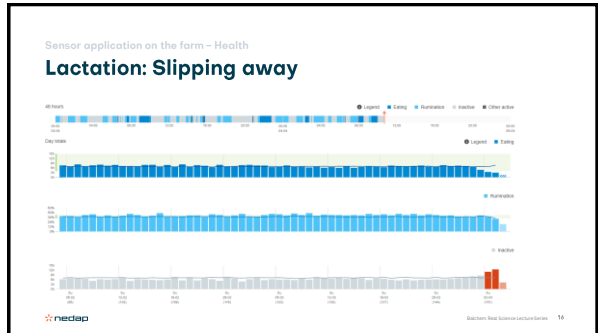
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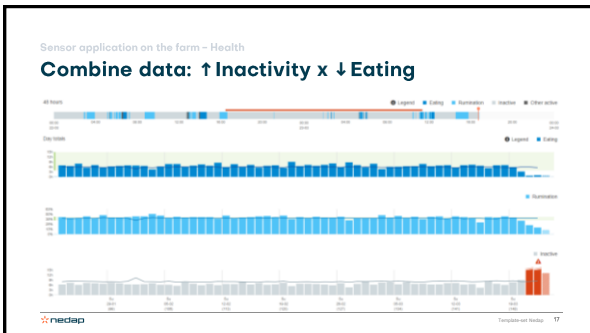
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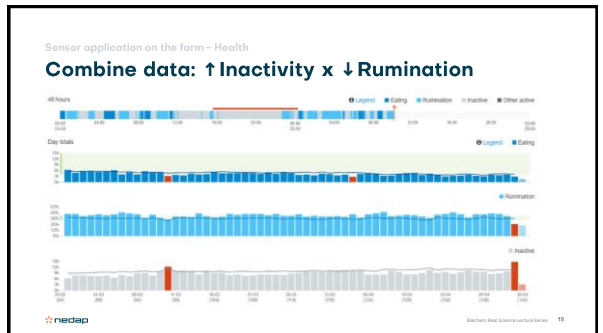
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Sensor application on the farm

Nutrition

When are they eating...

More importantly:

... when are they not?



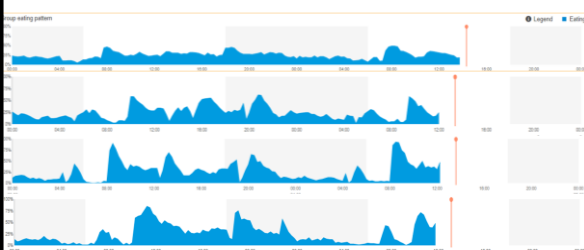
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Sensor application on the farm - Nutrition

Feed availability (...or quality?)


The cows are talking to us...
...are we listening?



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Data driven strategies with experts

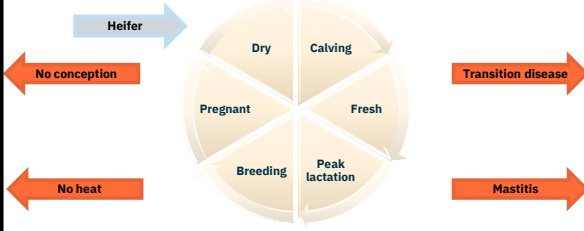


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Data driven strategies with experts

Optimize productivity & Keep momentum



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Data driven strategies with experts

Transition Health and Reproduction

Effect of transition cow health and estrous expression detected by an automated activity monitoring system within 60 days in milk on reproductive performance of lactating Holstein cows

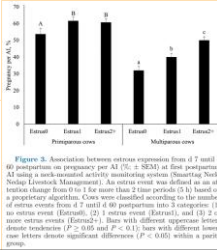
L. F. Bretzinger¹, C. M. Tippenhauer¹, J. J. Pfenis¹, M. Heuser¹, and B. Bonhard²

Table 1. Number of estrous events detected by an automated activity monitoring system¹ from d 7 until d 60 postpartum for 3,750 Holstein cows from 1 farm

Number of estrous events	All cows		Primiparous cows		Multiparous cows	
	n	%	n	%	n	%
0	779	20.8	273	17.5*	505	23.1*
1	1,119	27.8	635	29.3*	804	36.5*
2	1,553	41.4	675	43.2*	878	40.1*
Total	3,799		1,563		2,187	

¹Prevalences with different superscripts differ within a column ($P < 0.05$).
²An estrous event was defined as an attention change from 0 to 1 for more than 2 time periods (5 h) based on a proprietary algorithm.

Figure 3. Association between estrous expression from d 7 until d 60 postpartum on pregnancy per AI (FIC = 55.6%) at first postpartum AI using a neck-mounted activity monitoring system (SmartTag Neck, Nedap Livestock Management). An estrous event was defined as an attention change from 0 to 1 for more than 2 time periods (5 h) based on a proprietary algorithm. Cows were classified according to the number of estrous events from d 7 until d 60 postpartum into 3 categories: (1) no estrous event (Estrous-), (2) 1 estrous event (Estrous+), and (3) 2 or more estrous events (Estrous++). Cows with different superscripts denote reproductive outcomes ($P < 0.05$ and $P < 0.1$), bars with different letters denote significant differences ($P < 0.05$ within a parity group).



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Data driven strategies with experts

Reproduction

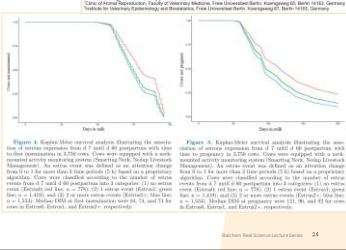
Effect of transition cow health and estrous expression detected by an automated activity monitoring system within 60 days in milk on reproductive performance of lactating Holstein cows

L. F. Bretzinger¹, C. M. Tippenhauer¹, J. J. Pfenis¹, M. Heuser¹, and B. Bonhard²

Conclusion by Bretzinger et al., 2022:

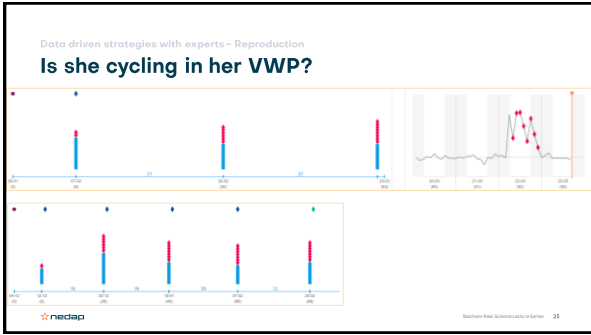
- "Results from the present study provide further evidence that early postpartum estrous expression influences fertility in lactating dairy cows."
- Cows with no estrous expression detected by an AAM system from d 7 until d 60 postpartum had inferior reproductive performance compared with cows that displayed estrous activity."
- Cows with stillbirth, RP, metritis, and subclinical ketosis were more likely to be anestrus within the WVP."
- Future studies should address intervention strategies in these cows to improve their reproductive performance."

Figure 4. Kaplan-Meier survival analysis illustrating the association between estrous expression from d 7 until d 60 postpartum with time to pregnancy in 3,750 cows. Cows were stratified into 3 categories: no estrous activity monitoring system (Estrous-), SmartTag Neck (Estrous+), and SmartTag Neck (Estrous++). An estrous event was defined as an attention change from 0 to 1 for more than 2 time periods (5 h) based on a proprietary algorithm. Cows were classified according to the number of estrous events from d 7 until d 60 postpartum into 3 categories: (1) no estrous event (Estrous-), (2) 1 estrous event (Estrous+), and (3) 2 or more estrous events (Estrous++). Cows with different superscripts denote reproductive outcomes ($P < 0.05$ and $P < 0.1$), bars with different letters denote significant differences ($P < 0.05$ within a parity group).

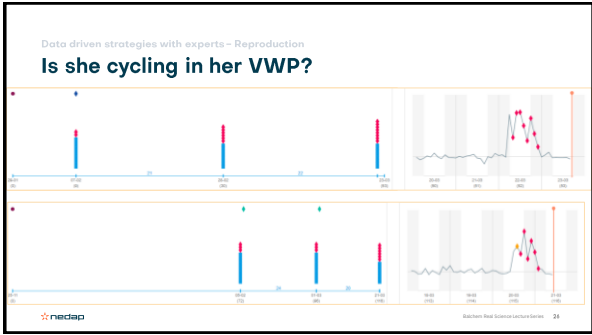


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Data driven strategies with experts

Nutrition

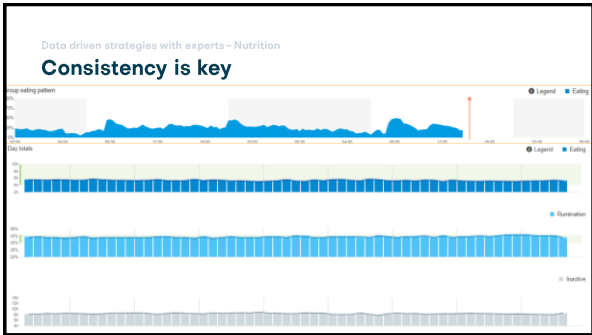
- Feed availability
- Feed quality
- Feed delivery
- Push-up moments

Ration formulation and feeding management feedback: provided by the cows

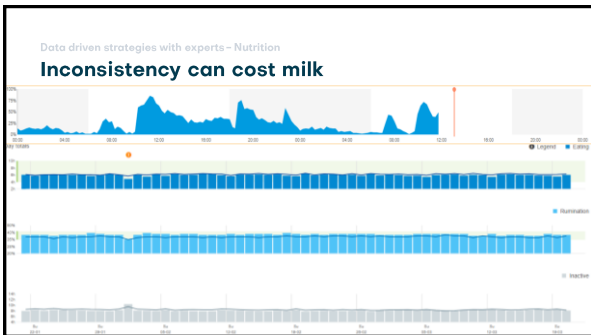
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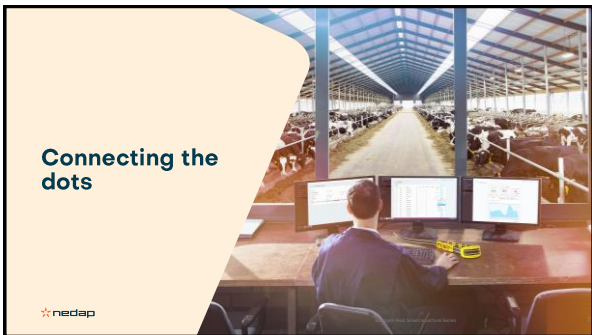
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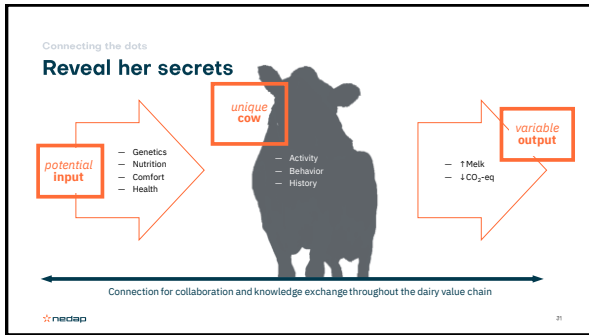
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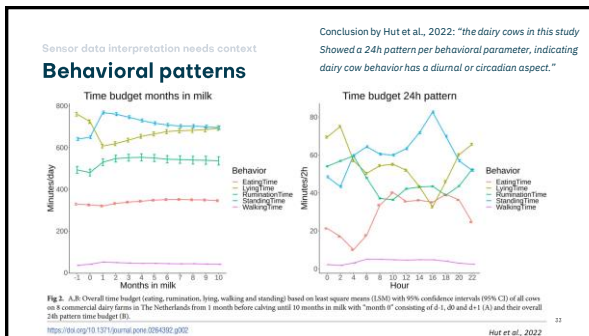
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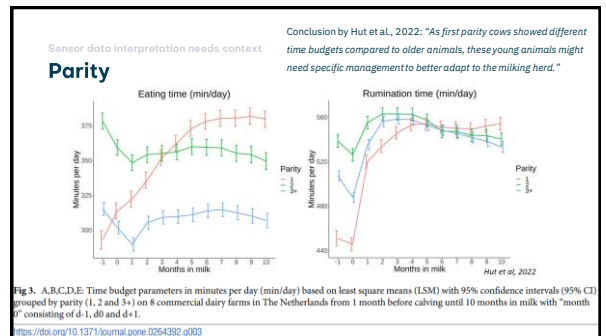
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Match the technology to your goals

Cow sensors as part of PLF can:

- Save on cost
- Save on time
- Increase productivity
- Support animal and people wellbeing

Under conditions:

- Reliable and durable devices
- Accurate and relevant data
- Easy to install and use
- Customer support and training

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Match the technology to your goals

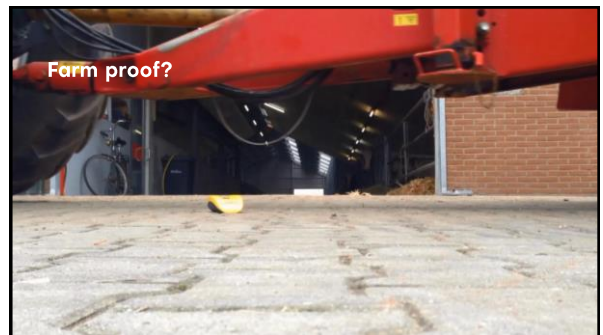
Fit to your management strategy

- AMS vs parlor
- Indoor vs grazing
- Family farm vs large operation
- Seasonal vs all-year round
- ...

Adapt the technology application to management and goals

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Cow monitoring technology

Take home message

- Even with 45+ year history in dairy development, cow monitoring is more relevant than ever
- The cows are talking to us, but are we listening?
- Cow monitoring as automation and information tool supports daily farm productivity and efficiency
- Including the expertise from experts can allow for more data driven strategies in the long term
- Connecting all the dots throughout the dairy value chain is key to close knowledge gaps

Reveal her secrets to unlock her true potential!

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Questions?

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