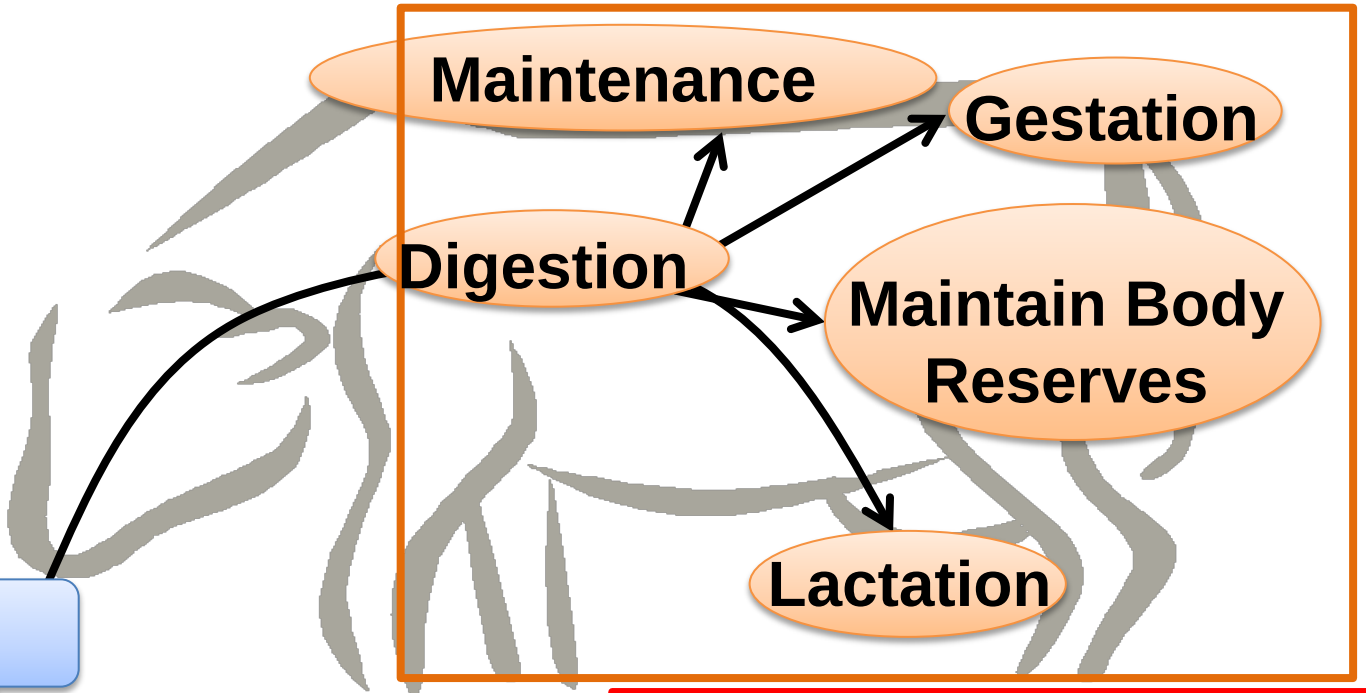
Rumen temperature monitoring to assess dairy cows feed efficiency

A. Fischer & P. Faverdin

Assessing feed efficiency



Intake

Measured net energy intake - **Expected net energy intake**

***R**esidual **E**nergy **I**ntake*

Positive Difference
➔ Cow **eats more** than expected
= **less efficient** than expected

Negative difference
➔ Cow **eats less** than expected
= **more efficient** than expected

Assessing feed efficiency

Measured net energy intake = **Expected net energy intake** + **REI**

Expansive + time-consuming

➔ Facilities **ONLY available in research farms!**

= TODAY feed efficiency is NOT available on farm

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OBJECTIVE

Build an indirect indicator of REI, without need for feed intake measures

Objective

Hypothesis:

Within same diet, free water intake reflects feed intake *(Khelil-Arfa et al. 2012)*

Within the same diet,
free water intake efficiency
may reflect
feed intake efficiency

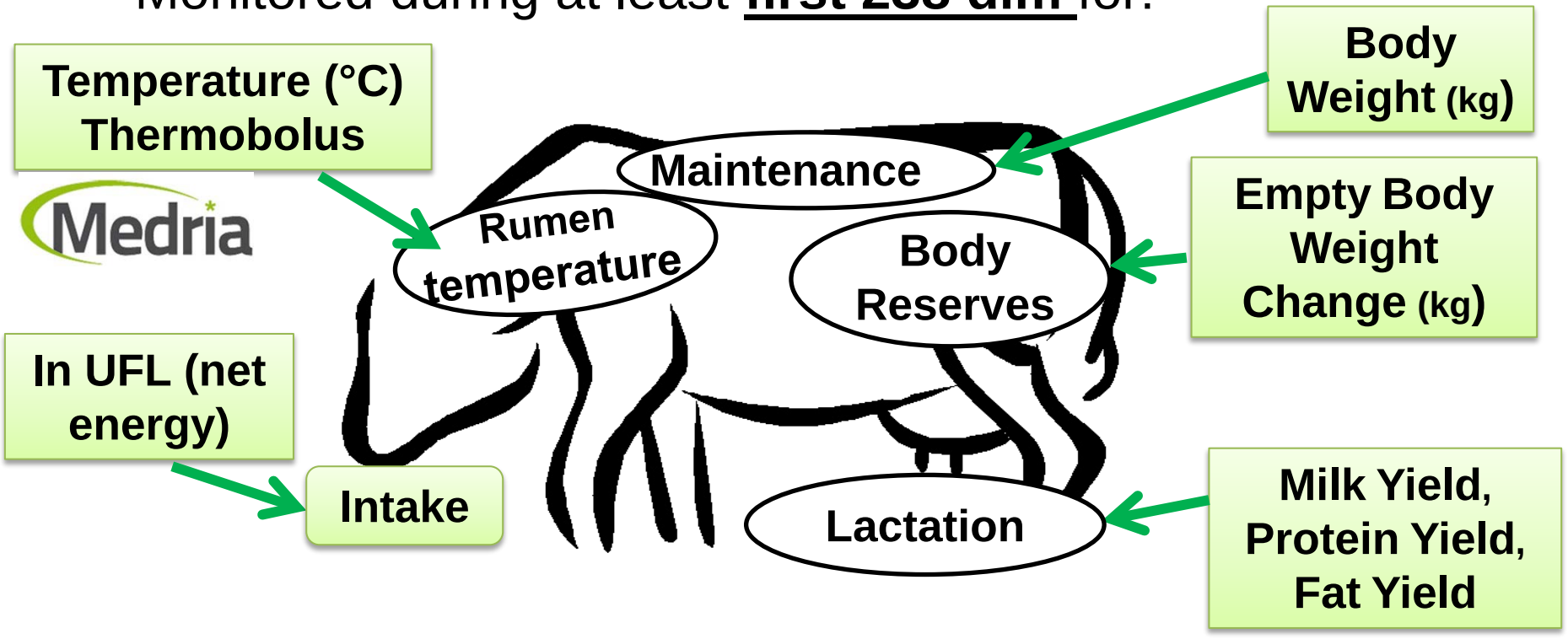
- **Experimental Design**
- **Definitions**
  - Defining both efficiencies
  - Assessing free water intake from rumen temperature
- **Results: Free water intake to predict REI**
- **Conclusion**

Experimental design

- 60 Holstein cows (50% primiparous)
- 1 **single diet** during whole lactation, ad libitum

  ➔ *65% Maize silage + 35% concentrates*

- Monitored during at least **first 238 dim** for:



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Defining both efficiencies

Assessing Feed efficiency:

Measured net energy intake − **Expected net energy intake** = **REI**

Linear regression

$BW^{0,75}$ + lactation requir. + EBWgain + EBWloss

Assessing free water intake efficiency:

Measured free water intake − **Expected free water intake** = **RWI**

Linear regression

Milk Yield + BW

Defining both efficiencies

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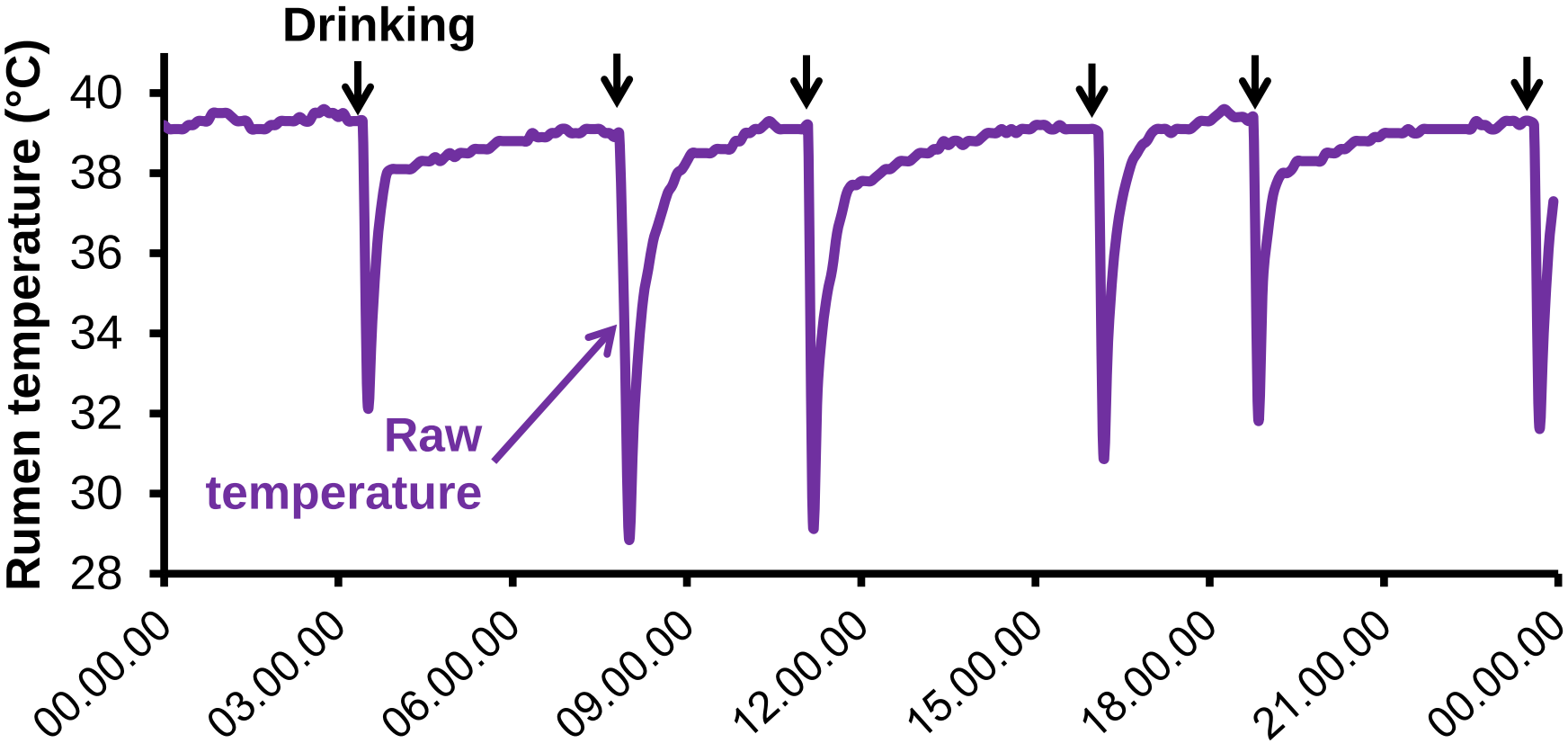
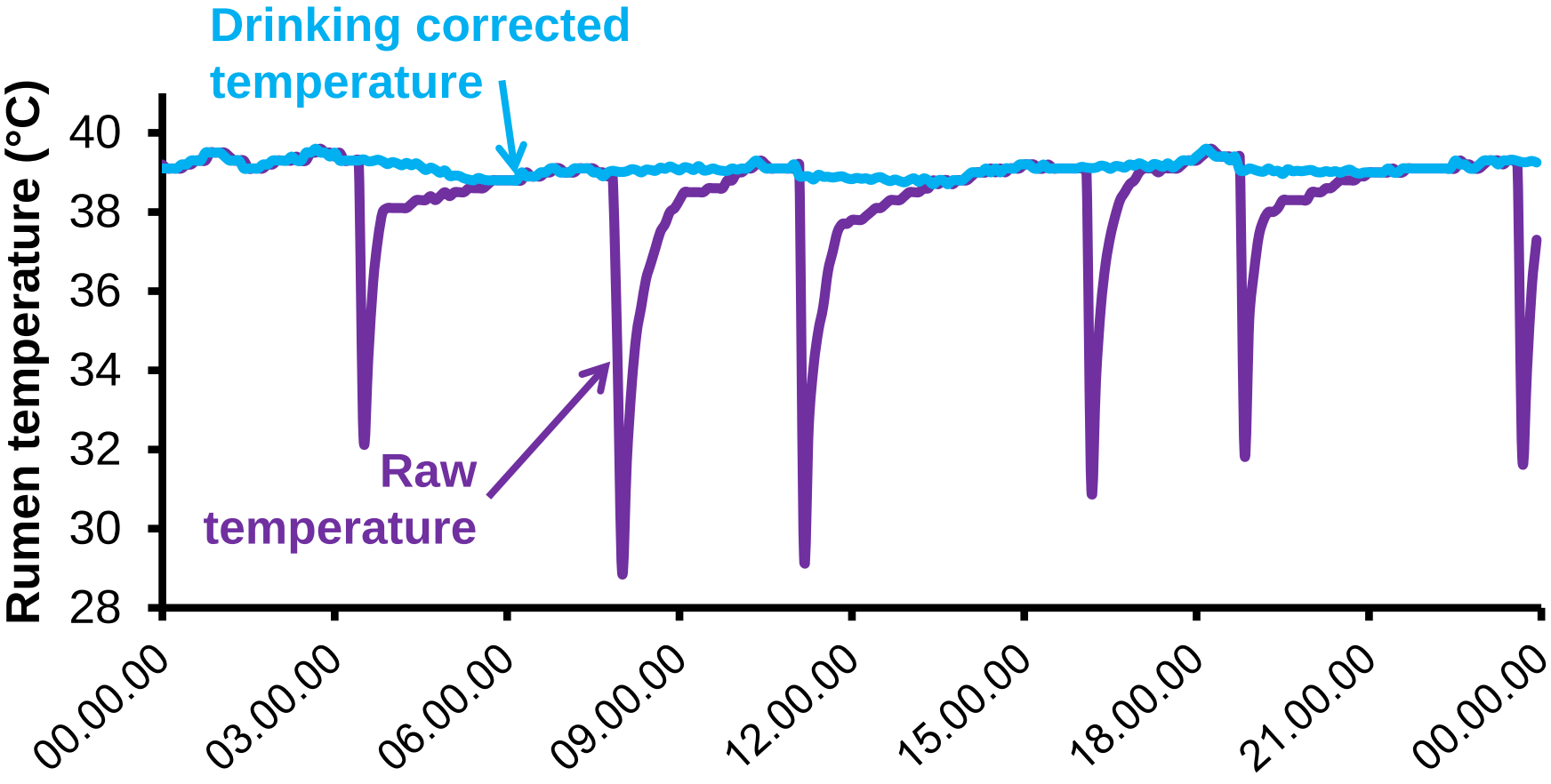


Assessing free water intake from rumen temperature



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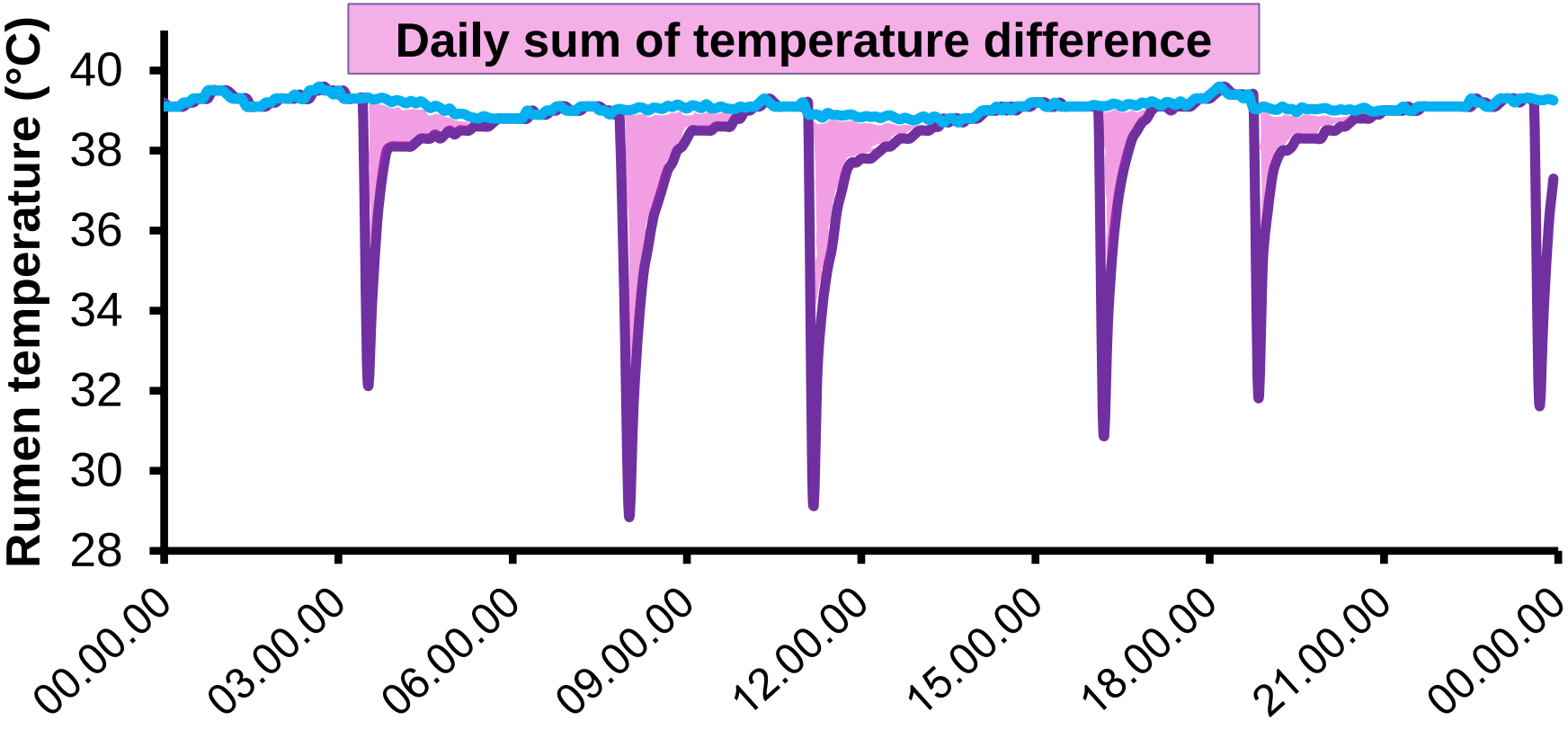

Hypothesis:

daily sum of temperature difference = proxy of free water intake

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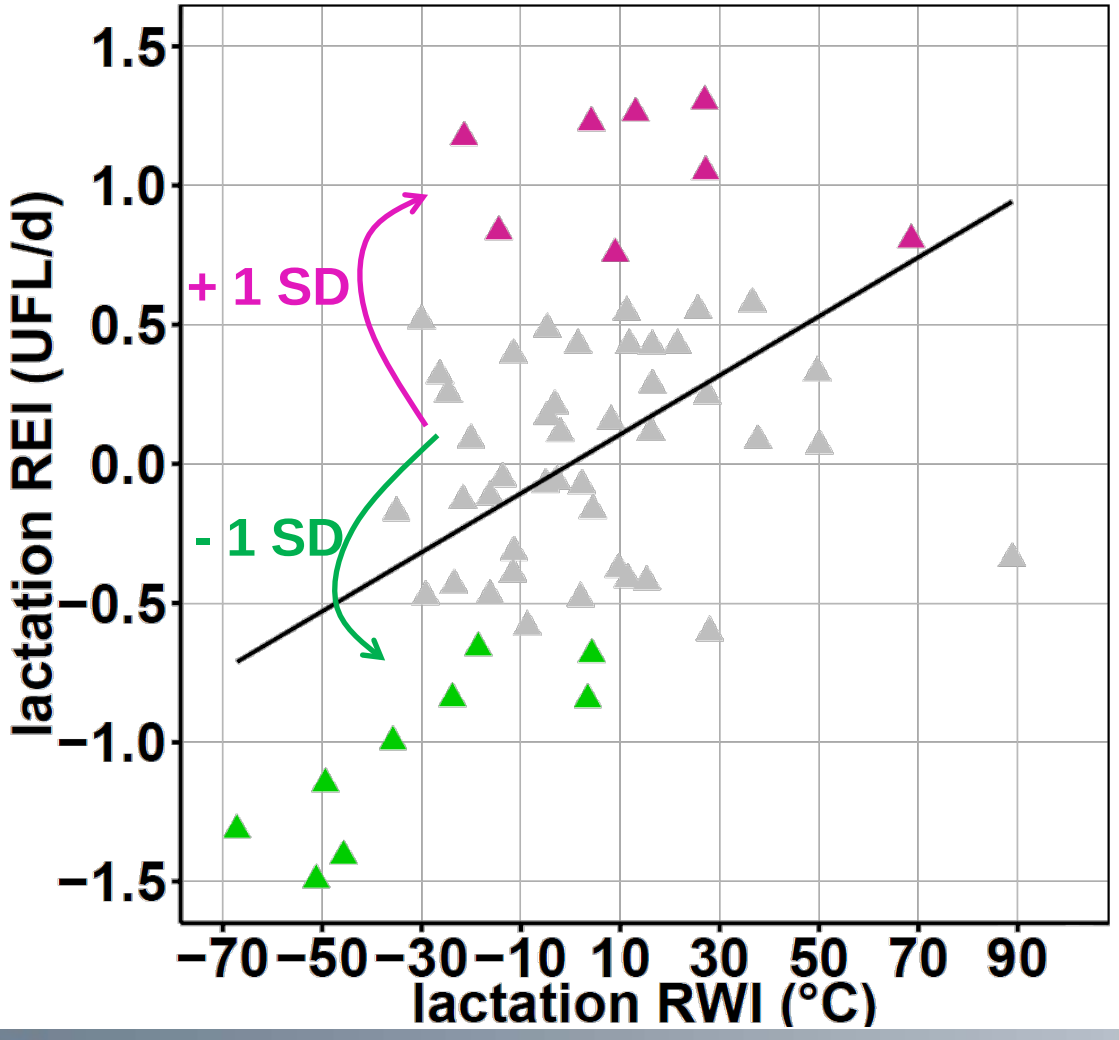
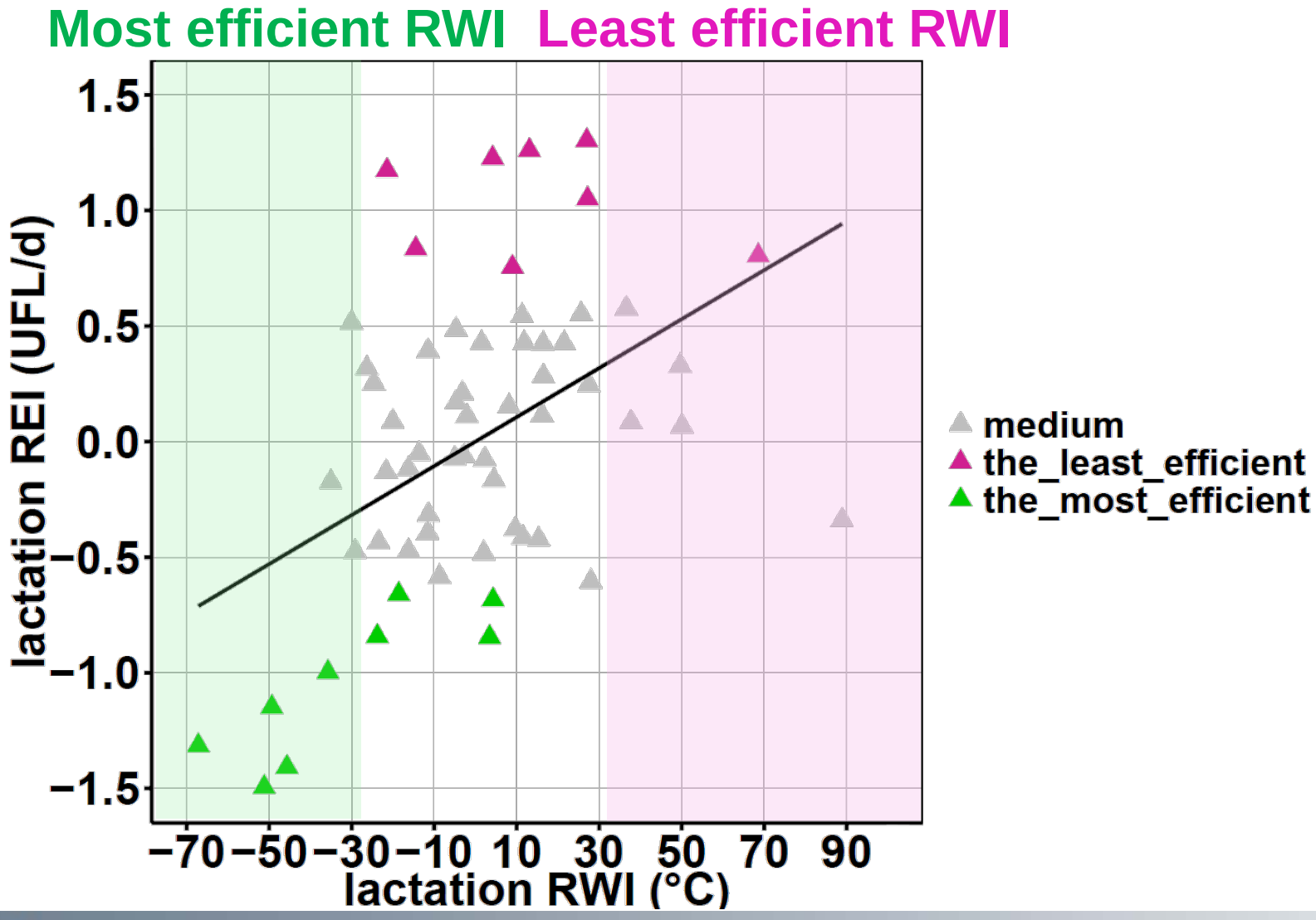
Free Water Intake efficiency to predict REI



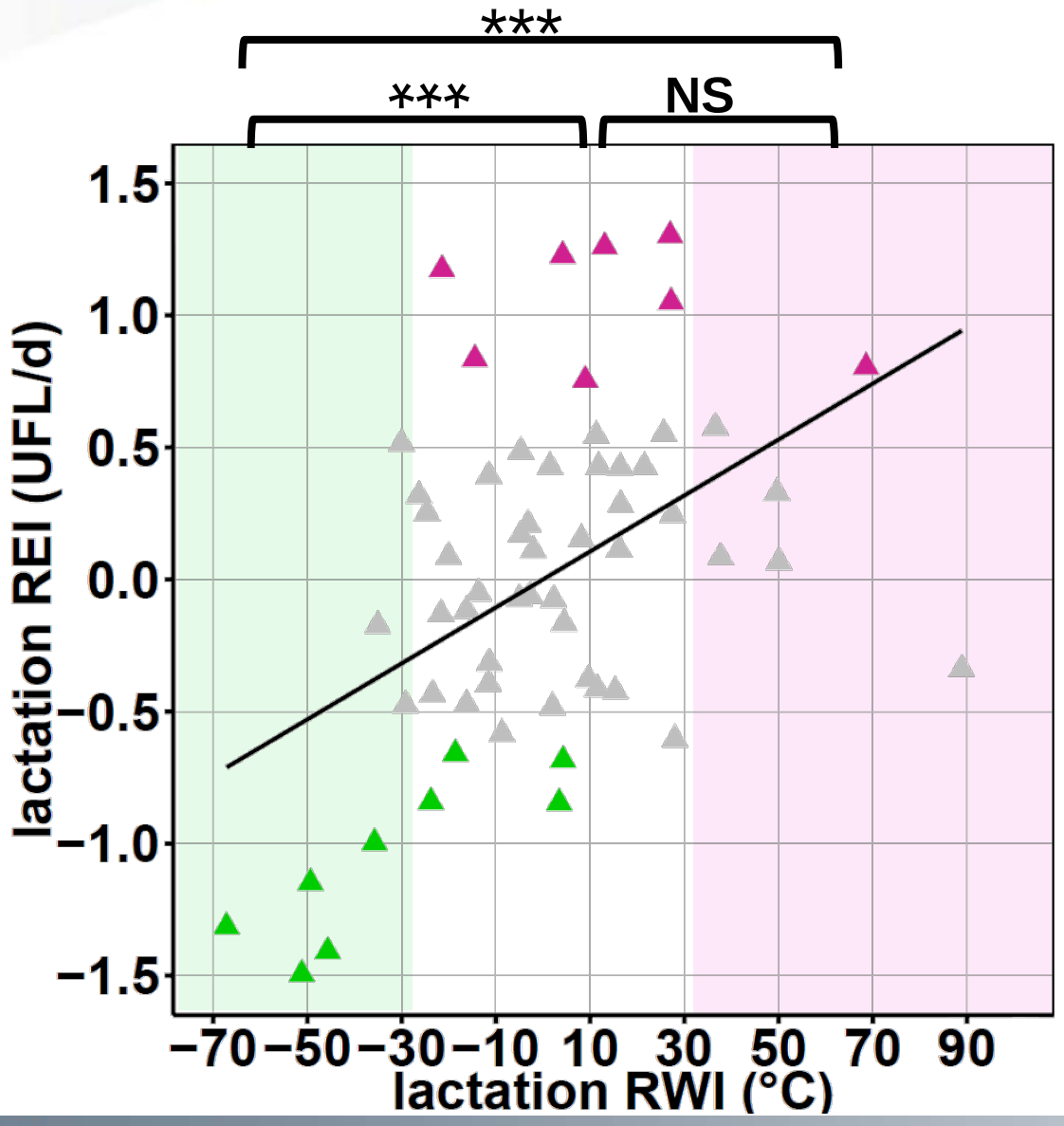
R^2 = 0,22
RSE = 0,58 UFL/d
slope = 0,01
Intercept = 0

medium
the_least_efficient
the_most_efficient

Free Water Intake efficiency to predict REI

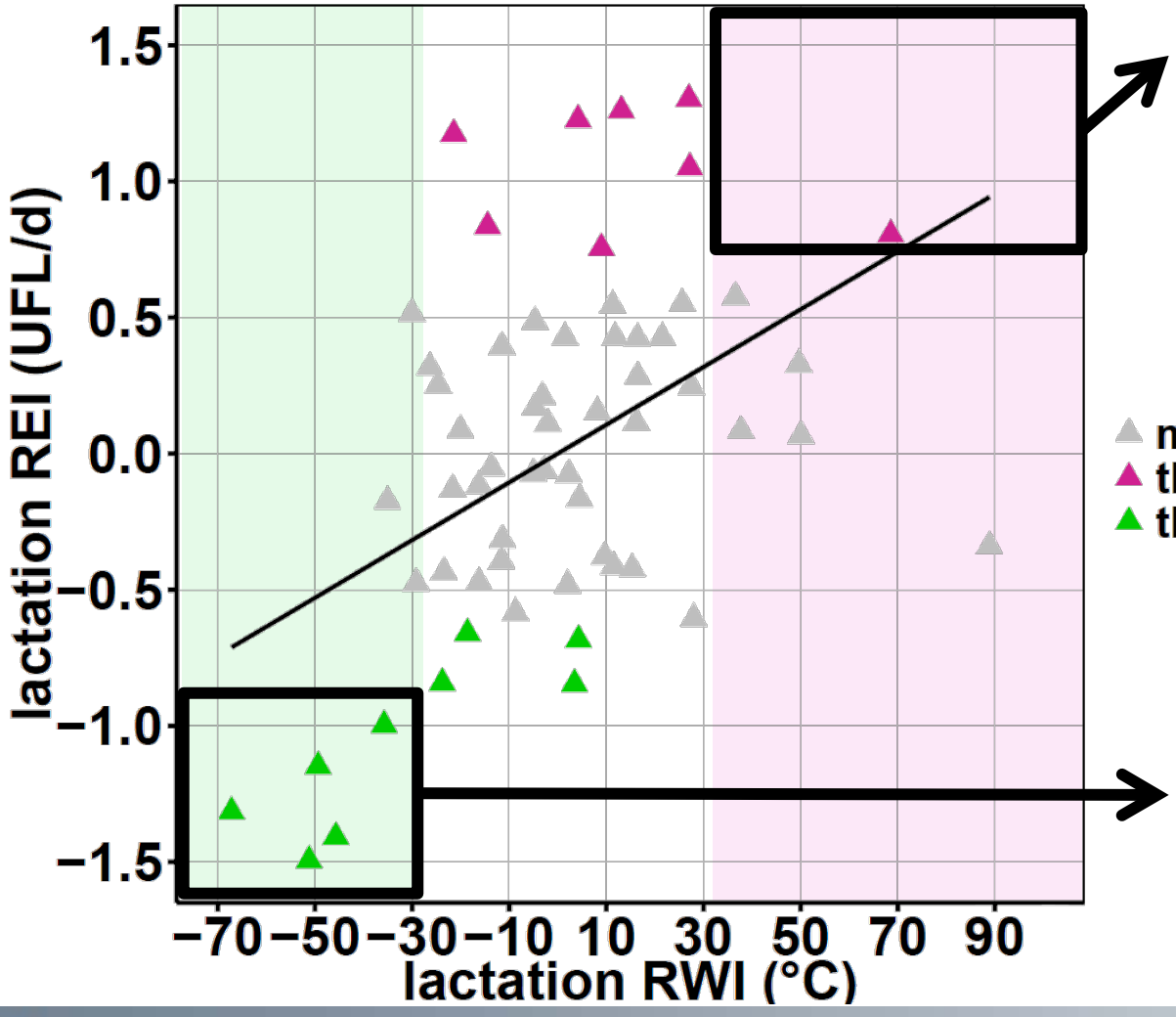


Free Water Intake efficiency to predict REI



The most efficient are different from rest of herd

Free Water Intake efficiency to predict REI



1/8 REI inefficient cows identified with RWI as inefficient cow

5 / 9 REI efficient cows identified with RWI = **56% of efficient cows**

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CONCLUSION

Possible to identify the **most efficient cows**

➔ **no need for feed intake monitoring**

➔ **interesting for genetic selection**

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BUT before :

- Validating RWI to assess REI on more cows
- Validate assessing free water intake with rumen temperature indicator
- Understand factors lying under rumen temperature change

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Thank you for your attention…