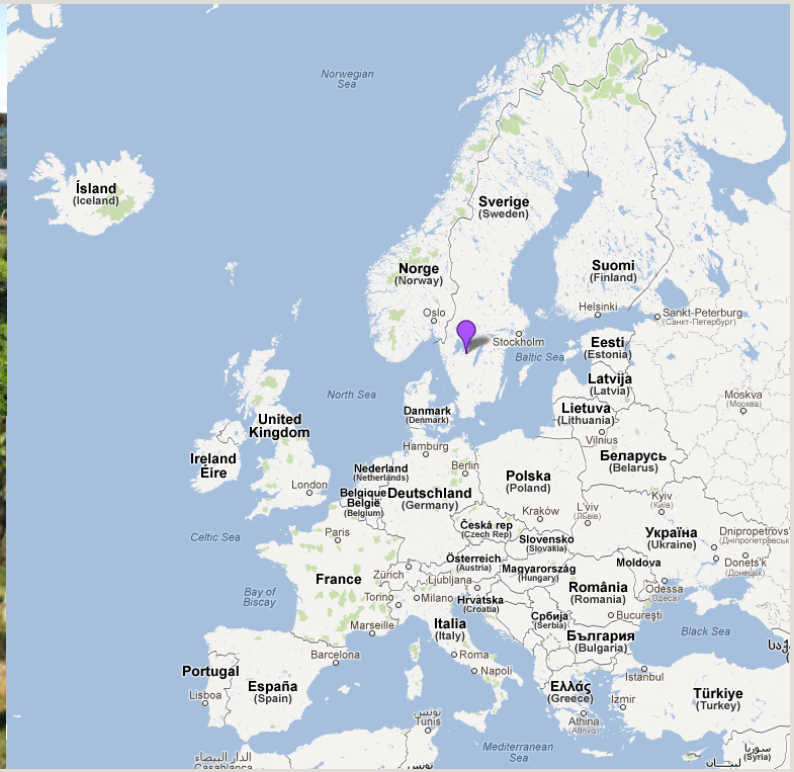
Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

Mikaela Jardstedt
Phd
Dept. Animal Environment and Health

Swedish University of Agricultural Sciences

Götala beef- and lamb research center



www.slu.se/hmh/Gotala

Sveriges lantbruksuniversitet
Swedish University of Agricultural Sciences

Validation of an automated system for monitoring rumination in beef cows

Mikaela Jardstedt[1], Peder Nørgaard[2], Elisabet Nadeau[1], Anna Hessle[1]

1. Department of Animal Environment and Health,
Swedish University of Agricultural Sciences, Skara, Sweden

2. Department of Basic Animal and Veterinary Sciences,
Faculty of Health and Medical Sciences, University of Copenhagen, Denmark

EAAP, 26 August 2013, Nantes

Background

- HR-Tag™ (RuminAct, Qwes HR)
  - Rumination monitoring system developed for dairy cows
  - Registers rumination time with a microphone based sensor
  - Displays rumination time in 2-hour intervals, or min/day
- Previously validated for dairy cows
- No evaluation of the HR-Tag™ system for beef cows

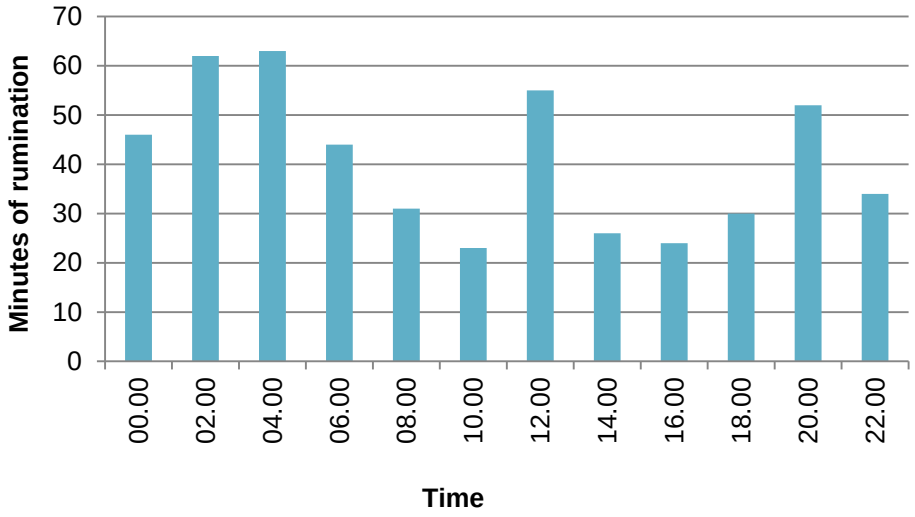


Figure 1. Cow with HR-Tag.
Picture from www.scrdairy.com

Objective

To validate the HR-Tag™ system by comparing the HR-Tag recordings of rumination time to visual observations

- How high is the correlation between HR-Tag™ and visual observations?
- Are the HR-Tag™ registrations affected by breed and/or by feed type?
- Are the two methods interchangeable?

Experimental Design

- Charolais (n=24) and Hereford (n=24) cows
- HR-Tag collars
- Loose housed, 4 cows per pen
- 8 cows/breed assigned to each diet
  - Grass/clover silage
  - Reed canarygrass silage
  - Whole-crop oat silage
- Fed *ad libitum*

Experimental Design

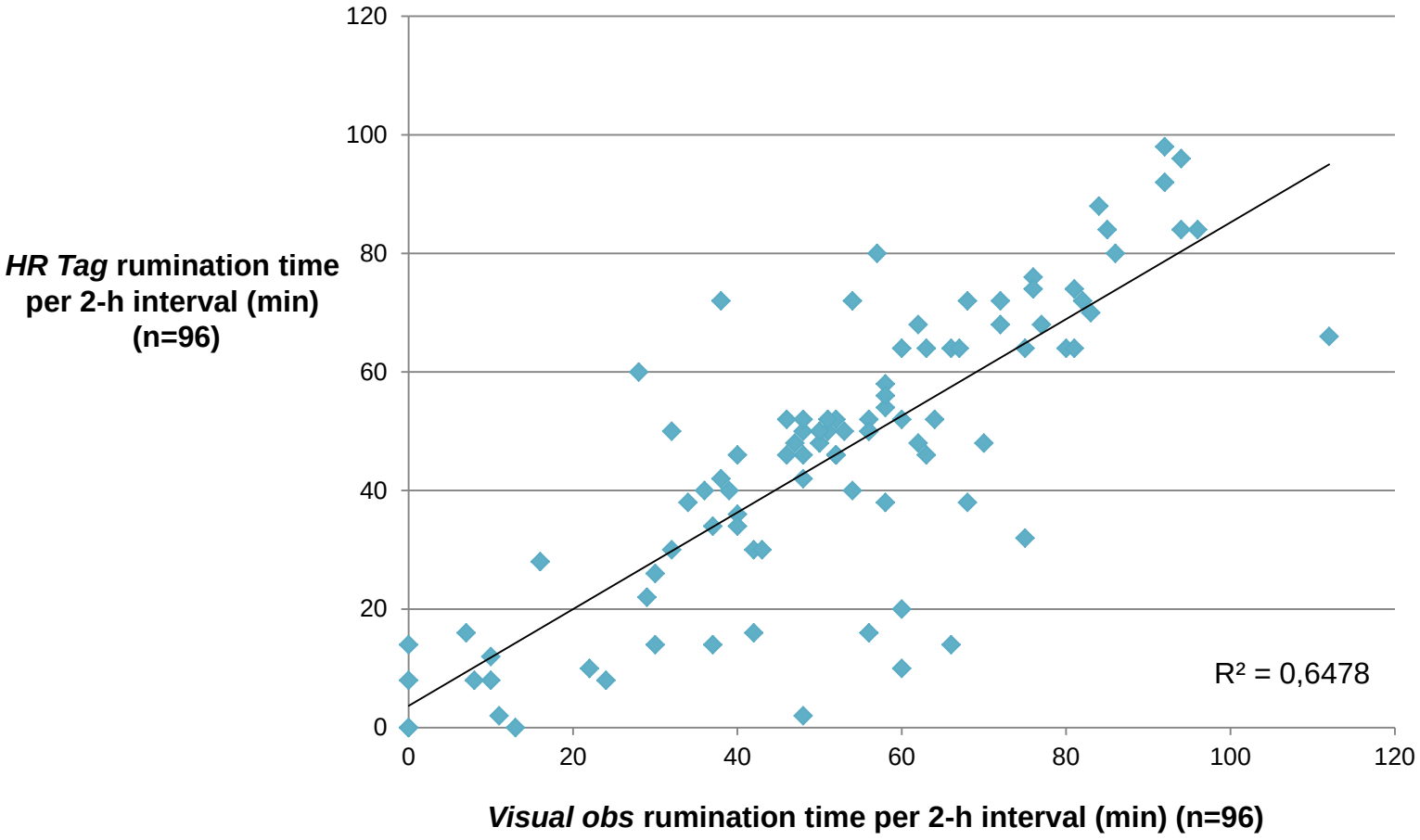
- Visual observation of rumination time
  - Two separate 2-hour intervals for every cow
  - Morning and evening
  - 96 observations in total

- Activity noted every 2 minutes per 2-h interval
  - Ruminating
  - Eating
  - Displacement of the HR-Tag noted

- *Diff Rum = Visual obs – HR Tag*

Results and Discussion

- r = 0.81, *p*<0.001 between *Visual obs* and *HR Tag*



Results and Discussion

- Average rumination time
  - *Visual obs* = 52,0 ± 24,3 min/2-h interval
  - *HR Tag* = 46,1 ± 24,6 min/2-h interval

- *Diff Rum = Visual obs – HR Tag*
  - Mean difference 5.9 min
  - Standard deviation 15.2 min

→ Underestimation by HR-Tag

Results and Discussion

- Previous validations on dairy heifers and cows have shown
  - better correlations, r = 0.88 and 0.93
  - overestimation by the HR-Tags, 4 and 0.45 min/2-h interval

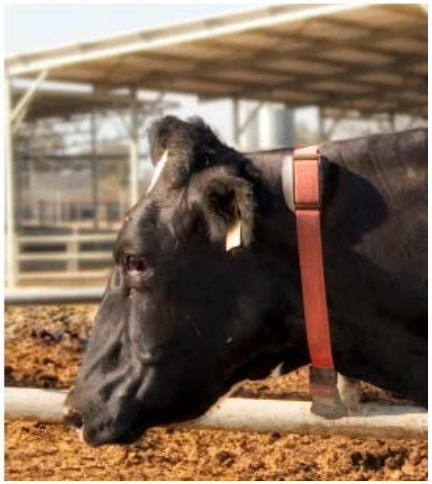
(Schirmann *et al.* 2009, Burfeind *et al.* 2011)

- A recent validation on beef heifers and steers showed
  - low correlation, mean r = 0.41
  - underestimation by the HR-Tags, 9.8 min/2-h interval

(Goldhawk *et al.* 2013)

Results and Discussion

- Beef cows/beef cattle physically different compared to dairy cows
- Different diets ⟶ different rumination patterns
- Displacement of the HR-Tag
- Visual observations



Results and Discussion

- No significant effect of breed, feed type or time of day on *Diff Rum, (p*>0.05)
- Same results with both methods
  - when studying the effect of breed and feed type on total rumination time per 2-h interval

Conclusion

- The HR-Tag™ rumination monitoring system shows acceptable agreement to visual observations and can be considered as an alternative to direct visual observations of rumination time in beef cows.

Aknowledgements

Project financed by:

- Interreg IV A, EU
- Västra Götalandsregionen, Sweden
- Swedish University of Agricultural Sciences, Sweden
- University of Copenhagen, Denmark
- Agroväst, Sweden
- Skaraborgs kommunalförbund, Sweden


Thank You For Your Attention!
Mikaela.jardstedt@slu.se