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Agroscope

Estimation of individual intake of grazing dairy cows with RumiWatch[®]

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Background and Objective



- Intake estimation of grazing dairy cows is time consuming and expensive
- Estimation with markers (n-alkanes, Yb,...)
- Easier, more precise with behavioral characteristics
 - Intake = bite mass x number of eat bites
- RumiWatch® Halter
 - Manager
 - Converter
- Pressure sensor & triaxial accelerometer

Individual intake estimation of grazing dairy cows with RumiWatch® based on mean bite mass



Materials and Methods

54 RumiWatch® files and individual intake estimations (7d)

Calibration (n = 7) :

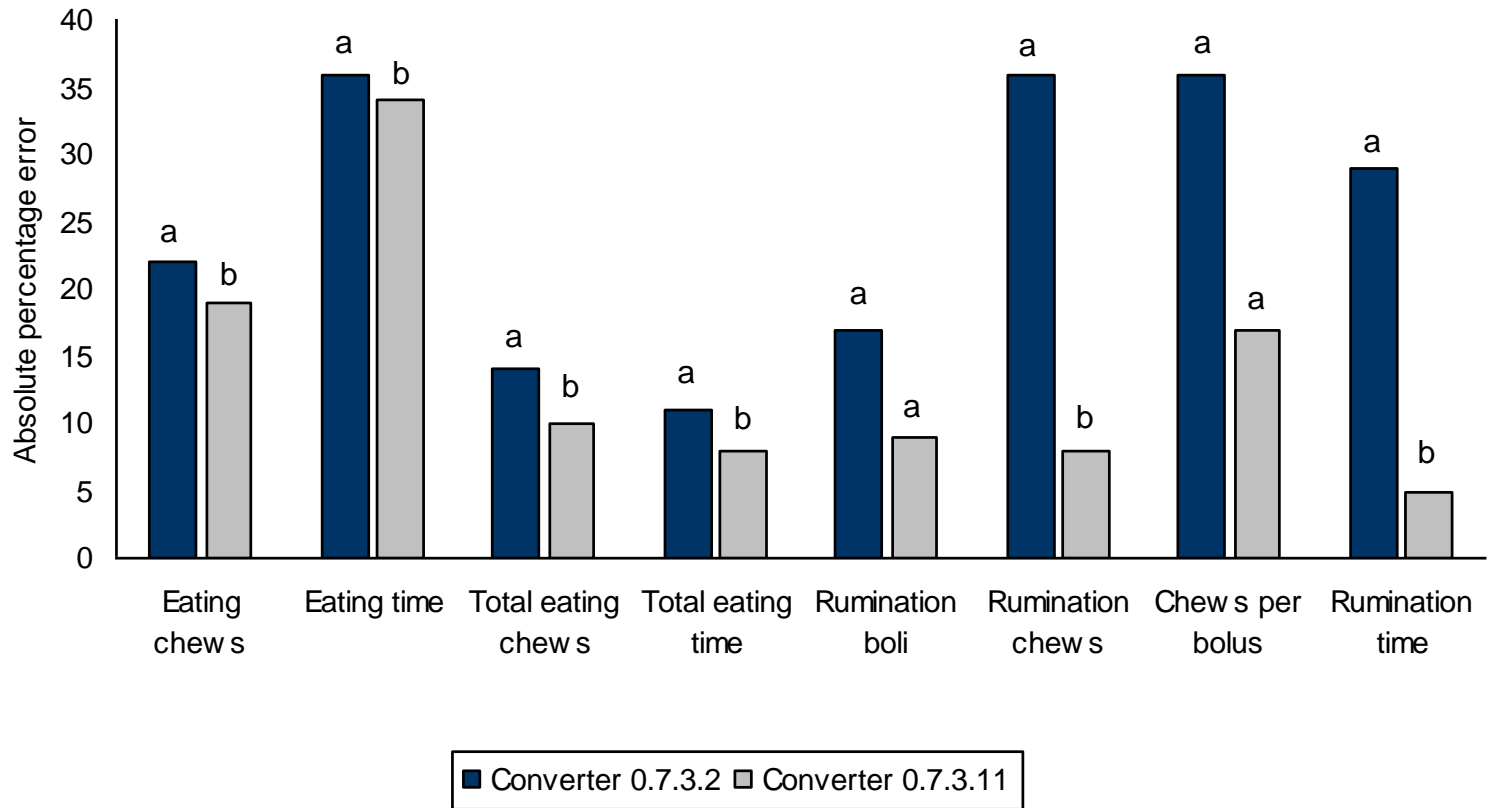
$$\textit{bite mass} = \frac{\textit{estimated herbage intake (n - alkanes)}}{\textit{number of eating chews}}$$

Validation (n = 6):

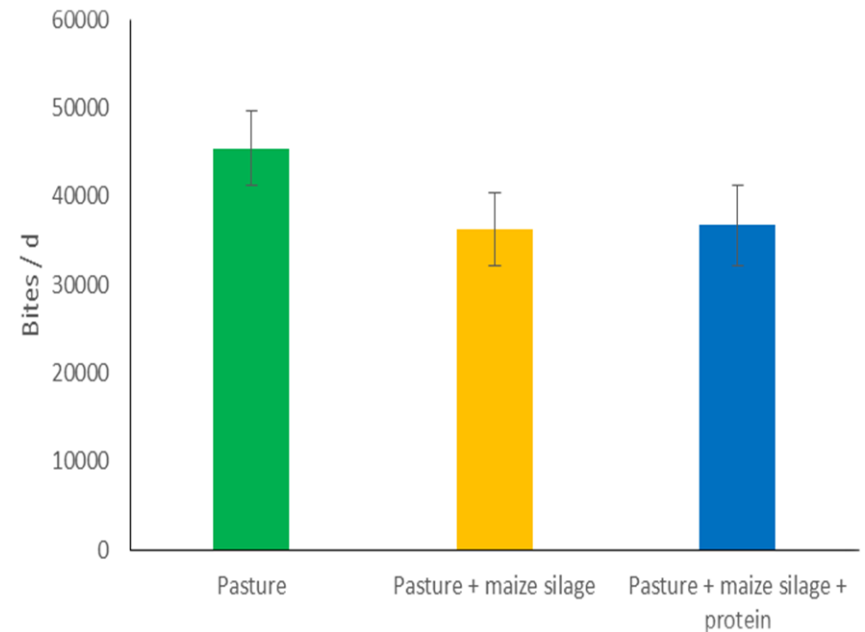
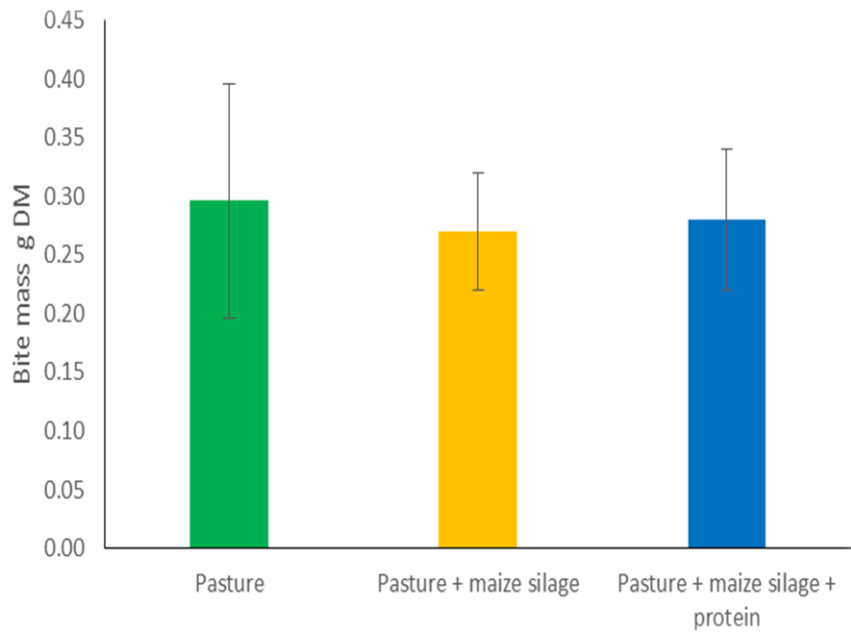
$$\textit{herbage intake} = \textit{bite mass} \times \textit{number of eating chews}$$



Accuracy of RumiWatch[®] data for grazing dairy cows

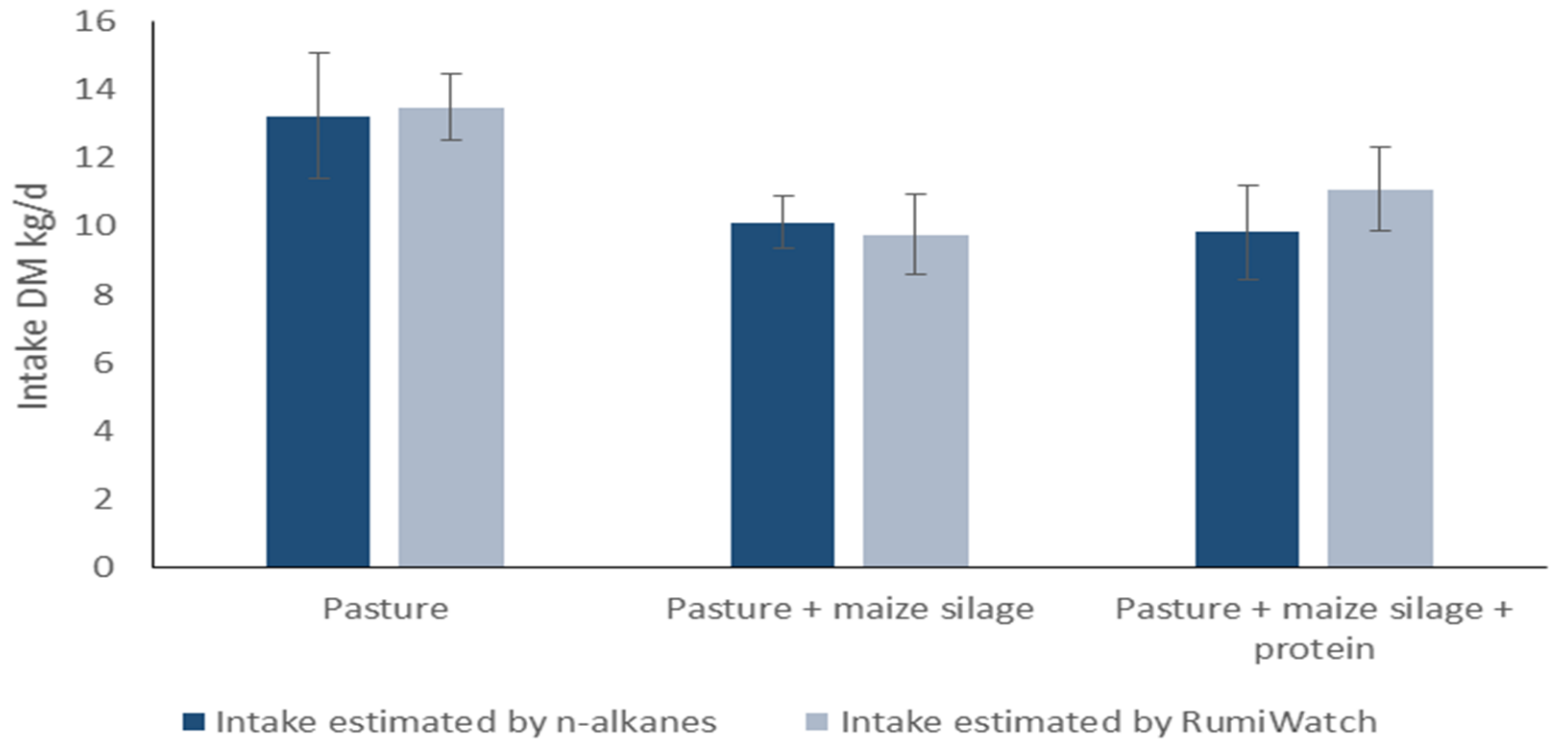


Mass and number of bites while grazing



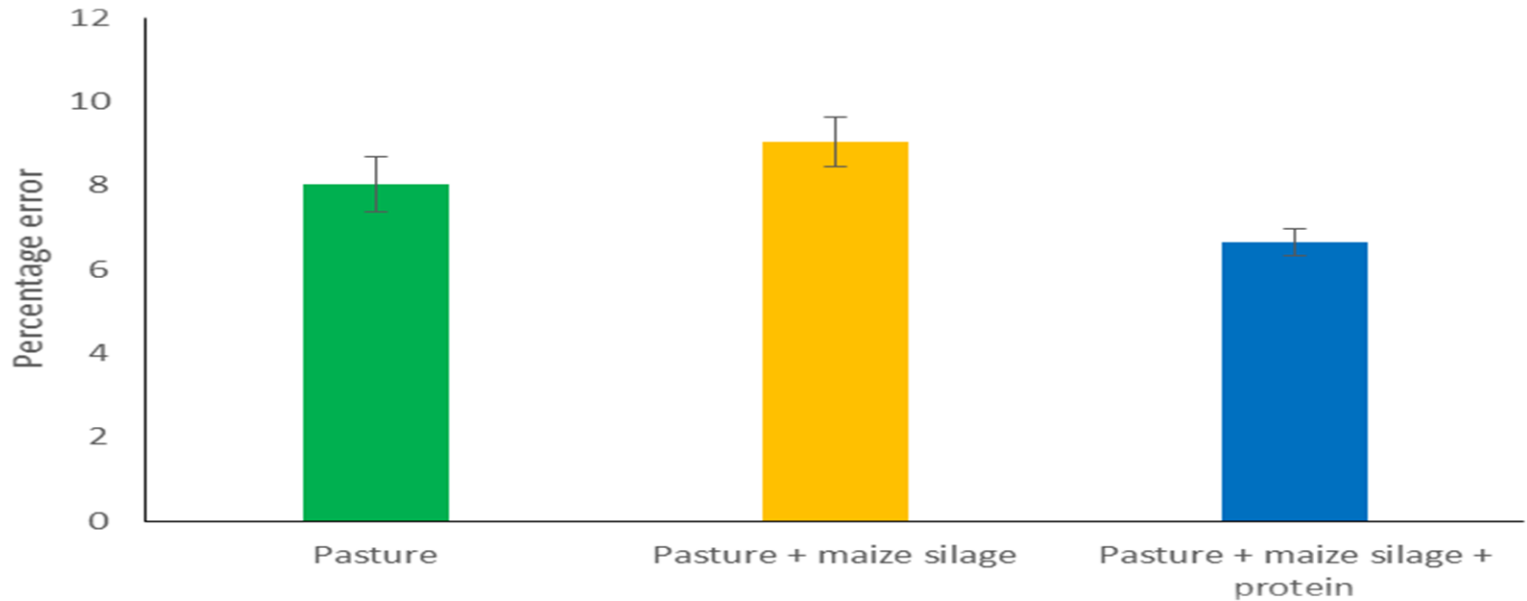


Herbage intake





Mean absolute percentage error





Summary & Conclusion

- Less eat bites per day when supplemented with corn silage
- Larger bite mass without corn silage supplementation
- Herbage intake estimation with behavioral characteristics
- influenced by mastication chews
- Further research in differentiation between mastication and prehension bites during grazing
- Bite mass estimations under different grazing conditions are needed



Thank you for your attention



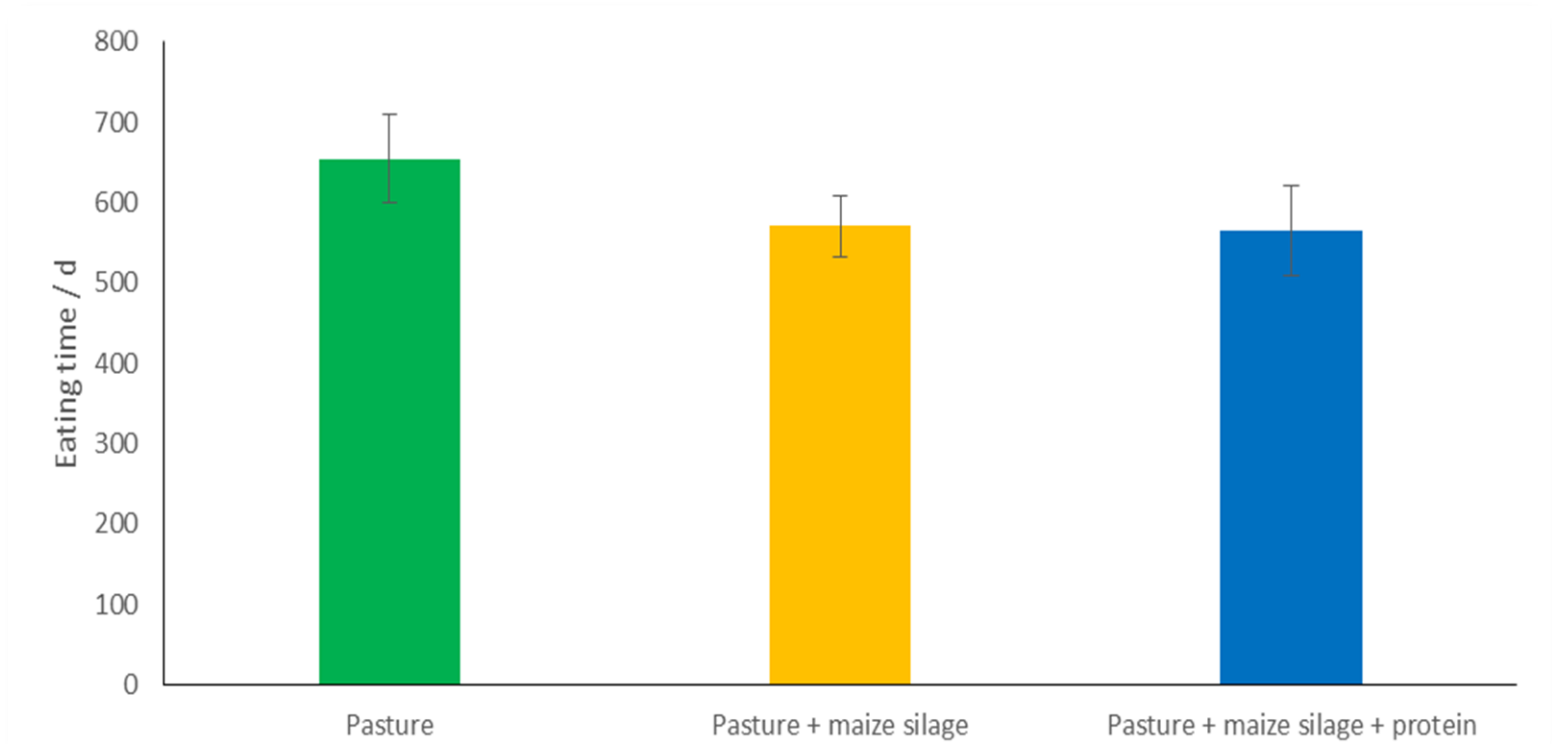


Annex I: Chemical composition of the feeds (mean±SD)

Item	Herbage	Maize sil.	Protein
DM (g/kg of wet weight)	162 ± 29.11	398 ± 33.8	882 ± 2.4
Analyzed nutrient and mineral composition (g/kg of DM)			
OM	889 ± 8.1	971 ± 0.5	944 ± 0.2
CP	199 ± 21.0	72 ± 5.7	562 ± 6.6
ADF	219 ± 30.2	194 ± 29.3	76 ± 3.1
NDF	225 ± 27.8	351 ± 49.7	316 ± 34.8
CF	186 ± 20.5	163 ± 23.8	34.3 ± 0.1
Ca	8.5 ± 0.7	1.6 ± 0.0	3.0 ± 0.0
P	4.9 ± 0.4	1.7 ± 0.0	6.3 ± 0.0
Mg	2.5 ± 0.2	0.8 ± 0.0	3.0 ± 0.0
Na	0.4 ± 0.0	0.2 ± 0.0	0.5 ± 0.0
K	39.5 ± 2.1	9.1 ± 0.0	20.5 ± 0.0
Calculated energy supply per kg of DM			
NEL (MJ)	6.4 ± 0.2	6.9 ± 0.3	8.5 ± 0.0



Annex II: Duration of eating on pasture





Annex III: Bite rate per minute on pasture

