Validation of behavioural-based models to estimate pasture herbage dry matter intake of dairy cows

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Objective

The objective was the validation of existing behavioural- and production-based models to estimate individual pasture dry matter intake (**PHDMI**) of dairy cows with an independent dataset.

Materials and Methods

- Independent dataset: 72 measurements of 7 d PHDMI of 38 Holstein and Swiss Fleckvieh cows
- Main feed resource was grazed herbage with mean concentrate supplementation of 0.7 kg DM d^{-1} (0 – 3.5 kg)
- RumiWatch halter for eating and rumination behaviour recording over a 7 d period
- Reference method for individual PHDMI: n-alkane double marker technique
- Two models were evaluated against reference PHDMI:
    - Exclusively behavioural-based model *(Schori et al. 2020, EGF-Proceedings)*
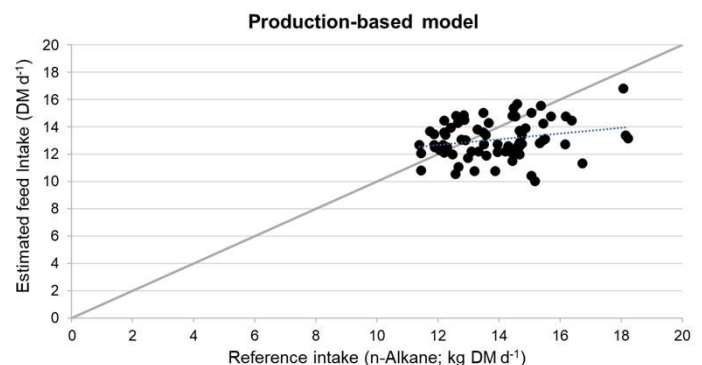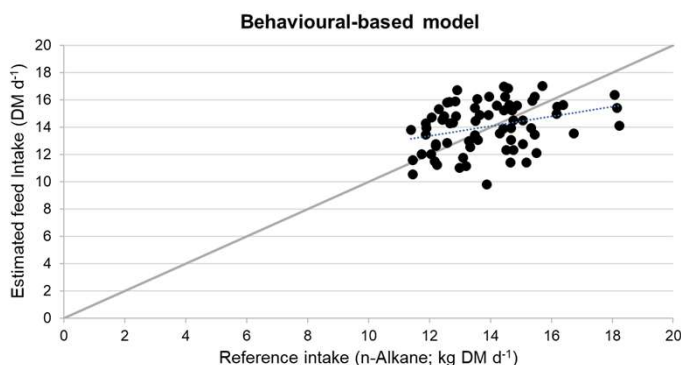   - Production-based model including behavioural characteristics *(Rombach et al. 2019, J. Dairy Sci.)*

Results

	Behavioural-based model	Production-based model
Mean bias (kg DM)	- 0.13 ± 1.95	0.81 ± 1.85
RMSEP (kg DM)	1.94	2.01
Rel. prediction error (%)	14.0	14.4
CCC	0.33	0.21
r	0.33	0.24
R^2	0.11	0.06

RMSEP = root mean square error of prediction
CCC = Concordance correlation coefficient
r = Pearson correlation coefficient
R^2 = Coefficient of determination

Conclusion

The estimation models, either behavioural- or production-based, appear to be valid for estimating mean herd PHDMI, but seem only moderately suitable for estimating individual PHDMI. Furthermore, the exclusively behavioural-based model performs similarly to or even better than the production-based model. A larger validation dataset with more values in the range of 2-12 kg PHDMI per day may be beneficial.

Agroscope   good food, healthy environment