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Estimation of cows' water intake and efficiency from on-farm known information

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ABSTRACT: Cows' real water intake (WI) determination at individual level is rather impossible in the field and existing prediction equations rarely consider the daily body weight (BW) and milk yield (MY). To develop an equation for WI and water efficiency (L per kg of milk; EFF_w), we used data recorded on a daily basis by sensors – including individual drinkers - of 23 lactating Holstein cows housed in tie-stalls for 4 weeks at the experimental farm of University of Bologna. A linear mixed model was adopted to evaluate significant regressors (covariates) of WI and EFF_w, considering cow as a random effect. WI averaged 176.83±31.61 L/d and was significantly correlated (0.71) with EFF_w, whose mean and range were 3.94±0.91 and 1.60-7.95 L. Significant regressors were MY, BW and days in milk for EFF_w; the same can be said for WI, but with a tendency for MY (P=0.06). Dry matter intake and parity were not significant. Predictions were significantly correlated with real measures: 0.39 (WI) and 0.57 (EFF_w). Although preliminary, findings suggest that water use efficiency indicators can be predicted using on-farm available information with an exploitable accuracy. In the era of sustainable farming, predicted WI and EFF_w represent an interesting opportunity for breeders.

Keywords: phenomics, dairy cow, sustainable dairy farming, water use, feed efficiency

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