Automated milk-recording systems: an experience in Italian dairy cattle farms

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INTRODUCTION

Accurate phenotypes are crucial for obtaining reliable breeding values. Due to budget reduction in most European countries, there is a need for phenotype recording methods that are both accurate and cost-effective. Automated milk-recording systems (AMS) record milk yield, milk components and other parameters on a daily basis, providing information for the management of dairy farms and, on a broader perspective, for the statistical description and genetic improvement of the population.

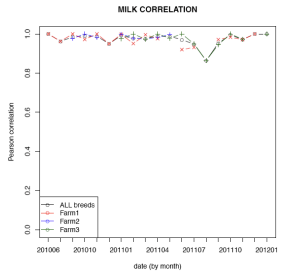
Within the PROZOO project, AMS data from three Holstein-Friesian farms in the Po valley (Northern Italy) were collected in a database, together with clinical diagnoses of metabolic diseases (e.g. ketosis, displaced abomasum). Blood and milk samples were also collected and analyzed for more than 50 parameters.

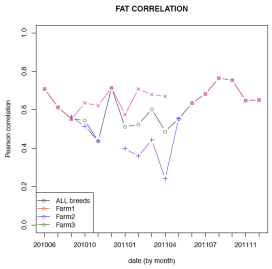
Objectives of this preliminary study are: 1) to assess the goodness of fit for main productive traits (milk, fat and protein yield) between AMS and official test-day (TD) records; 2) to integrate new phenotypes in a future genomic evaluation (data not yet available) and 3) to analyse newly collected health parameters with AMS records in order to find early alert indicators for metabolic disorders in dairy cattle.

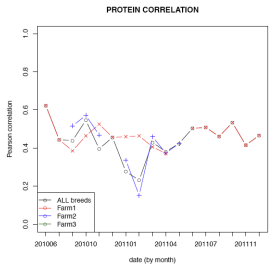
RESULTS

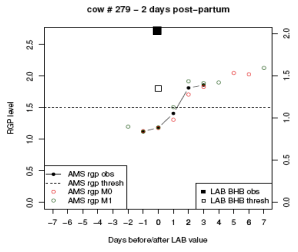
Correlations between AMS data and official TD records were high for milk (~1) but lower than 0.8 for both fat and protien yield. These results were probably biased downwards by initial problems at installation of AMS.

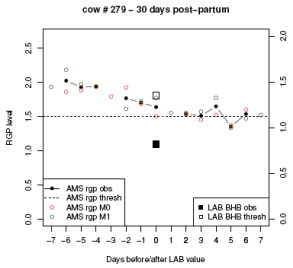
An additional downward bias for fat and protein curves might depend on the calibration with TD records, done few days after TD recording. Thus the following comparison could be sub-optimal.











Betahydroxybutyrate (BHB) is an indicator for ketosis in lactating cows. High values of BHB are expected to be correlated with high values for fat/protein ratio (FPR). In the left graph, cow #279, controlled at 2 days post-partum, showed high values of BHB (black square over the white square) corresponding to a strong increase in FPR (black line). Thirty days after calving, BHB decreased under the threshold and the FPR showed a negative trend, indicating that ketosis was nearly over (central graph).

CONCLUSIONS

Phenotyping costs are a concern in most European countries. AMS output much more information and at a lower cost than official TD records, which usually return only milk, fat and protein yields, and SCS data. However, validation of these methods is needed before integrating this information into routine genetic evaluations. Preliminary results show issues with fat and protein yield recording, though factors potentially influencing the results are still under examination. In addition, AMS information can be used as an on-farm management tool and as an early-alert system for health problems. Although accurate validation is still needed given the few cases currently analysed, FPR is a good example of a “new phenotypic trait” that can be recorded daily with AMS, and that can be of interest both for breeding and management purposes.

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