COMPARISON OF EMPIRICAL MODELS FOR PREDICTION OF LACTATION PERFORMANCE IN DAIRY CATTLE

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Predictions of milk production were made using AFRC (1990), ARC (1980), MAFF (1976), NRC (1989) and CamDairy (Hulme et al. 1986). The models were validated by comparing actual fat corrected milk production (FCM) (y) to predicted FCM (x) through analyses of data from two experiments (n=202), one conducted at the Institute for Grassland and Animal Production in the UK, and the other at the Dairy Forage Research Centre in the USA. If the models were predicting without discernable bias then the intercept would be zero, and the slope would be one. Systematic bias towards underprediction at low milk yields was seen in all models except CamDairy. The CamDairy model gave a closer fit between actual and predicted FCM for low levels of actual FCM. The most likely reason for the better fit with the CamDairy model is the use of a variable energy requirement for FCM, based on the law of diminishing returns. All models showed significant interactions between their prediction and parity, indicating that none of the models adequately predicted the lower milk production of heifers.

Model	Intercept (L)	Slope (L actual FCM / L predicted FCM)	r^2
CamDairy	-0.36 ± 1.88	0.989 ± 0.079	0.77
AFRC 1990	9.65 ± 1.47 *	0.630 ± 0.067 #	0.66
ARC 1980	10.35 ± 1.33 *	0.584 ± 0.059 #	0.68
TB33	8.87 ± 1.55 *	0.591 ± 0.063 #	0.66
NRC 1989	11.04 ± 1.32 *	0.575 ± 0.060 #	0.66

* Intercept is significantly different to zero ($P<0.001$)
\# Slope is significantly different to one ($P<0.001$)

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