

Evaluation of the Effect of Milk Recording Intervals on the Accuracy of an Empirical Model Fitted to Dairy Sheep Lactations

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Abstract : Mathematical models are useful for identifying the characteristics of sheep lactation curves to develop and implement improved strategies. However, the accuracy of these models is influenced by factors such as the recording regime, mainly the intervals between test day records (TDR). The current study aimed to evaluate the effect of different TDR intervals on the goodness of fit of the Wood model (WM) applied to dairy sheep lactations. A total of 4,494 weekly TDRs from 156 lactations of dairy crossbred sheep were analyzed. Three new databases were generated from the original weekly TDR data (7D), comprising intervals of 14(14D), 21(21D), and 28(28D) days. The parameters of WM were estimated using the "minpack.lm" package in the R software. The shape of the lactation curve (typical and atypical) was defined based on the WM parameters. The goodness of fit was evaluated using the mean square of prediction error (MSPE), Root of MSPE (RMSPE), Akaike's Information Criterion (AIC), Bayesian's Information Criterion (BIC), and the coefficient of correlation (r) between the actual and estimated total milk yield (TMY). WM showed an adequate estimate of TMY regardless of the TDR interval ($P=0.21$) and shape of the lactation curve ($P=0.42$). However, we found higher values of r for typical curves compared to atypical curves (0.9vs.0.74), with the highest values for the 28D interval ($r=0.95$). In the same way, we observed an overestimated peak yield (0.92vs.6.6 l) and underestimated time of peak yield (21.5vs.1.46) in atypical curves. The best values of RMSPE were observed for the 28D interval in both lactation curve shapes. The significant lowest values of AIC ($P=0.001$) and BIC ($P=0.001$) were shown by the 7D interval for typical and atypical curves. These results represent the first approach to define the adequate interval to record the regime of dairy sheep in Latin America and showed a better fitting for the Wood model using a 7D interval. However, it is possible to obtain good estimates of TMY using a 28D interval, which reduces the sampling frequency and would save additional costs to dairy sheep producers.

Keywords : gamma incomplete, ewes, shape curves, modeling

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