Extended lactations in grazing dairy cows: insights from lactation curve modelling

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Block calving and concentrated mating is typical with pasture-based dairy systems, but is labour-intensive. Extended lactations (EL), where cows are milked beyond the standard 305-day lactation (SL), have been proposed to reduce workload and non-replacement calves. While EL models have been studied in housed systems, there is limited research at farm-scale in grazing systems. This study evaluated EL and SL curves for pasture-based dairy cows using several models (Wood, Wilmink, Dijkstra and Legendre polynomials) and described daily milk and milksolids yields using Legendre polynomials. to determine if some animals are more suited to an EL than others. Thirty-five commercial herds across 101 production-herd years in New Zealand were identified in the Dairy Industry Good Animal Database as having cows with EL due to intentionally delayed seasonal mating. From those herds, 6,135 SL and 2,387 EL curves were modelled across breeds and parities using third and fifth order Legendre polynomials, respectively. Legendre polynomials were selected for their lower relative predictive errors across lactations in comparison to parametric models. With an average lactation length of 510 d, the mean (SD) of total milk yield for EL was 9,581 (3,422) kg, showing variation across animals. Average peak milksolids yield was similar for both SL and EL (2.3 kg/d), however, the peak occurred earlier in SL (42 d) than EL (65 d), with a SD of 64 and 118 d, respectively. A second peak in daily milk yield occurred in EL across all breeds and parities, at approximately 375 days in milk during the second spring of the lactation. This second peak and the variation in curve shapes were not captured by common parametric models used in housed systems, making the Legendre polynomial EL curves in grazing systems distinct from SL or housed EL. Applying Legendre polynomial models when determining persistency and total milk yield for an EL could provide a framework to assess an animals suitability for the system.

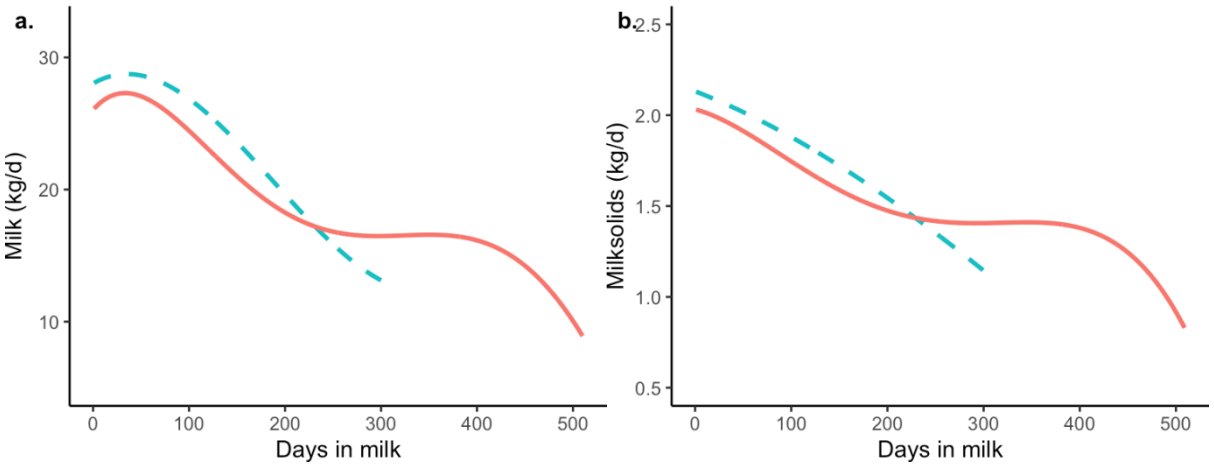

Figure 1: Average standard [n = 6,135 (milk); n = 6,134 (milksolids)] and extended lactation [n = 2,366 (milk); n = 2,363 (milksolids)] predicted curves for milk (a) and milksolids (b) yield (kg/d) modelled using Legendre polynomials in grazing dairy cows. Blue: standard lactation, red: extended lactation

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