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Simulations to define the optimum lifetime management for Holstein cows

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Interest in extended lactation has increased this last decade. However, little is known about the long terms effects of extended lactation on the lifetime productive and reproductive performance. The two main objectives of this study were 1) to determine the optimum duration of extended lactation to enhance efficiency and pregnancy rate compared with a 10 mo lactation, and 2) to define if the lactation duration should vary with the age of the cow to reach an optimum lifetime performance. A lifetime performance model taking into account the changing physiological priorities of an animal during its life and through repeated reproduction cycles (Martin and Sauvant, 2010, Animal 4, 2030-2047), was used to simulate different lifetime scenarios. The model was tested to fit 16 mo lactations. For each scenario, a total of 300 cows were randomly generated. Simulation of cows managed for repeated 16 mo lactation all their life (**EL**) had the highest lifetime efficiency (ratio of energy in milk to energy intake), and the longest lifetime compared with shorter (10, 12, or 14 mo) or longer lactations (18, 20, or 22 mo). Pregnancy rates were not significantly improved compared with a 10 mo lactation (**N**). Simulations of cows managed for a 16 mo lactation during their first lactation, followed by 10 mo lactations for the rest of their life (**EL-N**), had a lifetime efficiency similar to that of the scenario EL. Simulations of cows managed for a 10 mo lactation during their first lactation, followed by 16 mo lactations for the rest of their life (**N-EL**), had a lifetime efficiency similar to the N scenario. To conclude, these simulations indicated that 1) the 16 mo lactation is the optimum extended lactation length in terms of productive and reproductive performance, and 2) that managing the primiparous cows with a 16 mo extended lactation, followed by 10 mo lactations, allows the lifetime efficiency to increase being similar to cows managed for 16 mo lactation all their life.