BRIEF COMMUNICATION: Once-a-day milking with supplemented cows in Argentina

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Introduction

Dairy farming is an important activity in Argentina. The country produced over 11,000 million litres of milk in 2015 (Ministerio de Agroindustria 2015). Milk production is based on the utilisation of grazed lucerne pastures (*Medicago sativa L*), and the use of supplements such as silage, hay and concentrate feeds. Pasture comprises between 30% and 50% of the diet. Average milk production per cow is 5,900 kg/cow per year (equivalent to 401.2 kg of milk solids/cow per year; INTA 2015). Due to a favourable ratio between milk price and concentrate feeds price (average ratio milk to concentrate price over 1.5), dairy farmers in Argentina include great amounts of concentrate feeds in their systems. Over 95% of dairy herds of Argentina are Holstein, and cows are milked twice a day (TAD) (FAO 2011).

In the last decade, studies have been conducted, mainly in New Zealand, but also in Europe, to evaluate the effects of once-a-day (OAD) milking during the whole lactation (Stelwagen et al., 2013). Lifestyle benefits for farmers and employees and improvement in animal health and reproductive performance are the main motivations to choose OAD milking (Bewsell et al., 2008).

Most of literature, from research (Clark et al. 2006, Holmes et al. 1992, O'Brien et al. 2007) and commercial herds (Lembeye et al., 2016) on cows milked OAD during the whole lactation is under a grazing system with little use of supplementary feed. In Argentina, to the best of our knowledge, there are only two farms milking OAD for the whole lactation (including the farm in the present study), but no data on the performance of these farms have been published, up to now.

The objective of the present study was to report the productive performance of dairy cows grazing lucerne and supplemented with silage and concentrate feeds, milked OAD for the first year during the whole lactation in Argentina.

Materials and methods

The study was conducted in the central region of Argentina, in the Buenos Aires province. Cows were milked OAD for the first time after parturition and fed with a diet composed of grazed lucerne (45%), silage (13%) and concentrate feeds (42%). Cows calved seasonally from January to March (summer). Average live weight at the end of the lactation was approximately 450 kg per cow.

A total of 2,187 monthly herd-test records from 282 cows (New Zealand Holstein-Friesian x New Zealand Jersey), collected between February and October 2016, were used to predict total milk yield (MY), fat yield (FY), protein yield (PY), milksolids yield (MSY) and average somatic cell score (SCS; calculated as = $\log_2$ somatic cell count) for cows in their first (n=104), second (n=85) or third and more lactation (n=93) using a third order Legendre polynomial (Kirpatrick et al., 1990).

A mixed model in SAS (SAS, 2003) was used to estimate the least-square means for MY, FY, PY, MSY and SCS during the lactation. The model included the fixed effects of lactation number and calving month.

Results and discussion

Means and standard deviation of accumulated MY, FY, PY and MSY per cow, at 305 days of lactation, were 4,175.7 ± 698.2 kg, 166.2 ± 24.8 kg, 167.7 ± 24.3 kg and 333.3 ± 46.4 kg, respectively. Average SCS was 7.4 ± 2.1 (average SCC of 401,000). Accumulated MY, FY, PY and MSY and average SCS for each lactation group are presented in Table 1. Differences between calving months were not significant (P > 0.05).

Average MY for OAD cows in the present study was 29% lower than the national average milk yield of Argentine cows milked TAD. This figure is greater compared to the

Table 1 Accumulated milk yield (MY), fat yield (FY), protein yield (PY) and milk solids yield (MSY) and somatic cell score (SCS; calculated as $\log_2$ somatic cell count) of crossbreed cows (New Zealand Holstein-Friesian x New Zealand Jersey) during 305 days of lactation under once-a-day milking in Argentina. Data are means ± SE.

	First lactation	Second lactation	Third or greater lactation
MY (kg/cow)	3,779.9 ± 71.6[a]	4,221.7 ± 74.0[c]	4,616.0 ± 69.9[b]
FY (kg/cow)	154.7 ± 2.6[a]	168.2 ± 2.7[c]	179.3 ± 2.6[b]
PY (kg/cow)	155.2 ± 2.5[a]	169.5 ± 2.6[c]	181.7 ± 2.5[b]
MSY (kg/cow)	309.6 ± 4.9[a]	337.1 ± 5.0[c]	359.7 ± 4.8[b]
SCS	7.2 ± 0.2	7.6 ± 0.2	7.7 ± 0.2

[a,b,c] Means with different superscripts in the same row are significantly different (P<0.05)

19% decrease in milk production observed in commercial farms in New Zealand, when cows are milked OAD (Lembeye et al., 2016). Compared to studies conducted in New Zealand with similar breeds of cows milked OAD (Lembeye et al., 2016), Argentine cows, in our study, produced 28% and 17% more MY and MSY, respectively, possibly due to the high amounts of supplements used in Argentina (FAO 2011). However, FY for Argentine cows was similar to New Zealand crossbreed cows milked OAD in commercial farms. The high amount of non-structural carbohydrates, due to 42% of the total DM offered being as concentrate feeds, and therefore insufficient dietary fibre, may have prevented greater fat yields (Plaizier et al., 2008) in our study. Excessive rainfall caused damage to lucerne pastures, which resulted in higher than expected, amounts of supplements being fed to cows. The higher amount of supplements fed, may have had a negative economic impact on the whole farm, as supplements are more expensive than pasture alone.

Milk yield, in the present study, was 18% higher for cows on their third or greater lactation compared to primiparous cows. Lembeye et al. (2016) reported 32% higher MY for multiparous compared to primiparous cows milked OAD in New Zealand commercial farms. In the present study, the difference in MY between primiparous and multiparous was smaller than in New Zealand cows, may be due to higher amounts of supplementary feeds in Argentina (FAO 2011).

Average SCS for the herd, in the present study, was 17% lower compared to the national average SCS for Argentine cows milked TAD, in the same period of analysis, but higher than in New Zealand commercial farms milking OAD. The switch from TAD to OAD in a herd with relatively high SCS in previous lactations, plus excessive rainfall and mud might have been responsible for the high SCS observed in this study.

Data reported in this work correspond to cows milked OAD during the whole lactation for the first time. It would be expected, in subsequent years of milking OAD, greater MY and MSY per cow and lower SCS would occur. DairyNZ (2016), using data from commercial farms milking OAD, reported that productive performance of cows milked OAD improves after four or five years of milking OAD. This response may be a consequence of culling cows that are not suited to OAD milking, as proposed by Holmes (2011).

Summarising, milk yield per cow was 28% higher than that obtained in New Zealand with cows of similar breed milked OAD, but 29% lower compared to the Argentine average milk production with TAD milking. Somatic cell score was higher in the present study compared to New Zealand OAD farms but lower than the average values in Argentine farms, milking TAD.

Future challenges for the studied farm, in order to be successful at milking OAD, would be to decrease the amount of supplements used, select more suitable cows for OAD and put in practice all management alternatives to decrease somatic cell count. Also it would be interesting to address the reasons for this farm to adopt OAD. Further research is required to evaluate the productive and economic whole-farm performance of OAD systems in Argentina.

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