# BRIEF COMMUNICATION: Jersey cows milked once-a-day can produce 1,200 kg milksolids per hectare

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## INTRODUCTION

While dairy cows are generally milked twice-a-day (TAD) in New Zealand, more farmers are adopting a once-a-day (OAD) milking routine to improve their lifestyle, reduce farm costs and improve animal welfare. Clark *et al*. (2006) reported that the yield of milksolids (MS) from Jersey cows was less affected (-19.9%/cow) by OAD milking than the MS yield from Holstein-Friesian cows (-29.4%/cow). Jersey cows milked OAD in Taranaki between 2000 and 2004 averaged 222 kg MS/cow and 979 kg MS/ha (Clark *et al*., 2006). In the 2006/07 season average per cow production from cows milked TAD in New Zealand was 330 kg MS (Livestock Improvement Corporation, 2007). There is evidence to suggest that a significant proportion of cows, within herds, show minimal yield losses when milked OAD, suggesting the possibility of selecting cows that tolerate less frequent milking (Woolford *et al*., 1985).

Livestock Improvement Corporation (LIC) introduced a OAD Index in 2003 that utilised a "desired gains" approach in which official Animal Evaluation Unit breeding values (BVs) for traits in the Breeding Worth (BW) formula were subjectively weighted to suit likely OAD milking requirements, where additional selection pressure was applied against milk volume (McPherson *et al*., 2007). The index was primarily developed as a ranking tool for an individual cow within the general population and for herd mate comparisons.

A farm systems trial was designed to investigate the production potential from Jersey cows milked either OAD all season or OAD from late January each year that were managed to maximise per cow production and days in milk.

## MATERIALS AND METHODS

On 1 June 2004, two Jersey herds, one consisting of 101 high OAD Index cows ($BV_{OAD}$ = 1,388; \$135 ± 3.08 $BW_{TAD}$) and the other 44 average OAD Index ($BV_{OAD}$ = 1,004; \$103 ± 4.67 $BW_{TAD}$) cows were established at the Waimate West Demonstration Farm in Taranaki. The high $BV_{OAD}$ cows were milked OAD for the entire lactation (OAD herd). The average $BV_{OAD}$ cows were milked TAD until late January and then milked OAD to the end of the season (TAD/OAD herd). The stocking rate for the OAD herd of 4.4 cows/ha, was set 10% higher than the TAD/OAD herd to target equal milksolid production (MS; fat + protein) per ha under the two milking frequencies. The trial ran for three lactations. Annual replacement rate was set at 20% with replacement heifers also selected using the 2003 OAD index.

All cows were joined to start calving on 9 July each year. Cows allocated to the OAD treatment were milked OAD from immediately after calving. Cows were milked at approximately 06:00 h (OAD herd and TAD herd) and 16:00 h (TAD/OAD herd until late January). Milk yields were measured daily on a herd basis and milk composition (fat and protein) were measured on individual cow samples at monthly intervals during lactation, using a Milkoscan 133B milk analyser (Foss Electric, Hillerød, Denmark).

Farmlets were run under standard decision rules (Macdonald & Penno, 1998) to ensure consistency of grazing management, conservation, supplementation, drying off and culling. No supplements were purchased and all cows were wintered on the farm.

Milk yield and MS yield/cow were calculated from monthly herd-test data for each herd each season. Bulk milk somatic cell counts for each herd were obtained from the daily factory milk supply reports for each herd. Mean somatic cell counts were calculated for each cow each season. All data were analysed using ANOVA of the six herd means (2 milking treatments x 3 years), with year as a random effect and herd as a fixed effect. The SCC data were transformed to $\log_{10}$ for analysis to normalise the variance.

## RESULTS AND DISCUSSION

The aim of this study was to investigate the production potential of Jersey cows when milked either OAD all season or OAD from late January and managed to maximise per cow production and days in milk. Part season OAD milking is attractive

**TABLE 1:** Predicted mean annual milk, fat, protein and milksolids yield per cow and per hectare, days in milk, somatic cell count (SCC) and milk composition for Jersey cows milked once a day for either the full season (OAD) or from late January (TAD/OAD) for three seasons. SED = Standard error of difference.

| Component | Milking frequency | | | |
|---|---|---|---|---|
| | OAD | TAD/OAD | SED | P value |
| Milk yield (kg/cow) | 2,592 | 3,196 | 64 | 0.011 |
| Fat yield (kg/cow) | 163.1 | 189.0 | 4.3 | 0.027 |
| Protein yield (kg/cow) | 117.0 | 136.2 | 3.0 | 0.024 |
| Milksolids yield (kg/cow) | 280.0 | 325.2 | 6.8 | 0.022 |
| Milksolids yield (kg/ha) | 1219 | 1277 | 28 | 0.176 |
| Days in milk (d) | 269 | 274 | 4 | 0.292 |
| $Log_{10}$SCC | 1.99 | 1.89 | 0.05 | 0.210 |
| Bulk milk SCC (x 1,000 cells/mL) | 96.6 | 78.7 | NA | NA |
| Fat (%) | 6.30 | 5.95 | 0.04 | 0.015 |
| Protein (%) | 4.50 | 4.27 | 0.04 | 0.031 |

to farmers in summer dry areas of New Zealand to reduce feed demand when growth slows during summer but has not been previously investigated under controlled conditions.

It is difficult to compare milk yield per cow in our experiment with other herds on OAD milking because of differences in stocking rate and because the current experiment lacked a twice-a-day control treatment. In the current study annual MS yield/cow for the OAD herd was 14% lower than that for the TAD/OAD herd (Table 1) and 10% lower than TAD cows stocked at 3.8 cows/ha and managed under the same grazing rules on the same farm over the period 2000 to 2004 (Dalley *et al*., 2005). Clark *et al*. (2006) reported a 16 to 25% decrease in per cow production, relative to TAD controls, when unselected Jersey cows were stocked at 4.2 cows/ha and milked OAD for four years.

The higher stocking rate of the OAD herd in this study, combined with a smaller yield loss from OAD milking using the OAD index to select superior cows, resulted in no significant difference in per hectare production between the two treatment groups (Table 1). The OAD herd produced milk with a higher fat and protein concentration than the TAD/OAD herd (Table 1). There were no significant differences in mean SCC or days in milk between the treatment groups. The 1,219 kg MS/ha produced by the Jersey OAD herd (BW \$135 ± 3.1) in the current trial was greater than the 979 kg MS/ha reported for unselected Jerseys cows (BW \$58 ± 2.5) by Clark *et al*. (2006) and the New Zealand average for all herds of 934 kg MS/ha (Livestock Improvement Corporation, 2007). Per hectare production is influenced by milksolids production per cow and stocking rate. In the current trial a higher per cow production of. 280 kg MS/cow compared with 222 kg MS/cow reported by Clark *et al*. (2006) was the major contributor to the improved per hectare performance as the stocking rates of the two trials were similar.

Previous New Zealand research (Clark *et al*., 2006) has reported shorter lactations from cows milked OAD. The 14 day shorter lactation lengths were associated with summer droughts that reduced growth rates and pasture quality. Cows were dried off because of poor milk yield and high SCC. In the current trial there was no difference in lactation length between the treatment groups, with the OAD herd achieving 40 more days in milk than the Jersey OAD cows in the trial of Clark *et al*. (2006). The low average SCC of both herds in the current trial enabled cows to be milked despite yields declining to 0.5 kg MS/cow/day, equivalent to 5 kg of milk per day in late lactation. Supplementary feed availability was the key factor determining dry off date for the OAD herd in the current trial. This trial has demonstrated that selecting high BW, low SCC Jersey cows can improve per cow and per hectare production from OAD milking, over that previously reported. Production comparable to that of cows milked TAD under similar management conditions and higher than the New Zealand industry average is achievable with both full and part season OAD milking.

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