

Reproductive Performance of Cows Milked Once a Day (OAD)

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Executive Summary

Compared with cows milked twice a day (TAD), cows milked once a day (OAD):

1. Cycle earlier (by up to 8 days)
2. Have higher 3-week submission and pregnancy rates (7% greater)
3. Have fewer days from calving to conception (5 days fewer)
4. Require fewer CIDRs (11% fewer)
5. Have lower empty rates
6. However, poor nutrition in early lactation with cows milked OAD will compromise low empty rates

Research Findings

The initial breed by milking frequency comparison (2000-2004; Clark *et al.*, 2006) showed significant improvements in reproductive performance when cows were milked OAD (Table 1). Cows milked OAD had higher 3-week submission rates (SR; +7.3%) and 3-week pregnancy rates (PR; +7.8%) than those milked TAD. Cows milked OAD conceived 3 days earlier, took 5 days less from calving to conception, and used 11% fewer CIDRs than those milked TAD. There was no effect of milking frequency on 3-week conception rate (CR), 6-week SR, CR or PR, days to 1st oestrus or total number of matings per cow.

Table 1. Average CIDR use, 3-week submission rate (SR), conception rate (CR) and pregnancy rate (PR), time of first oestrus and conception, planned start of mating (PSM) to conception, calving to conception and total number of matings for Holstein-Friesian cows milked once a day (FOAD) or twice a day (FTAD) and Jersey cows milked once a day (JOAD) or twice a day (JTAD). Data are the mean of four years. NS = non-significant, SED = standard error of the difference between treatment means.

Item	FOAD	FTAD	JOAD	JTAD	SED	F vs. J	OAD vs. TAD
CIDR use (%)	5.2	23.7	5.9	9.4	3.4	P<0.05	P<0.001
3-week SR (%)	89.7	79.3	94.4	90.1	3.2	P<0.01	P<0.01
3-week CR (%)	46.5	47.3	53.6	44.1	5.9	NS	NS
3-week PR (%)	41.8	37.4	50.4	39.3	5.0	NS	P<0.10
1 st oestrus date	2-Oct	2-Oct	29-Sep	24-Sep	2.72	P<0.05	NS
Conception date	5-Nov	7-Nov	2-Nov	7-Nov	1.67	NS	P<0.05
PSM to conception (days)	26.1	28.2	23.8	28.4	1.60	NS	P<0.05
Calving to conception (days)	84.5	87.8	84.6	91.6	2.88	NS	P<0.05
No. matings/cow	1.73	1.72	1.68	1.71	0.1	NS	NS

During spring 2006, an experiment was conducted in Taranaki to investigate the effect of diet quality and metabolisable energy intake on milk production in early lactation. The experiment compared the milk production, energy balance and reproductive performance of cows milked either OAD or TAD from calving, and offered either the standard post-calving diet of pasture plus forage supplement, or this diet supplemented with 5 kg DM/cow/day of a high quality grain supplement, for the first 6 weeks post calving. As the cows calved they were randomly allocated to either OAD or TAD milking groups and either standard or concentrate feeding regimes. Cows calved between 26th July and the 24th August.

Post-partum, anoestrus, interval (PPAI) was determined from milk samples collected twice a week and analysed for progesterone. The results (Table 2) demonstrate that cows milked OAD for the first 6 weeks cycle earlier than those milked TAD, and that offering cereal grain to cows milked OAD does not give any additional benefits. Grain feeding to cows milked TAD decreased PPAI by 3 days.

Table 2. Reproductive cycling information for cows milked once a day (OAD) or twice a day (TAD) and offered either a standard pasture/forage supplement (Std) diet or this diet with concentrates (Conc) during spring. NS = non-significant, PPAI = Post-partum, anoestrus, interval.

	OAD - Std	OAD - Conc	TAD - Std	TAD - Conc	Significance OAD vs. TAD
PPAI (days)	30.9	31.4	39.1	36.4	P<0.05
% cycled within 35 days of calving	75	67	50	63	NS
% cycled within 42 days of calving	79	83	66	63	P<0.10
CIDRs used (%)	0	4	8	8	NS

At the Waimate West Demonstration farm (WWDF) a comparison of full-season OAD milking (101 cows, 4.4 Jersey cows/ha) and part-season OAD milking from late January (TAD/OAD; 44 cows, 4.0 Jersey cows/ha) commenced in July 2004. There have been no statistically significant differences in 3-week SR, CR or PR in either the 2004-05 or 2005-06 season, with both herds achieving low empty rates (Table 3). For the current 2006-07 season, the empty rates for the OAD and TAD/OAD herds are 5 and 9%, respectively. However, another 6% of the OAD herd are classified as late calvers. This result is not surprising given the feed pressure that the OAD herd was under through the spring period.

Table 3. Effect of milking cows once a day for a full- (OAD) or part- (TAD/OAD) season on reproductive parameters from 2004 to 2006. SR = submission rate, CR = conception rate, PR = pregnancy rate, PSM = planned start of mating.

	04/05		05/06	
	OAD	TAD/OAD	OAD	TAD/OAD
3-week SR (%)	85	91	95	88
3-week CR (%)	68	79	72	73
3-week PR (%)	57	71	67	64
PR at pregnancy diagnosis (%)	96	96	96	93
PSM to conception (days)	22	25	17.5	20
Calving to conception (days)	84	85	83	84

Analysis of the WWDF calving information has identified that after 2 years of full season OAD milking the mean calving date of the herd has advanced by 7 days, despite no changes in mating start date or the length of the mating period (Table 4). Anecdotal evidence from farmers and more recent research results suggest that cows milked OAD all season cycle earlier and have stronger heats. The 2005-06 season has also seen a reduction in days to conception for the TAD/OAD herd, possibly reflecting an improvement in body condition score of these animals in early lactation.

Table 4. Changes in days from the planned start of mating (PSM) to conception and the mean calving date from 2003 to 2006 when herds are milked once a day for a full- (OAD) or part- (TAD/OAD) season.

	03/04		04/05		05/06	
	OAD	TAD/OAD	OAD	TAD/OAD	OAD	TAD/OAD
PSM to conception (days)	-	-	22	25	17.5	20
Mean calving date	2 Aug	2 Aug	31 Jul	4 Aug	27 Jul	30 Jul

LIC (P. Gatley, pers. comm.) have analysed the SR data of 26,000 heifers milked OAD during the 2004-05 season and compared this to the SR data for heifers milked TAD in the same season. Heifers milked OAD had a 10% higher SR than those milked TAD (Figure 1), a similar result to that observed in the Taranaki experiments. Holstein-Friesian heifers showed the greatest improvement in SR with OAD milking, however, they had the lowest SR when milked TAD.

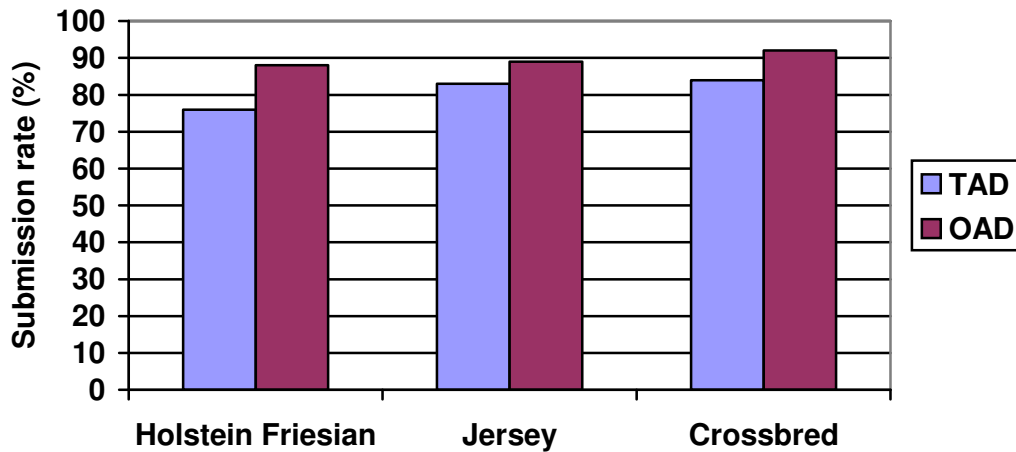


Figure 1. Submission rate for heifers in the national herd milked either twice a day (TAD) or once a day (OAD) during the 2004-2005 season (P. Gatley, LIC, pers. comm.).

Farmer Case Study

Neil and Eileen Bateup are commercial dairy farmers who adopted OAD milking, as Neil had always been concerned that there was too much wastage of high genetic merit, young cows. He believes modern cows are bred to milk, as opposed to looking after themselves, which was manifesting itself as unacceptable empty rates (approximately 10% in 2 and 3 year olds), with 2 year olds often being dried off by the end of February in very thin condition to prepare them for calving the following year. Neil adopted OAD milking for his 2 and 3 year old animals for two years (2002-04), following which he adopted OAD milking for his whole herd. In the 2002-03 season Neil and Eileen had 210, 2 and 3 year old cows. Thirty more 2 year olds were purchased to lift the stocking rate of this herd by 15% and OAD milking began. The OAD milking herd are milked TAD for the 4-5 day colostrum period and then milked in the morning after the TAD herd. They graze the paddocks furthest from the dairy with the remaining 430 TAD cows kept closer.

In all years there have been no CIDRs or inductions used. Cows are artificially bred (AB) for 4 weeks followed by bulls for a further 6.5 weeks giving a total mating period of 10.5 weeks. Kamars are used for heat detection and cows are only checked during the morning milking, no heat detection is done in the paddock.

Neil observed significant improvements in reproductive performance when his 2 & 3 years olds were milked OAD (Table 5; Dalley & Bateup, 2004). Since adopting OAD milking for his entire herd, the high SR (Table 6) and consequently, increased numbers of early, in-calf, AB mated cows, has allowed for more selection pressure on which calves are selected for rearing. Neil has only mated the top 80% of his herd to AB Jersey, the rest being mated to beef sires or short gestation length sires. The replacement rate reared has so far been 20%, which has enabled an increase in herd size as young yearlings are now grazed off and a reasonable level of culling on production (or suitability for OAD milking) has occurred.

The 2006-07 season has seen a rise in the empty rate of the whole herd (Table 6). The vet suspected BVD, however, a subsequent milk test has ruled this out. When the mating data were analysed, half the empty cows were mated to AB and had not

shown any subsequent heats prior to scanning. Like many parts of the country, spring 2006 on the Bateup farm followed a cold wet winter, with consequently lower than desired average pasture cover on the farm. Feed continued to be tight throughout late winter and spring. Neil's mating results suggest that even with OAD milking, good feeding is still required to get good mating results. The fact that half the empty cows showed no heats following their first mating suggests that these animals became anoestrus.

Table 5. Reproductive performance of once-a-day (OAD) and twice-a-day (TAD) milking herds at the Bateup farm for the 02/03 and 03/04 seasons (from Dalley & Bateup, 2004). SR = submission rate.

	02/03		03/04	
	OAD	TAD	OAD	TAD
3-week SR (%)	98.7	88.0	97	85
Empty rate (%)	3	7.6	3.6	8.9

Table 6. Reproductive performance of 2 year olds and the whole herd at the Bateup farm for the 04/05, 05/06 and 06/07 seasons when all cows were milked once a day (OAD). SR = submission rate.

	04/05		05/06		06/07	
	2 yr olds	All cows	2 yr olds	All cows	2 yr olds	All cows
3-week SR (%)	93	92	94	90	95.5	92
4-week SR (%)	-	97	-	94	-	97
6-week SR (%)	-	99	-	98.5	-	99
Empty rate (%)	3	4	3	5	3	9

Conclusions

The research results, together with industry performance data, has indicated that OAD milking can increase 3-week SR, reduce the time from calving to first oestrus (PPAI) and reduce empty rates. However, like other aspects of OAD milking attention to detail is important, and good levels of feeding in early lactation are required to achieve the observed benefits.

References

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