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To compare whole lactation twice-a-day milking with part lactation once-a-day milking at different stages of lactation

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Session 21

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Background

- **Advantages of OAD**
  - Increase labour productivity and reduce costs
  - Uptake of alternative employment
  - Improvement in quality of life
- **Disadvantages of OAD**
  - Reduced milk yield
  - Reduced profitability
- **Change in milking frequency in mid lactation –Why?**
  - Negative effects partially offset by OAD milking for part lactation only
  - OAD in early lactation – easier management of labour peak in spring calving systems, anecdotal evidence of improved body condition and reproductive performance
  - OAD in late lactation – less reduction in milk produced, less labour demand over longer period
- **Objective**
  - **To compare whole lactation twice-a-day milking with part lactation once-a-day milking at different stages of lactation**

Description of study

- **42 spring-calving Holstein-Freisian cows**
  - **Selected on expected calving date, milk yield of the previous lactation and lactation number, SCC**
- **Treatments**
  - **Whole lactation TAD milking (TAD);**
  - **TAD until 21 June and OAD thereafter (TAD/OAD) (110d);**
  - **OAD until 21 June and TAD thereafter (OAD/TAD) (110d);**
- **Cows were placed on treatments from calving**
- **Cow nutrition**
  - **Post grazing sward height maintained at 60mm**
  - **Cows on all 3 treatments received 625 kg concentrate**
- **TAD cows - am and pm. OAD cows - am only**
- **Mean calving date: 2 March**

Measurements

- **Milk production**
  - **yield (daily) and gross composition (weekly)**
- **Live weight and body condition score**
  - **weekly and fortnightly, respectively**
- **Milk quality**
  - **somatic cell count (weekly initially and subsequently fortnightly)**
  - **clinical mastitis incidence**
- **Reproductive performance**
  - **submission, conception and pregnancy rates**
- **Data analysed: standard analysis of variance, fitted using SAS Proc Mixed**

Production Characteristics

(complete lactation)

	Milking frequency			sed	Sig.
	TAD	TAD/OAD	OAD/TAD		
Milk yield, kg/cow	6,131	6,021	5,775	248.5	ns
MS, kg/cow	473.5	469.1	445.6	17.19	ns
Fat, g/100g	4.27	4.33	4.22	0.128	ns
Protein, g/100g	3.46	3.47	3.52	0.058	ns
Lactose, g/100g	4.55	4.47	4.54	0.049	ns
LWT, kg	608 [a]	628 [a]	692 [b]	21.0	**
BCS	2.54 [a]	2.87 [b]	3.07 [b]	0.116	*

Production Characteristics

(start of lactation to 18 June)

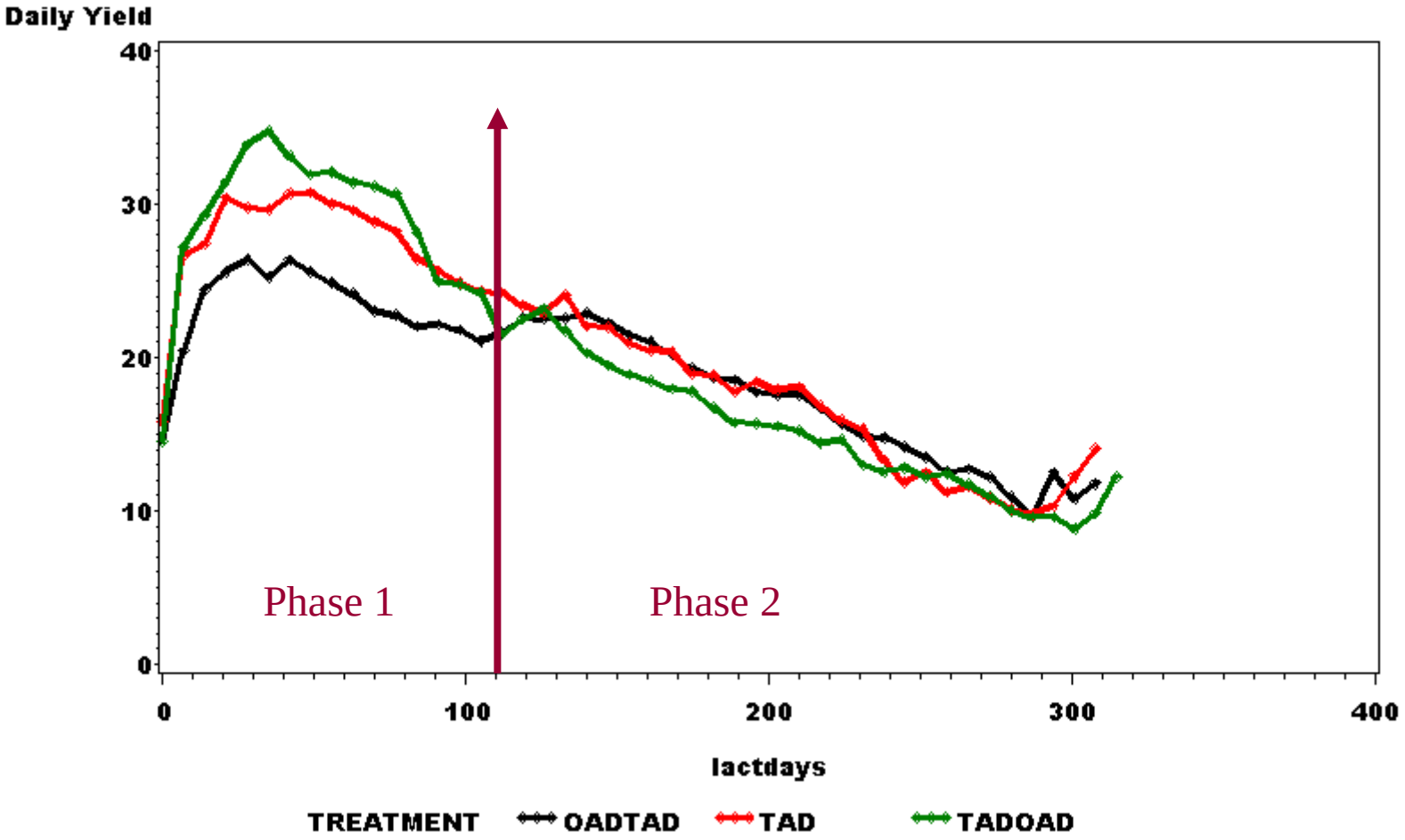
	Milking frequency			sed	Sig.
	TAD	TAD/OAD	OAD/TAD		
Milk yield, kg/cow	2,944 [a]	3,159 [a]	2,561 [b]	160.0	*
MS, kg/cow	225.1 [a]	236.6 [a]	199.6 [b]	10.44	*
Fat, g/100g	4.28	4.21	4.41	0.150	ns
Protein, g/100g	3.39	3.33	3.41	0.048	ns
Lactose, g/100g	4.58	4.56	4.53	0.057	ns
LWT, kg	581	541	633	38.0	ns
BCS	2.57 [a]	2.63 [a]	3.05 [b]	0.108	*

Production Characteristics

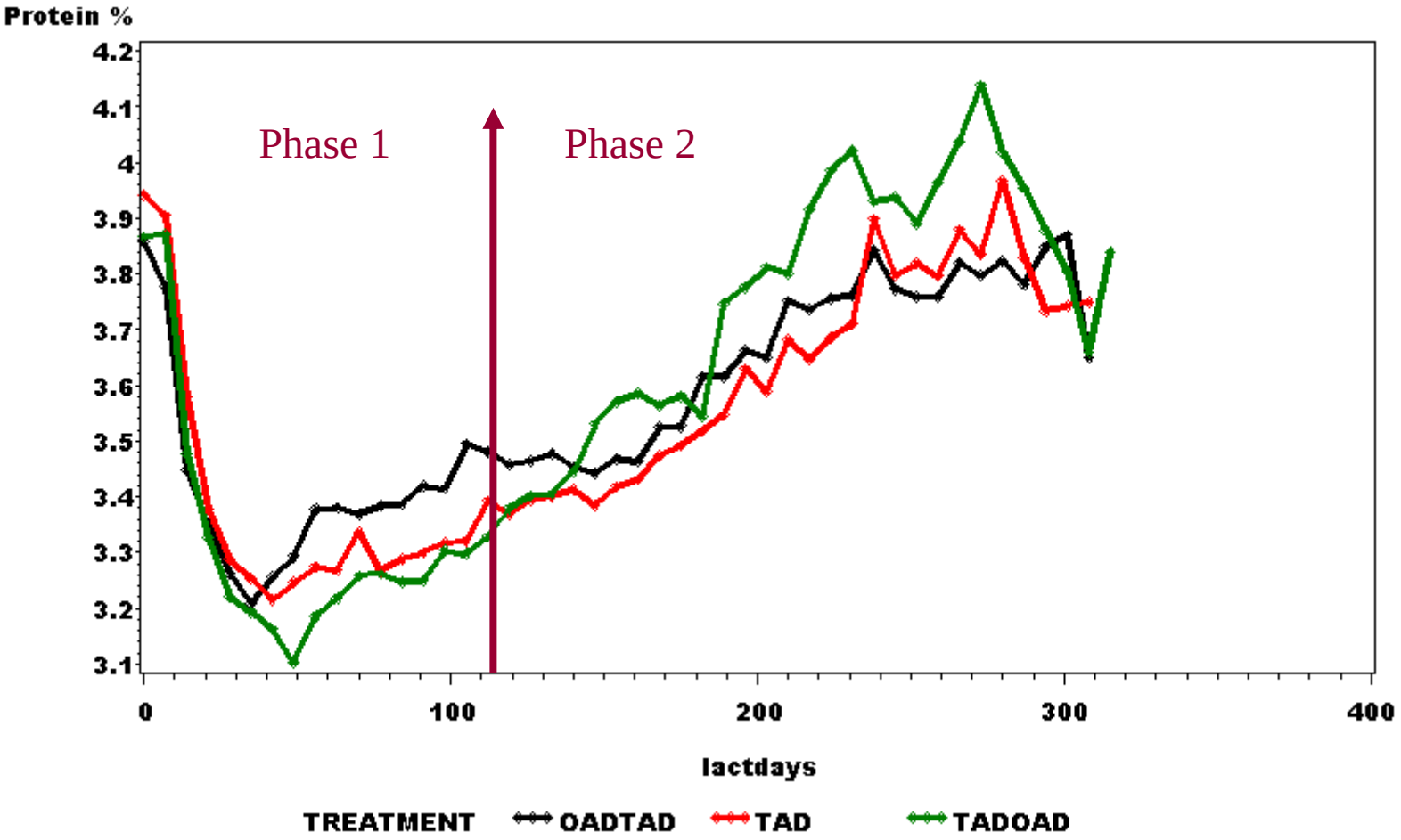
(25 June to end of lactation)

	Milking frequency			sed	Sig.
	TAD	TAD/OAD	OAD/TAD		
Milk yield, kg/cow	3,159	2,799	3,159	184.5	ns
MS, kg/cow	245.8	226.7	241.3	13.46	ns
Fat, g/100g	4.29 ^{ab}	4.47 ^{a}	4.07 ^{b}	0.148	*
Protein, g/100g	3.54	3.64	3.60	0.080	ns
Lactose, g/100g	4.52 ^{b}	4.33 ^{a}	4.55 ^{b}	0.051	**

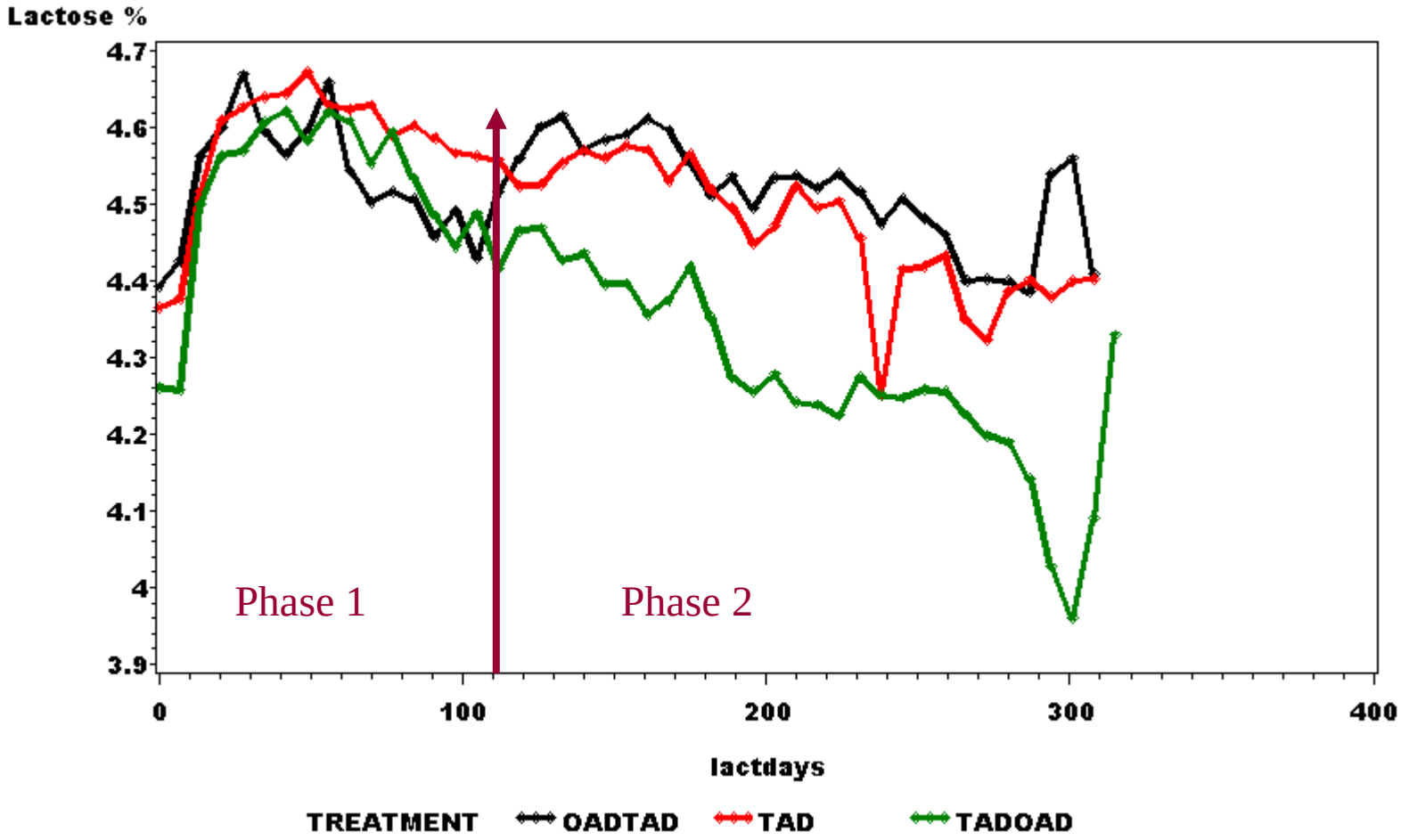
Lactation profile of daily milk yield



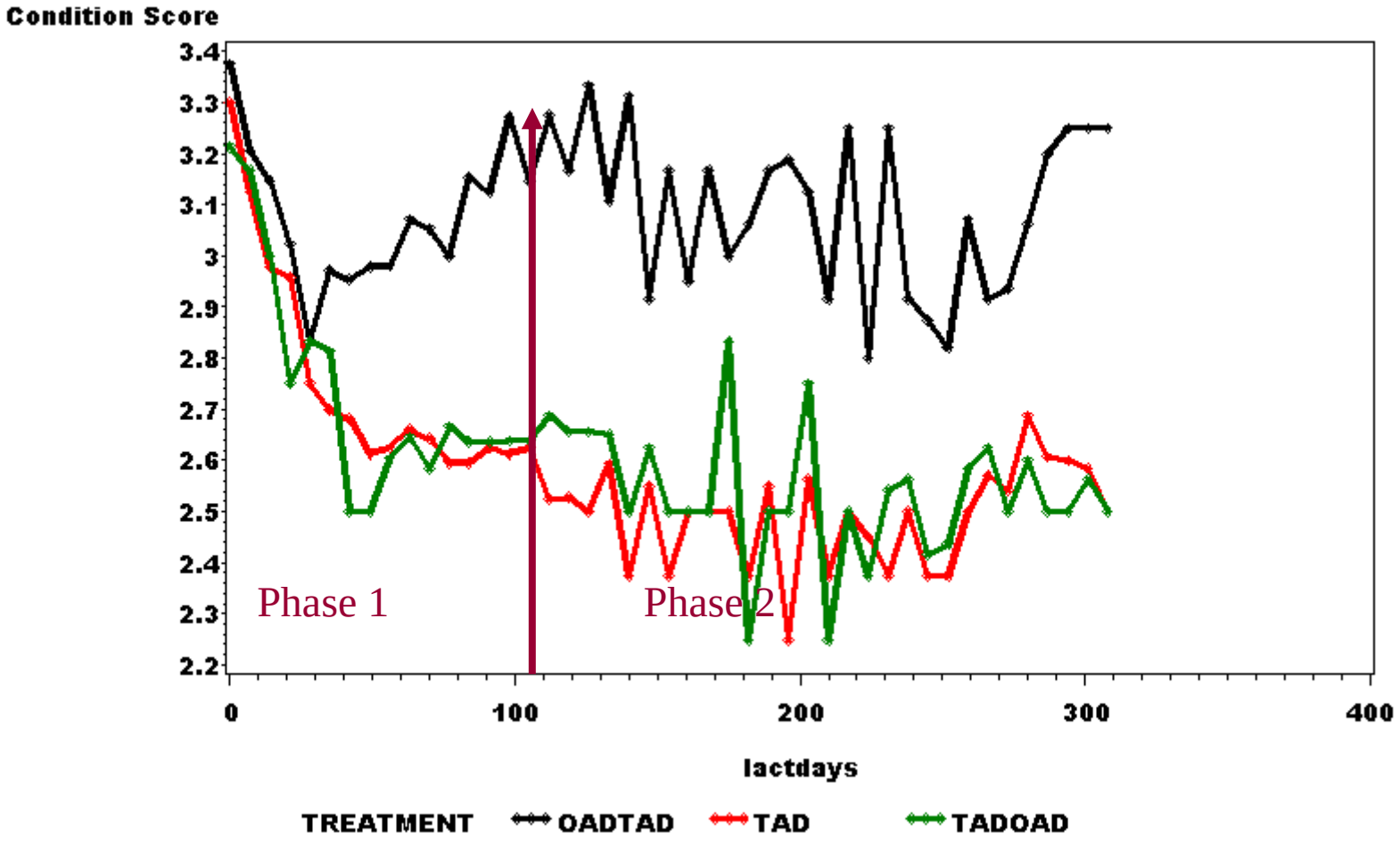
Lactation profile of milk protein content



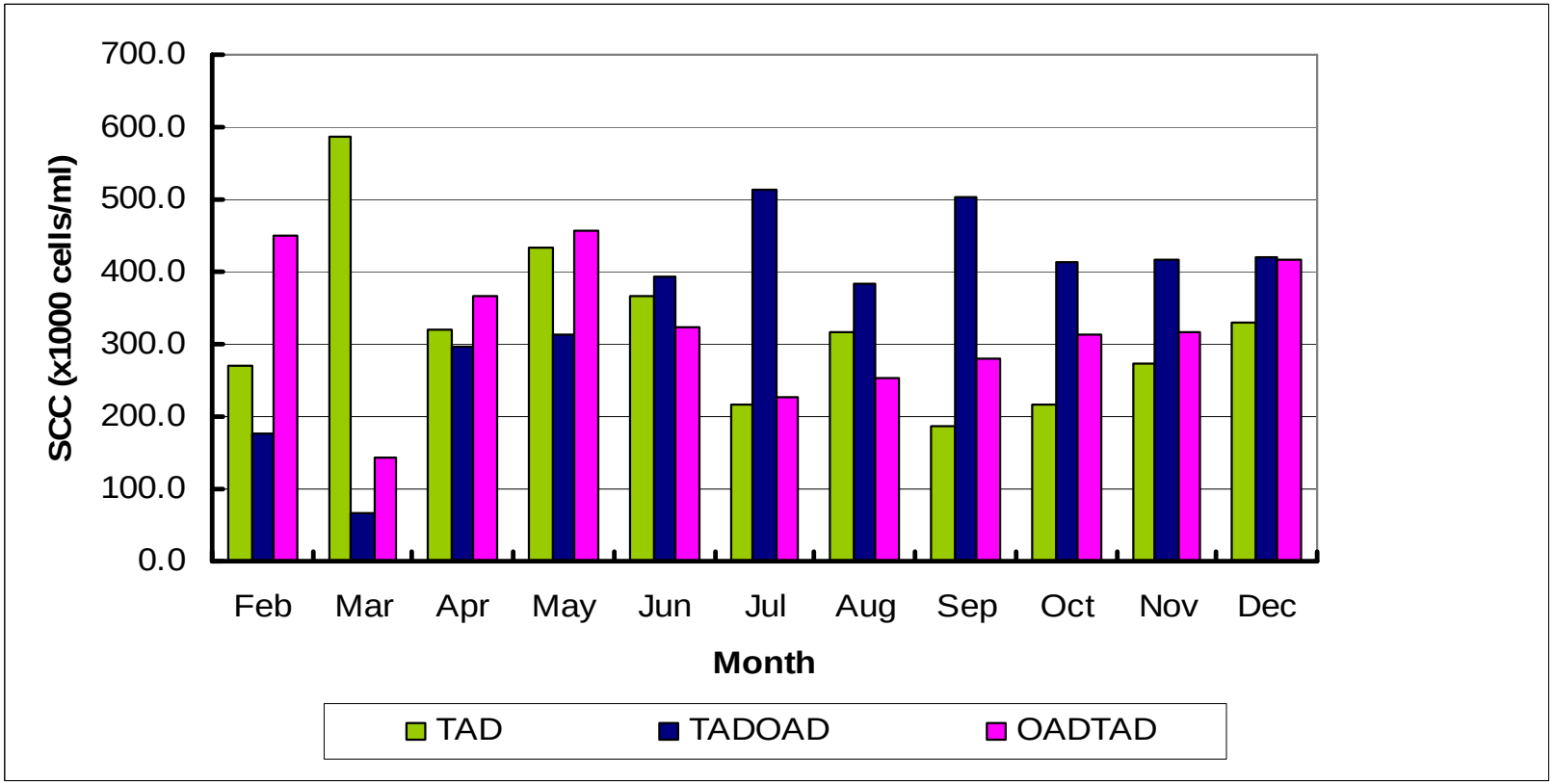
Lactation profile of milk lactose content



Lactation profile of cow body condition score



Effect of milking frequency on udder health



Reproductive performance indicators

Variable	TAD	TAD/ OAD	OAD/ TAD	Sig.
Oestrus detection rate (pre MSD) (%)	43	21	71	*
Submission rate (21 d) (%)	86	36	64	*
Calving to first service interval (d)	61	75	68	**
Overall pregnancy rate (%)	93	64	79	†

Discussion

- **OAD throughout lactation (2005) - MY/cow ↓ 26%; MS yield/cow ↓ 20% compared to TAD**
- **OAD in early or late lactation (before or after 110 d) ↓ MY /cow and MS yield/cow by 5% or less**
- **Clarke et al – NZ (2007) compared OAD with TAD/OAD - Two years, Jersey cows - TAD /OAD produced 12 % more MS per cow than OAD milking**
- **SCC of milk and infection incidences higher with TAD/OAD – challenge high**
- **The lower milk lactose levels - TAD/OAD could have implications for milk processability and milk price (penalty < 4.2%)**
- **Effect of OAD milking in early lactation on BCS pronounced – observed previously**

Conclusion

- For complete lactation: milk yield, MS yield, fat, protein, lactose similar for 3 MF
- Cows milked OAD in early lactation
  - have lower milk yield but increase to same level after change to TAD
  - have higher BCS and retain this after change to TAD
- Cows milked TAD in early lactation and changed to OAD show very poor lactose levels in late lactation
- Changing MF in mid lactation may have–ve impact on SCC
- Merit in milking OAD in early lactation - labour an issue