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Profitability. Sustainability. Competitiveness.

# Effect of milking frequency and nutrition in pasture-based dairy cows during an extended lactation

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# Dairy Farming in New Zealand

- Seasonal pasture-based system
  - 40% Holstein-Friesian (491 kg BW)
  - 13% Jersey (383 kg BW)
  - 39% HFxJ cross (440 kg BW)
- Milk yield = 4,000 kg/year, 22 kg/day at peak
- AI = 75% of cows
- Strategic use of supplements and milking frequency

*New Zealand Dairy Statistics 2010-11*


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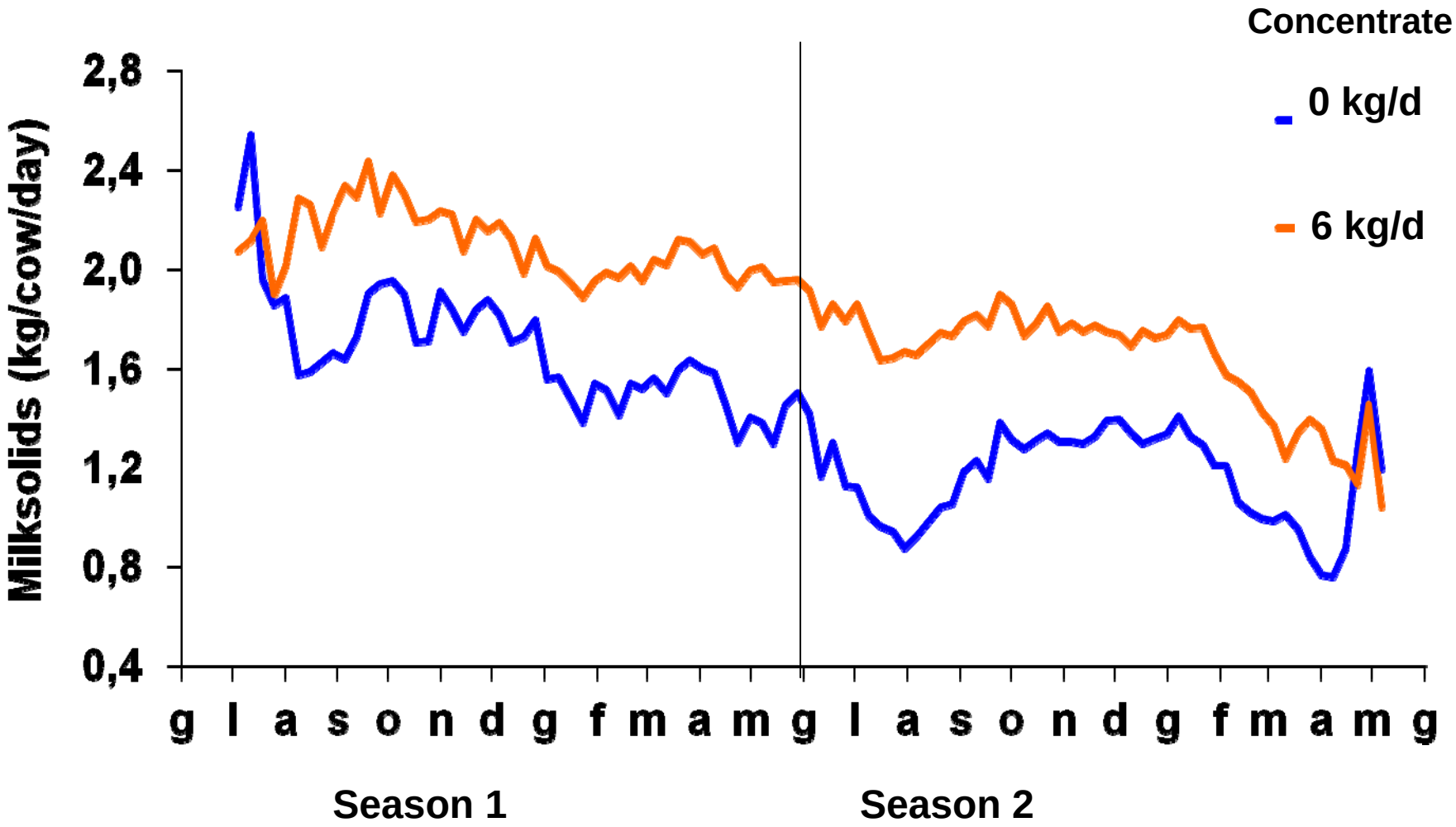
# Extended Lactation: Why?

- Extended lactations (>300 to 650 DIM)
- Improve reproductive function and welfare
- Reduce costs of breeding
- More profit
- More even spread of labour

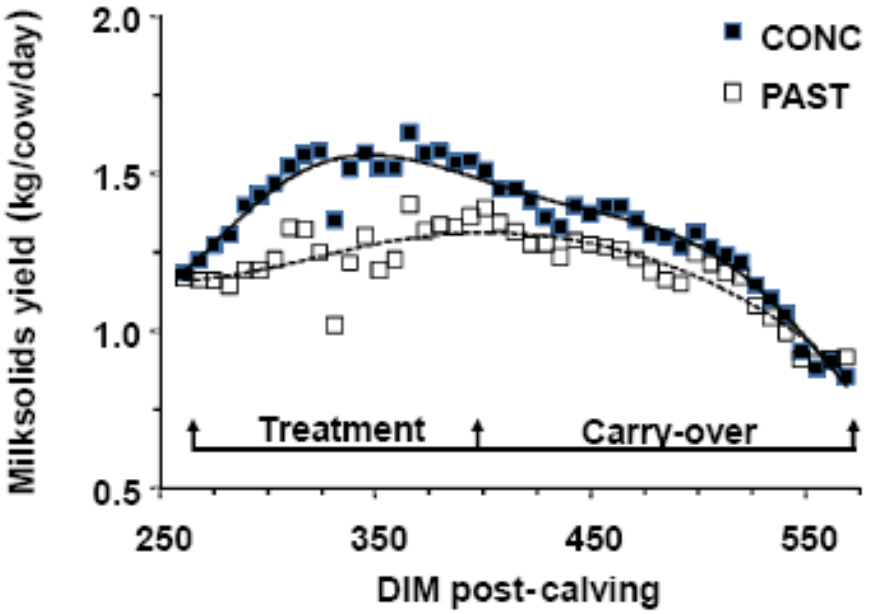
# Milksolids Production During Extended Lactations




Kolver et al., 2007

# Concentrate Supplementation Increased Production in Extended Lactations

- 60 H-F non-pregnant cows (250 DIM)
- Pasture (**Past**) or Past + 5 kg/d DM of concentrate (**Conc**)
- Treatment 11 weeks




**Phyn et al., 2010**

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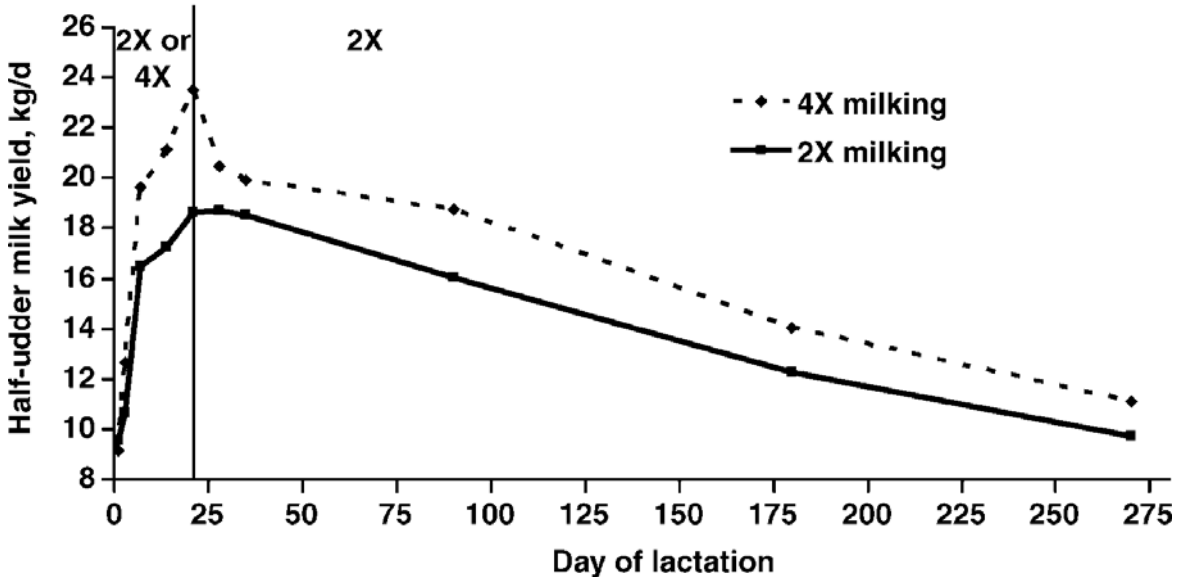
# 4x Increase Milk Production



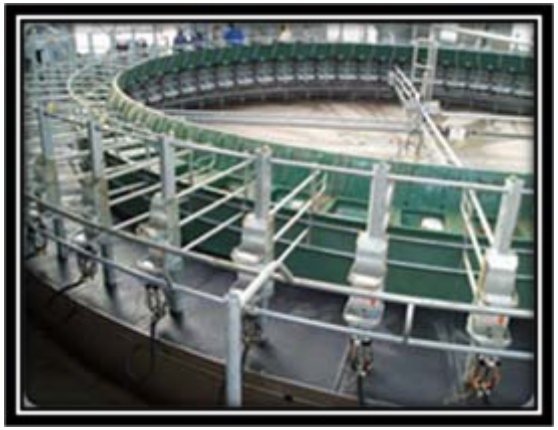

**Wall and McFadden 2008**

- Milking 4x for 4 wk increased milk production (**Hillerton et al., 1990**)

# Objective

- We proposed that concentrate supplementation and 3x milking will increase production during an EL
  - In NZ Holstein-Friesian grazing dairy cows

# Experimental Treatments



- 120 Holstein-Friesian
  - 328 DIM (non-pregnant)
- n = 30 cows/treatment
- Milking frequencies (2x or 3x)
- Diet: Pasture (Pas) or pasture + 6 kg/d DM concentrate (Con)
- Treatments for 9 wks (July – Sept)

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# 3x Increased Milk Production

| | Treatments | | | *P-value* |
|---|---|---|---|---|
| | 2x | 3x | SED | Diet |
| Milk yield (kg) | 757 | 835 | 24 | <0.01 |
| Lactose yield (kg) | 35 | 37 | 1.0 | 0.04 |
| Protein yield (kg) | 32 | 33 | 1.0 | 0.24 |
| Fat yield (kg) | 36 | 37 | 1.2 | 0.65 |
| Lactose, % | 4.65 | 4.52 | 0.02 | <0.001 |
| Protein, % | 4.31 | 4.08 | 0.03 | <0.001 |
| Fat, % | 4.91 | 4.64 | 0.08 | <0.001 |

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# Con increased Milk Production

| | Treatments | | | *P-value* |
|---|---|---|---|---|
| | Pas | Con | SED | Diet |
| Milk yield (kg) | 764 | 828 | 24 | <0.01 |
| Lactose yield (kg) | 34 | 38 | 1.2 | <0.001 |
| Protein yield (kg) | 31 | 34 | 1.0 | 0.01 |
| Fat yield (kg) | 36 | 37 | 1.2 | 0.39 |
| Lactose, % | 4.55 | 4.61 | 0.02 | 0.01 |
| Protein, % | 4.18 | 4.21 | 0.03 | 0.28 |
| Fat, % | 4.88 | 4.68 | 0.08 | <0.01 |

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# Con Increased BW and BCS

| | Treatments | | | | | *P-value* | |
|---|---|---|---|---|---|---|---|
| End of treatment | 2x | 3x | Pas | Con | SED | MF | Diet |
| BW, kg | 533 | 533 | 523 | 544 | 3 | 0.95 | <0.001 |
| BCS | 5.0 | 5.0 | 4.8 | 5.2 | 0.09 | 0.64 | <0.001 |
| End of mating | | | | | | | |
| BW, kg | 599 | 602 | 597 | 605 | 5 | 0.62 | 0.15 |
| BCS | 6.4 | 6.2 | 6.2 | 6.4 | 0.13 | 0.07 | 0.22 |

BCS: 1 to 10 (1 is emaciated and 10 is obese)

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# Con Increased Plasma Hormones

| | Treatments | | | *P-value* |
|---|---|---|---|---|
| | Pas | Con | SED | Diet |
| Insulin, µU/mL | 4.89 | 6.48 | 0.20 | <0.001 |
| IGF-I, ng/mL | 15.4 | 17.9 | 0.62 | <0.001 |
| Growth hormone, ng/mL | 1.83 | 2.19 | 0.11 | <0.001 |
| Leptin, ng/mL | 0.75 | 0.97 | 0.04 | <0.001 |

# Treatments Affected Reproductive Function

| | Treatments | | | | | *P-value* | |
|---|---|---|---|---|---|---|---|
| | 2x | 3x | Pas | Con | SED | MF | Diet |
| 21-d submission rate, % | 98 | 93 | 95 | 97 | 3 | 0.15 | 0.66 |
| 42-d pregnancy rate, % | 83 | 72 | 85 | 71 | 8 | 0.14 | 0.08 |
| First service conception rate, % | 63 | 64 | 73 | 55 | 9 | 0.92 | 0.05 |
| Final non-pregnancy rate, % | 4 | 9 | 4 | 9 | 5 | 0.22 | 0.27 |

# Conclusions

- Milk yield, BCS, BW, and plasma hormones increased with concentrate supplementation
- Milk yield but not MS increased with 3x
- No carryover effect

# Thank you!