Recent advances in pasture-based automatic milking systems

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Viability of Australian AMS

- AMS opportunity: lifestyle, conditions of work, decrease labour and/or shift in time
- Low cost critical, high international milk price volatility.
- Low cost = high pasture and robot utilisation
- *Can AMS follow well established pasture management principles?*
- *Can we achieve AMS grazing systems to fully utilise milking robots across the 24 hours of a day?*

1. Conventional vs automatic milking pasture utilisation
2. 24h robot utilisation

1. Pasture Utilisation

– *Can AMS follow well established pasture management principles?*

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Original Article

A comparison of conventional and automatic milking system pasture utilization and pre- and post-grazing pasture mass

C. E. F. Clark ✉, S. R. Farina, S. C. Garcia, M. R. Islam, K. L. Kerrisk, W. J. Fulkerson

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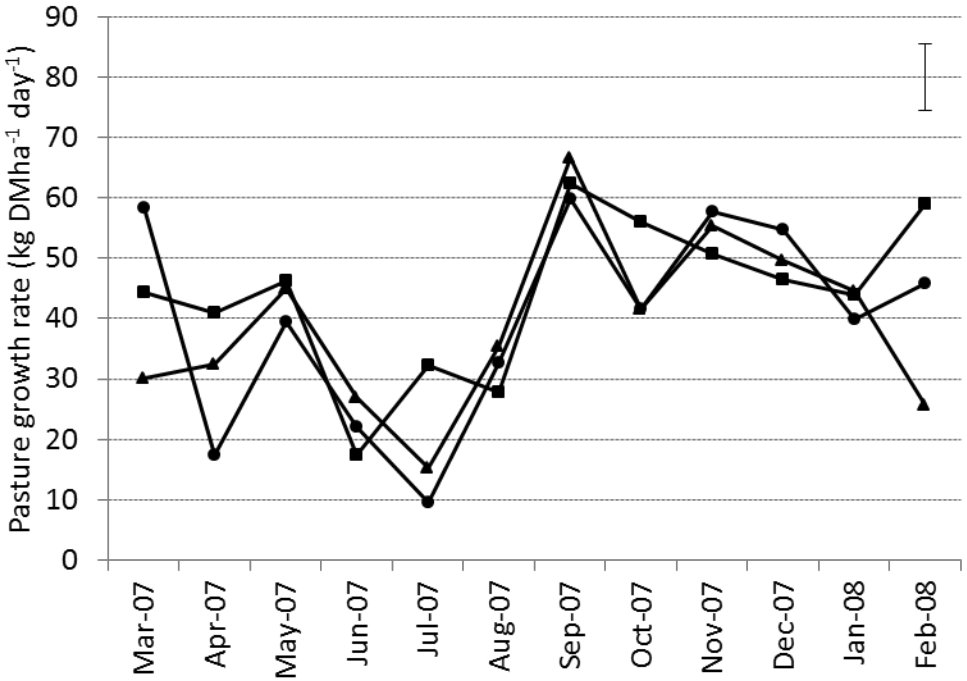
- CMS: moderate stocking rate (MSR) (9.5ha, 30 cows, 2.5 cows/ha) and high stocking rate (HSR) (6.5ha, 30 cows, 3.8 cows/ha)
- AMS: 3.1 cows/ha, 41 ha, 128, mixed breed (Friesian, Illawarra and crossbred)

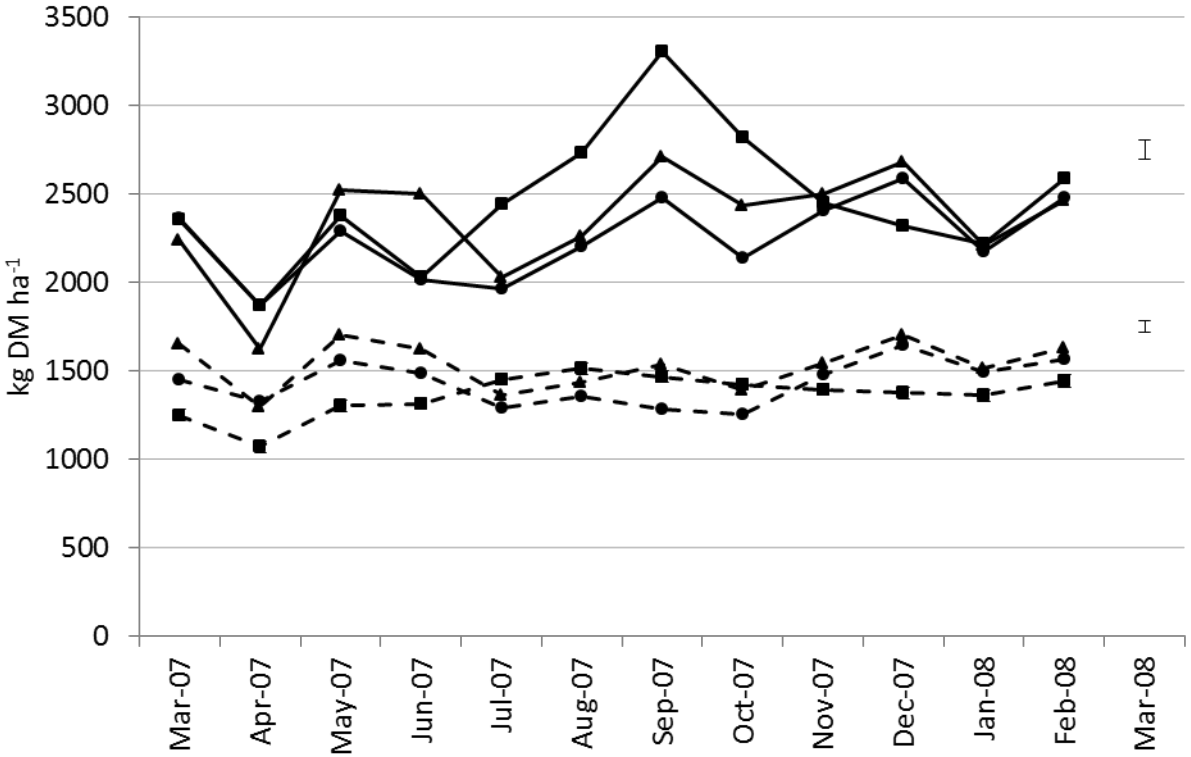
Results



- matching daily pasture consumption with pasture growth rate
- maintain a whole farm system pasture mass of around 2,000kgDM/ha (±200kgDM)
- pre- and post-grazing mass of 2,600 and 1,500kgDM/ha (±200kgDM), respectively

(Holmes and Roche, 2007; Garcia and Holmes, 2005).

Results


3500
3000
2500
2000
1500
1000
500
0
kg DM ha-1
Mar-07
Apr-07
May-07
Jun-07
Jul-07
Aug-07
Sep-07
Oct-07
Nov-07
Dec-07
Jan-08
Feb-08
Mar-08

Results

	System				
	MSR	**HSR**	**AMS**	**s.e.d.**	***P*-value**
Pre-grazing pasture mass (kg DM/ha)	2,330^{ab}	2,226^{b}	2,478^{a}	80	0.02
Post-grazing pasture mass (kg DM/ha)	1,496^{a}	1,403^{b}	1,355^{b}	42	0.01
Pasture utilised (kg DM/ha/yr)	12,987	13,015	14,518	1,522	0.54

Conclusion

- *Can AMS follow well established pasture management principles?*

2. Improving milking robot utilisation

- Can we achieve AMS grazing systems to fully utilise milking robots across the 24 hours of a day?

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animal

Review: Milking robot utilization, a successful precision livestock farming evolution

A. J. John[1†], C. E. F. Clark[1], M. J. Freeman[2], K. L. Kerrisk[1], S. C. Garcia[1] and I. Halachmi[3]

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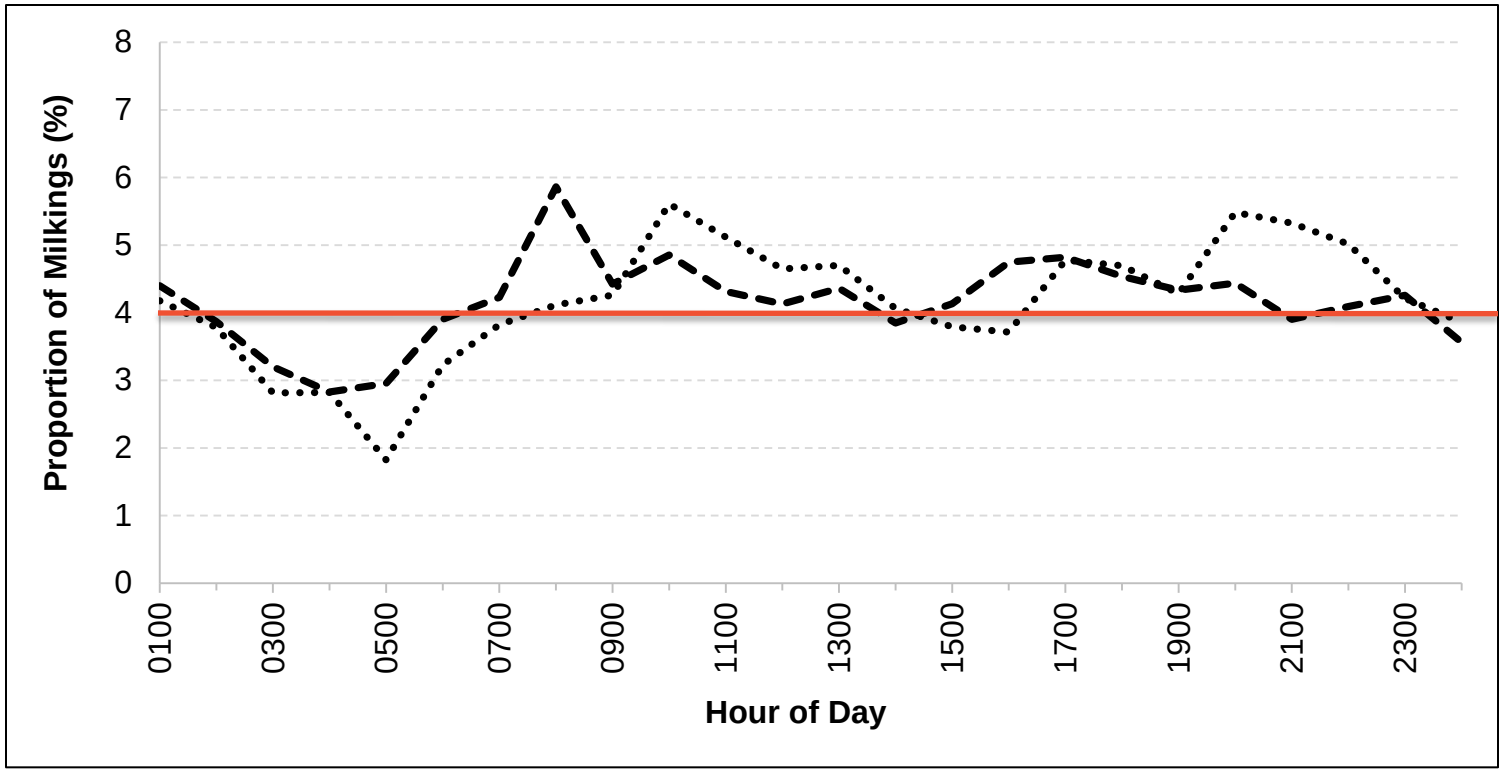
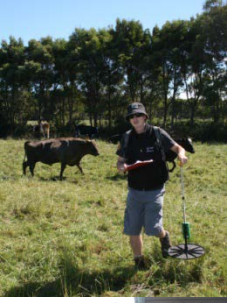
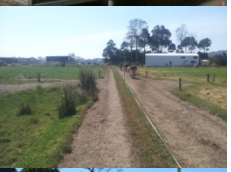
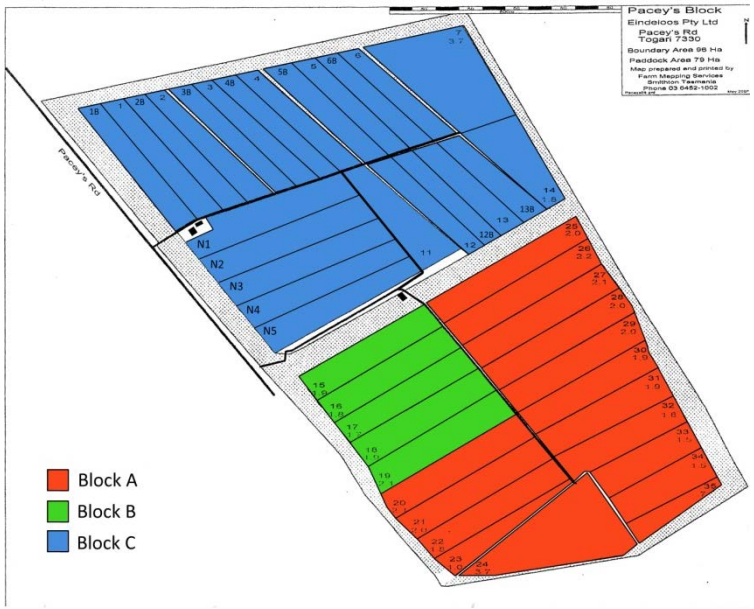


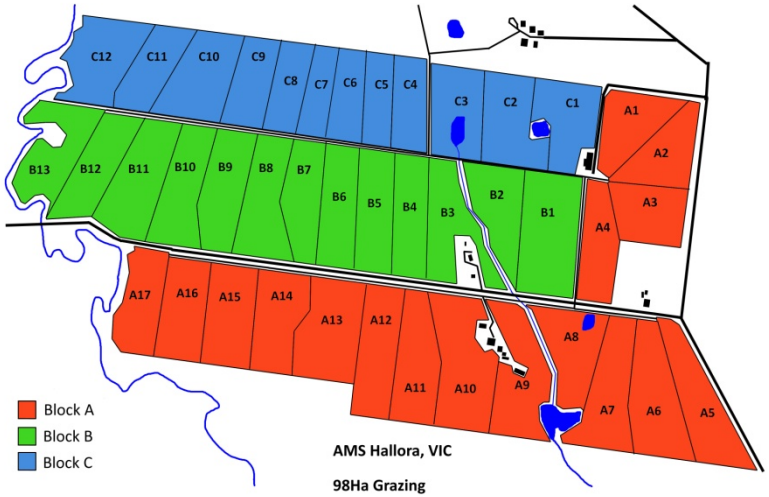




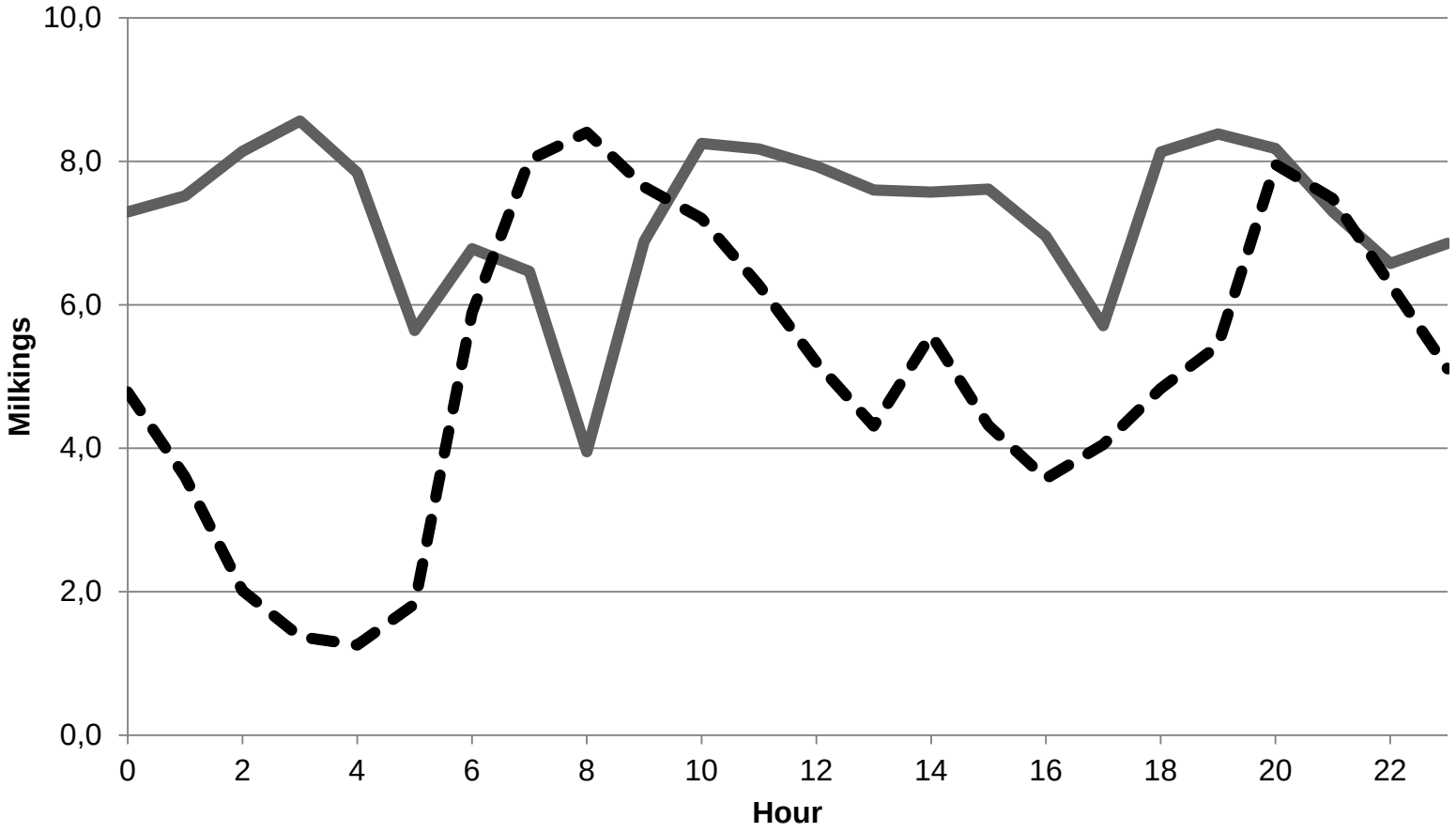
TAS – Farm A



VIC – Farm B



Results



Results

Allocation	Gate Times	Feed Offered (pasture + silage)	% of Total Feed Offered	Active Access Time	% Daily Feed / Hour
A	0930-1730	6.7 ± 1.3	47%	8	5.9%
B	1730-0230	2.1 ± 0.6	15%	9	1.7%
C	0230-0930	5.3 ± 1.3	38%	7	5.4%

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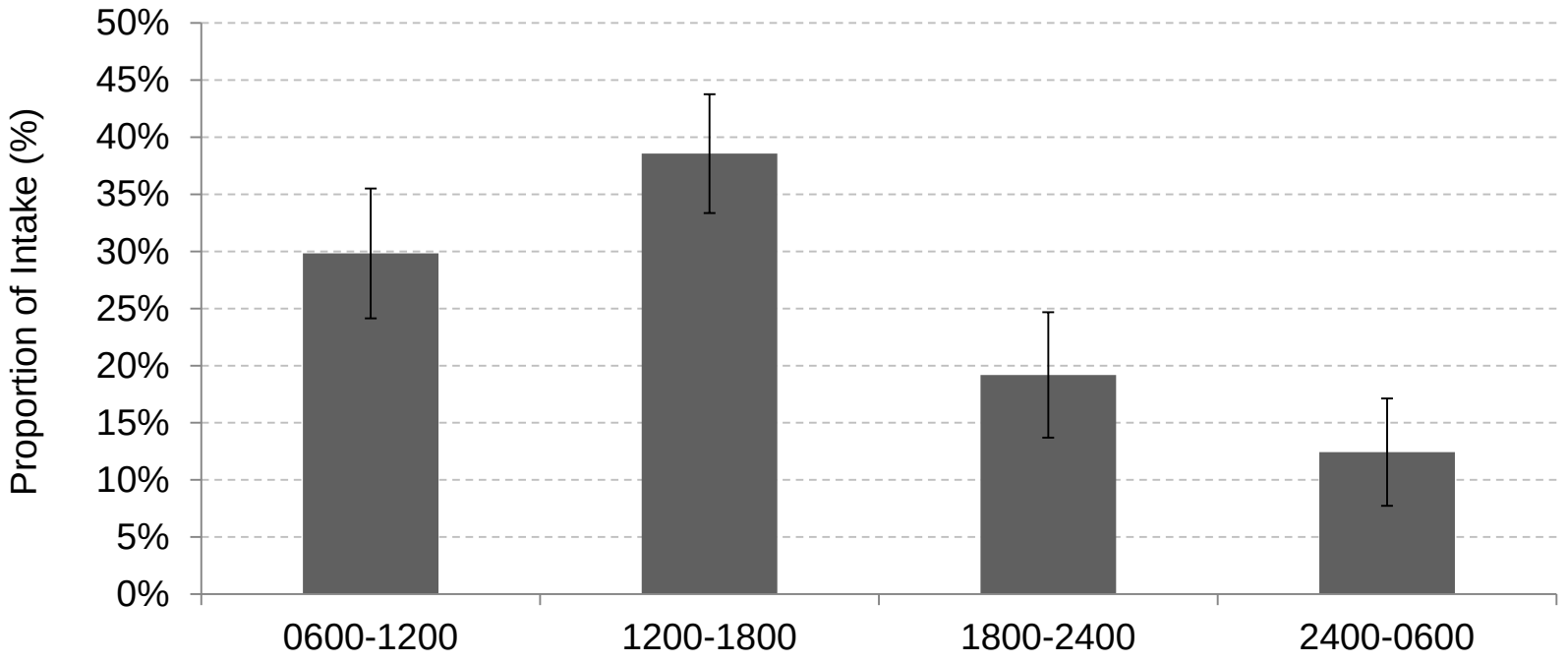
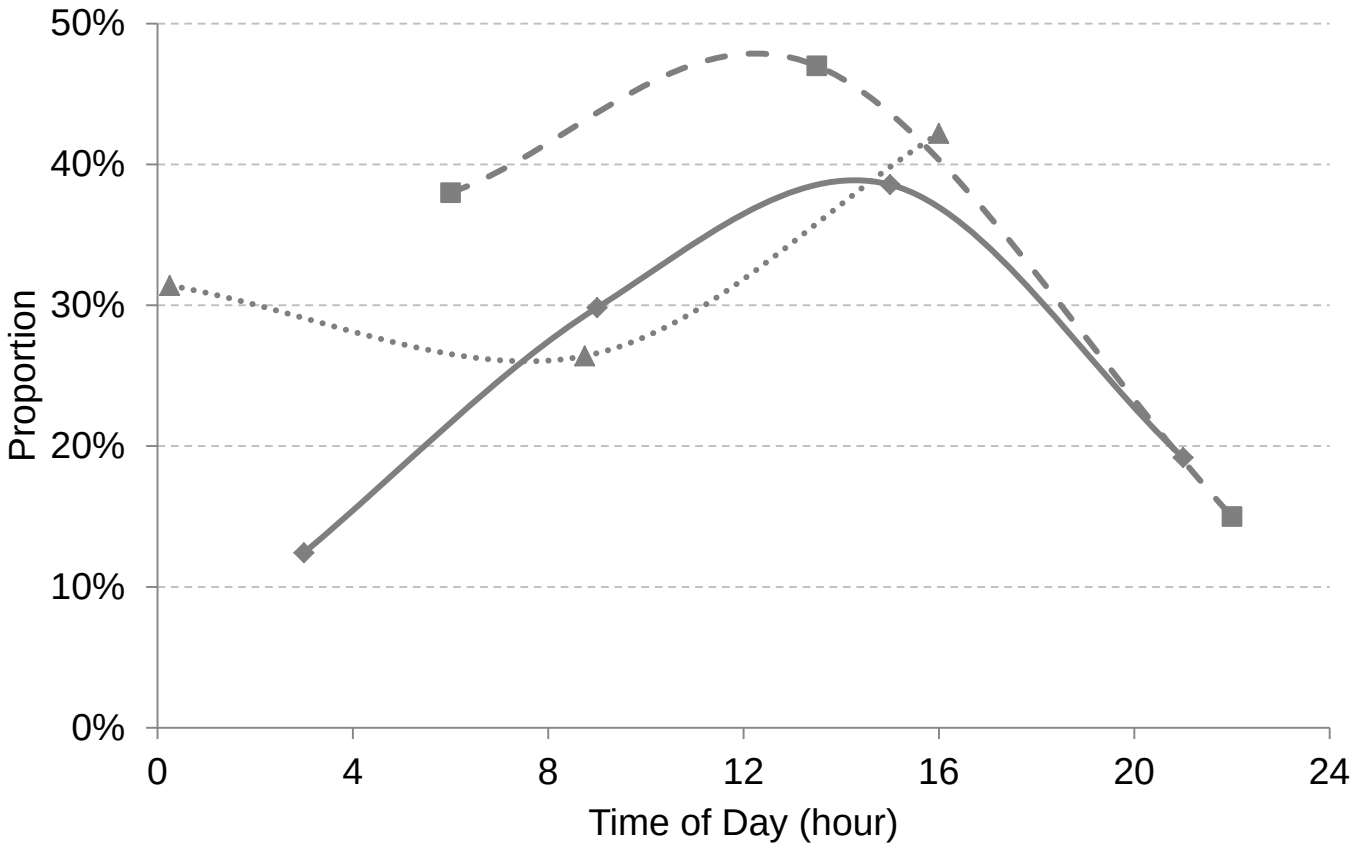


John et al. 2016; Precision Dairy Conference

Results



Conclusions

Can we achieve AMS grazing systems to fully utilise milking robots across the 24 hours of a day?

- Predominantly driven by diurnal variability in feed intake
- 30% increase in milking robot utilisation through a simple change in how we offer feed on farms

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