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?

- 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

The graph shows the results over time, with data points for each month from March 2007 to March 2008. The x-axis represents the months, and the y-axis represents kg DM ha$^{-1}$. The graph indicates fluctuations in the data, with peaks and troughs visible throughout the year.
## Results

![Image of cows in a milking system](image.png)

<table>
<thead>
<tr>
<th>System</th>
<th>MSR</th>
<th>HSR</th>
<th>AMS</th>
<th>s.e.d</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-grazing pasture mass (kg DM/ha)</td>
<td>2,330&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>2,226&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2,478&lt;sup&gt;a&lt;/sup&gt;</td>
<td>80</td>
<td>0.02</td>
</tr>
<tr>
<td>Post-grazing pasture mass (kg DM/ha)</td>
<td>1,496&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1,403&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1,355&lt;sup&gt;b&lt;/sup&gt;</td>
<td>42</td>
<td>0.01</td>
</tr>
<tr>
<td>Pasture utilised (kg DM/ha/yr)</td>
<td>12,987</td>
<td>13,015</td>
<td>14,518</td>
<td>1,522</td>
<td>0.54</td>
</tr>
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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?
Review: Milking robot utilization, a successful precision livestock farming evolution

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(Received 17 June 2015; Accepted 16 February 2016)
TAS – Farm A

VIC – Farm B
Results
## Results

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<th>Allocation</th>
<th>Gate Times</th>
<th>Feed Offered (pasture + silage)</th>
<th>% of Total Feed Offered</th>
<th>Active Access Time</th>
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<td>A</td>
<td>0930-1730</td>
<td>6.7 ± 1.3</td>
<td>47%</td>
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<td>5.9%</td>
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<tr>
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![Proportion of Intake (%) chart](image)
Results

![Graph showing time of day vs proportion]

- The graph illustrates the proportion of events occurring at different times of the day.
- The x-axis represents the time of day (hour) ranging from 0 to 24.
- The y-axis represents the proportion ranging from 0% to 50%.
- The data points suggest a peak in the proportion during midday, around 12 hours.
- The graph includes three lines, each representing different data sets or categories.
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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