Feeding and transport of bobby calves

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Bobby calves in Australia

- Bobby calves are largely male dairy calves
- Low value, by-product of milk production
- Seasonal
- Slaughtered around 5 days of age
- Transported for up to 10 hours
- Off feed for up to 30 hours
- Often difficult to handle as a group
Factors that may affect welfare outcomes

- Colostrum and feeding management
- Conditions in holding yards
- Total duration of travel
- Stocking density during transport
- Flooring in truck
- Handling during loading, unloading and at the abattoir
- Age at transport
- Total time off feed
The effect of feeding practices

- Calves are fed either once or twice/day
- Recommended amount is 10% of body weight

- Naturally calves feed 5-12 times/day
- From 2 days old calves may drink as much as 20% of body weight
Aims

• To compare once and twice daily feeding of calves up to 8 days old

• To compare feeding 10% (~4 l) compared to 20% (~8 l) of body weight.
Treatments

Calves from 3 to 8 day old were fed milk replacer either once or twice daily.

1) 10% of body weight daily over one meal (1 x 10%); 
2) 10% of body weight daily over two meals (2 x 5%); or 
3) 20% of body weight fed over two meals (2 x 10%).

At the start of the experiment calves were an average of 44kg bodyweight
Measurements

- Milk intake at each meal
- Daily bodyweight
- Behaviours: time spend drinking, time spend sucking when no milk is present (non-nutrient), time spend lying.
- A novel arena test was conducted as a measurement of alertness and exploration.
- Blood samples were taken on days 4 and 8 for a 24hr period. Blood samples were analysed for glucose, NEFA, cortisol, PCV, insulin and beta-hydroxybutyrate.
Daily milk intake (l) from 3 to 8 days old
## Non-nutrient sucking

<table>
<thead>
<tr>
<th>Measurement</th>
<th>1 x 10%</th>
<th>2 x 5%</th>
<th>2 x 10%</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Day 3</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bouts</td>
<td>11</td>
<td>13</td>
<td>12</td>
<td>0.83</td>
</tr>
<tr>
<td>Time</td>
<td>620</td>
<td>770</td>
<td>740</td>
<td>0.78</td>
</tr>
<tr>
<td><strong>Day 7</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bouts</td>
<td>11</td>
<td>22</td>
<td>10</td>
<td>0.0023</td>
</tr>
<tr>
<td>Time</td>
<td>480</td>
<td>1260</td>
<td>490</td>
<td>0.00060</td>
</tr>
</tbody>
</table>
Concentrations of glucose (mmol/l) and NEFA (mmol/l) of calves at 8 days old
Conclusion

- Feeding twice daily offers benefits to calves up to day 4 of life when feeding to 10% of bodyweight

- Feeding 20% of bodyweight (over 2 meals) was beneficial after day 4 to satisfy feeding motivation and nutrition for growth.
Transport of bobby calves

- Transported at 5 days of age
- Transported up to 10 hours
- Off feed for up to 30 hours
- Conditions during transport/saleyard
- Handling during (un)loading and at the abattoir
Effect of age, flooring and stocking density during road transport of bobby calves
Animal Welfare Code of Practice

- Calves need to be at least in their 5th day of life to be transported for slaughter
- Younger calves may be transported for a maximum of 6 hours to a breeding facility, however bedding needs to be provided
- Calves need to be given sufficient space to lie down, although a specific space allowance is not prescribed
Objective

The objective of this study was to identify the **space allowance** requirements for transport of bobby calves and to understand factors such as **age** and **flooring** that minimise risks to welfare during transport of bobby calves.
Methods

- Dedicated truck with movable compartments, transport for 12 hours
- Stocking densities: 0.2 m², 0.3 m², 0.5 m²
- Age: 3, 5 and 10 day old
- Flooring: straw, mesh, solid
- A total of 432 male calves were transported during 12 trips over 2 years
- Average weight was 38kg
Calves in transport
Measurements

Blood samples
- prior to loading,
- after unloading and
- after recovery
  - Glucose, packed cell volume (PCV), beta-hydroxybutyrate (BOHB), creatin kinase (CK)

Lying behaviour during transport (video observations)

Behaviour for 12 hrs during recovery after transport
Effect of **age** on behaviour and physiology before, during and after transport, and after 12 hours of recovery

<table>
<thead>
<tr>
<th>Measurement</th>
<th>3 days</th>
<th>5 days</th>
<th>10 days</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lying (%)</td>
<td>59</td>
<td>48</td>
<td>42</td>
<td>3.0 × 10^{-5}</td>
</tr>
<tr>
<td>Glucose</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre loading</td>
<td>6.9</td>
<td>6.1</td>
<td>6.2</td>
<td>0.016</td>
</tr>
<tr>
<td>After transport</td>
<td>6.2</td>
<td>5.8</td>
<td>5.8</td>
<td>0.037</td>
</tr>
<tr>
<td>After recovery</td>
<td>4.5</td>
<td>4.2</td>
<td>4.2</td>
<td>0.081</td>
</tr>
<tr>
<td>Drinking bouts at Recovery</td>
<td>1.0</td>
<td>1.8</td>
<td>3.3</td>
<td>9.1 × 10^{-6}</td>
</tr>
</tbody>
</table>
Effect of **flooring** on behaviour and physiology during and after transport and after 12 hours of recovery

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Solid</th>
<th>Mesh</th>
<th>Straw</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lying (%)</td>
<td>41</td>
<td>45</td>
<td>63</td>
<td>0.00012</td>
</tr>
<tr>
<td>CK</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>After transport</td>
<td>240</td>
<td>330</td>
<td>180</td>
<td>0.0045</td>
</tr>
<tr>
<td>After recovery</td>
<td>170</td>
<td>200</td>
<td>130</td>
<td>0.0085</td>
</tr>
</tbody>
</table>
## Results

<table>
<thead>
<tr>
<th>Measurement/space</th>
<th>0.2m²</th>
<th>0.3m²</th>
<th>0.5m²</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time spend lying (%) during transport</td>
<td>52</td>
<td>45</td>
<td>52</td>
<td>0.069</td>
</tr>
<tr>
<td>Lying (%) sd</td>
<td>20</td>
<td>13</td>
<td>12</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Posture changes</td>
<td>10</td>
<td>16</td>
<td>17</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>CK value</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- After 12h transport</td>
<td>490</td>
<td>200</td>
<td>150</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>- After 12h recovery</td>
<td>260</td>
<td>130</td>
<td>110</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
Conclusions (age and flooring)

- 3-day old calves lie down more than older calves during transport, therefore a comfortable area to lie down may be more important for these calves.

- Calves lie down more on straw bedding compared to solid or mesh flooring.
Conclusions (space allowance)

- Total lying time did not differ between space allowance treatments
- Higher variation in lying behaviour and less posture changes with less space indicates that calves with a space allowance of 0.2m² were not able to lie down and get up unobstructed.
- The large increase in CK after transport at 0.2m² may indicate either increased bruising or increased muscle fatigue.
- Therefore the variation in lying behaviour and the number of posture changes provide additional information on comfort during transport.
- The results would suggest that calves should be transported at a space allowance of at least 0.3m².