Learning from Cash Cow – The Northern Australia Beef Fertility Project

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Cash Cow project team

Cash Cow producers and cattle vets
The Cash Cow project sought answers to 2 fundamental questions

• Why do some cows become pregnant quickly after calving whilst others take significantly longer, or fail to become pregnant?
• Why do some pregnant cows successfully wean their calf whilst others fail to do so?
• However, during the course of the project we developed a more holistic approach focused on answering the question ‘how is my breeding herd performing in relation to what is practically achievable in this environment’.
### Estimating business KPI’s using readily available data – ‘The BRICK’

<table>
<thead>
<tr>
<th>Measure</th>
<th>Value</th>
<th>Measure</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Branding rate (Cₘ mated)</td>
<td>74%</td>
<td>Herd size</td>
<td>4,656 AE</td>
</tr>
<tr>
<td>Weaning rate</td>
<td>72%</td>
<td>Average annual steer growth</td>
<td>170 kg/yr</td>
</tr>
<tr>
<td>Branding rate (C retained)</td>
<td>91%</td>
<td>Weaner production</td>
<td>183 kg/cow</td>
</tr>
<tr>
<td>Lactation rate</td>
<td>90%</td>
<td>Herd LWP</td>
<td>168 kg/AE</td>
</tr>
<tr>
<td>Heifers as replacements</td>
<td>86%</td>
<td>Breeding cattle LWP</td>
<td>161 kg/AE</td>
</tr>
<tr>
<td>Average herd size change</td>
<td>5%</td>
<td>Steer LWP</td>
<td>187 kg/AE</td>
</tr>
<tr>
<td>Mortality: Female weaners</td>
<td>1.9%</td>
<td>Herd LWP ratio</td>
<td>0.37 kg/kg</td>
</tr>
<tr>
<td>Mortality: Yearling heifers</td>
<td>1.9%</td>
<td>Breeding cattle LWP ratio</td>
<td>0.36 kg/kg</td>
</tr>
<tr>
<td>Mortality: Heifers 2-3 yrs</td>
<td>2.3%</td>
<td>Steer LWP ratio</td>
<td>0.42 kg/kg</td>
</tr>
<tr>
<td>Mortality: Cows</td>
<td>5.2%</td>
<td>Income</td>
<td>$1.43 /kg</td>
</tr>
<tr>
<td>Mortality: Spays</td>
<td></td>
<td>Cost of production</td>
<td>$0.95 /kg</td>
</tr>
<tr>
<td>Mortality: Male weaners</td>
<td>1.9%</td>
<td>Operating margin</td>
<td>$0.48 /kg</td>
</tr>
<tr>
<td>Mortality: Yearling males</td>
<td>2.3%</td>
<td>Labour</td>
<td>$0.30 /kg</td>
</tr>
<tr>
<td>Mortality: Males 2-3 years</td>
<td>5.7%</td>
<td>Mortality effect on sales</td>
<td>-$0.23 /kg</td>
</tr>
<tr>
<td>Mortality: Mature males</td>
<td>8.3%</td>
<td>Income</td>
<td>$241 /AE</td>
</tr>
<tr>
<td>Mortality: Bulls</td>
<td>1.0%</td>
<td>Variable costs</td>
<td>$4 /AE</td>
</tr>
<tr>
<td>Sold: Male weaners</td>
<td>4%</td>
<td>Gross Margin</td>
<td>$237 /AE</td>
</tr>
<tr>
<td>Sold: Male yearlings</td>
<td>3%</td>
<td>Overhead costs</td>
<td>$155 /AE</td>
</tr>
<tr>
<td>Sold: Males 2-3 years</td>
<td>71%</td>
<td>EBIT</td>
<td>$83 /AE</td>
</tr>
<tr>
<td>Sold: Mature males</td>
<td>27%</td>
<td>Labour</td>
<td>$50 /AE</td>
</tr>
<tr>
<td>Female / Total sales</td>
<td>48%</td>
<td>Bull costs</td>
<td>$24 /weaner</td>
</tr>
</tbody>
</table>

LWP – liveweight production
Measuring beef production

• If I retain 500 cows at the end of the year how much beef can I potentially sell 12 months later

• Annual liveweight production - annual change in total weight of cows adjusted for mortality plus weaner production
Weaner production is easy to measure, and provides a good estimate of annual live weight production. Annual total number of calves weaned multiplied by average weaner weight, divided by number of females retained the previous year.

Weaner production (kg/cow retained) by country type.
What is commercially achievable beef production?

Northern Forest

Weaner Production (kg/cow retained)

Commercially achievable performance by country type
Weaner production is similar to annual steer growth.
Measuring reproductive performance and identifying the major factors affecting performance – a key objective of Cash Cow performance of ~78,000 cows managed in 142 breeding mobs located on 72 properties monitored over 3 to 4 years.
Cash Cow country types and producer estimates of annual steer growth:

- **N Forest** – 100kg p.a
- **C Forest** – 180kg p.a
- **N Downs** – 170kg p.a
- **S Forest** – 200kg p.a
Data collected during the Cash Cow project

First reproductive cycle for Pilot Heifers
- 2008 PD Muster
- 2009 WD Muster

First reproductive cycle for Main Heifers and Breeders
- 2009 PD Muster
- 2010 WD Muster

Second reproductive cycle for Main Heifers and Breeders
- 2010 PD Muster

Second reproductive cycle for Pilot Heifers
- 2011 WD Muster
- 2011 PD Muster

2009 Weaning data
2010 Weaning data
2011 Weaning data

Induction resource, breeder and bull management surveys

Nutrition & Management
- NIRS Mar 2009
- NIRS Sep 2009
- NIRS Mar 2010
- NIRS Sep 2010
- NIRS Mar 2011
- NIRS Sep 2011

Disease
- 1st blood sample collected for Pilot Heifers & Breeders
- * 1st blood sample collected for Main Heifers and Breeders
- * 1st vaginal swab collected for Pilot and Main Heifers and Breeders
- 2nd blood sample collected for Main Heifers
- * 1st 2011 blood sample collected for Pilot and Main Heifers and Breeders
- * 2nd 2011 blood sample collected for Pilot Heifers and Breeders
- * 1st 2011 vaginal swab collected for Pilot and Main Heifers and Breeders

Management & template data
12 to 20 pieces of data on factors affecting cow and heifer performance electronically recorded at first annual weaning muster and/or at pregnancy test muster for 3 to 4 years.

Cows processed per hour

~8% of NLIS tags needed to be replaced
The Cash Cow measures of reproductive performance

- Percentage of lactating cows pregnant within 4 months of calving - a measure of the proportion of cows likely to wean a calf in consecutive years
- Annual pregnancy rate
- Percentage foetal/calf loss
- Incidence of missingness – the Cash Cow estimate of mortality

Foetal aging used to define month of calving and month of re-conception
Understanding what level of performance is achievable

Observed performance (median, interquartile range) of cows (≥4 years old) by country type.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Southern Forest</th>
<th>Central Forest</th>
<th>Northern Downs</th>
<th>Northern Forest</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant within 4 months of calving (%)</td>
<td>74 (39 - 85)</td>
<td>77 (56 - 84)</td>
<td>68 (60 - 76)</td>
<td>17 (7 - 31)</td>
</tr>
<tr>
<td>Annual pregnancy rate (%)</td>
<td>87 (77 - 93)</td>
<td>88 (79 - 92)</td>
<td>82 (75 - 91)</td>
<td>66 (56 - 74)</td>
</tr>
<tr>
<td>Foetal/calf loss (%)</td>
<td>5 (2 - 9)</td>
<td>6 (4 - 9)</td>
<td>7 (3 - 15)</td>
<td>14 (9 - 19)</td>
</tr>
<tr>
<td>Pregnant cow missingness (%)</td>
<td>8 (3 - 13)</td>
<td>6 (1 - 11)</td>
<td>7 (4 - 13)</td>
<td>12 (6 - 18)</td>
</tr>
</tbody>
</table>

Values in red are what is commercially achievable
Have you any questions
Major factors affecting percentage of lactating cows pregnant within 4 months of calving (P4M)

- Country type – on average when all other major factors were taken into account, performance in Southern Forest was 12% higher than Central Forest, 23% higher than Northern Downs and 59% higher than Northern Forest.

- Parity - 1st lactation cows 13-16% lower than mature and aged cows. Supports recommendations that replacement heifers should be segregated until they wean their first calf.

- Average wet season (Nov-Apr) CP:DMD - when this ratio was <0.125 performance was 7.5% lower. Potential response to ‘best practice’ grazing management such as wet season spelling.

- Cows which gained condition between the PD and the W/D muster were 8% higher than those which lost condition.
Effect of time of calving

Concept of an optimum calving period and hence an optimum re-conception period

49% difference
Effect of body condition score at time of pregnancy diagnosis

Performance of females in poor body condition 18% lower than those in good condition, however impact much less in Northern Forest.
Effect of wet season cow phosphorous status

26%, 25%, 63% & 72% of average wet season FP:ME in the Southern Forest, Central Forest, Northern Downs and Northern Forest were <420mgP/MJ ME

High risk of P deficiency affecting performance

Low risk of P deficiency affecting performance
Have you any questions
Major factors affecting percentage foetal/calf losses between confirmed pregnancy and weaning

- Country type - percentage loss in the Central Forest, Northern Downs, and Northern Forest were respectively 4%, 2% and 7% higher than in the Southern Forest

- Reproductive history of cow – percentage loss in cows which lactated previous year 4% lower than in those that did not lactate

- Lactation number – when all other factors were taken into account percentage loss in heifers was 2% higher than in mature cows

- Mustering efficiency – 9% higher loss where mustering efficiency was <90%.

- Inadequate protein status (low CP:DMD) during the dry season (May-Oct) prior to calving – 4% higher loss.
Foetal aging enables period of calving to be estimated and hence when weaning musters should be conducted to minimise these losses.
Heat stress during month of calving

Heat stress resulted in 4-7% higher loss, except in NF

<table>
<thead>
<tr>
<th>Country Type</th>
<th>THI above 79 during expected month of calving for &lt; 15 days</th>
<th>THI above 79 during expected month of calving for &gt;= 15 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern forest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central forest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern downs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Northern forest</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Critical importance of mothering ability & distance to waters. Paddock shade?
Where risk of wet season P deficiency adversely affecting performance was high and cows were in poor condition at the previous pregnancy diagnosis muster, calf loss was ~8% higher than where the risk of P deficiency adversely affecting performance was low and cows were in poor condition.

High risk of P deficiency effect
Low risk of P deficiency effect
Effect of genotype and cow size/height on performance

P4M in ≥50% *B indicus* 13-15% lower than in <50% *B indicus*.

P4M in shorter cows 5% higher than taller cows and, foetal/calf loss 4% lower in shorter cows compared to taller cows.
### Impact of wild dogs on foetal/calf loss

<table>
<thead>
<tr>
<th>Wild dog Category</th>
<th>Foetal/Calf Loss (%)</th>
<th>95% Confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wild dogs considered a problem – baiting used</td>
<td>11.81</td>
<td>9.33 - 14.29</td>
</tr>
<tr>
<td>Wild dogs considered a problem - intermittent control only</td>
<td>10.84</td>
<td>6.40 - 15.28</td>
</tr>
<tr>
<td>Wild dogs not considered a problem</td>
<td>6.29</td>
<td>3.27 - 9.31</td>
</tr>
</tbody>
</table>

Producers knew when wild dogs were adversely affecting performance, but method of control had no significant effect.

There is a critical need to rethink our approach to control of wild dogs.
Impact of infectious diseases

- Pestivirus (BVDV) – 23% lower percentage pregnant within 4 months in mobs with widespread evidence of infection. In mobs with high level of recent infection foetal/calf loss was 8% higher.
- Venereal diseases (vibrio) – in mobs with evidence of widespread infection foetal/calf loss was 7% higher.
- Lepto – only low level of infection detected. Trend for higher foetal/calf loss in mobs with high level of recent infection with *L. pomona*.
- 3-day (BEF) – widespread evidence of infection but no significant impact on likelihood of cows becoming pregnant.
- Neospora – widespread evidence of infection but no impact on foetal/calf loss.
Using the Cash Cow findings to improve my beef breeding business

Key questions to ask

1. How is my beef breeding business going? Use the BRICK to generate KPI’s.
2. How much beef is being produced by each of my breeding herds? Measure annual liveweight production from each herd.
3. Are the annual kilograms of beef produced from each breeding herd lower than expected or below what is commercially achievable? Compare to Cash Cow production benchmarks.
4. How are my breeding herds performing? Measure performance using the Cash Cow measures.
5. Is the reproductive performance of my breeding herds lower than expected or below what is commercially achievable? Compare to Cash Cow performance benchmarks.
5. What is likely to be contributing to any lower than expected or below what is commercially achievable performance? Examine the major factors affecting performance identified in the Cash Cow project.
Thankyou - questions

Rainfall variation during the Cash cow project