Management of breeding cows in low nutrition environments

Geoffry Fordyce
Uni of Qld, Australia
Thank you

Please accept my sincere gratitude for this wonderful opportunity to share Australian beef production research and experience outcomes with you.

Special thanks to NESPRO, João Batista G. Costa Jr, Leonardo Canellas, the Universidade Federal Rio G. do Sul and other sponsors, plus the University of Londrina where I will visit next week.
Well-managed wet season nutrition
Dry season on fertile downs
Dry season in low-fertility area
Oases in a dry land
Herding cattle
Cattle trucks
Car park at cattlemen’s meeting
Challenges

• Low nutrition: low rainfall, low-fertility soils (N & P), high temperatures, over-grazing
• Occasional disease
• Low-value markets and high costs
• Poor understanding of herd and business performance
• Judging business success by cattle numbers rather than by production & business efficiency
• Main business: Cattle or real estate?
The question?

Is herd management suitable?
How can I produce more and bigger calves?
Do I have the right type of cows?
How can I reduce costs?

What are the right questions?
Main questions

Is my cow herd producing at an achievable level at an achievable operating margin?

= Where am I now, and where could I be?

Note: PRODUCTION, not performance

Cattle herds produce beef and income, so primary questions must focus on these

Performance, eg, weaning rate, guides solutions if production is unsatisfactory

What is the EVIDENCE that management decisions are correct?
What is the productivity of a well-managed cow herd?

Consider a cow herd as a business sub-enterprise:

\[
\text{Operating margin (\$/kg)} = \frac{\text{kg net live weight produced} \times \text{Value of live weight harvested} - \text{Cost}}{\text{kg pasture consumed}}
\]

Also a pasture utilised cost, ie:

\[
\frac{\text{kg net live weight produced}}{\text{kg pasture consumed}}
\]

What occurs in your business? [EVIDENCE]
How much net live weight can a cow herd produce?

Weaner numbers
Weaner weight
Cow growth
Cow survival

Rough indicator = Weaner production
= Lactation rate * Average weaner weight

Eg, 70% lactation rate x 180 kg average weaner weight
= 126 kg per cow of weaner production
Weaner production variation

Southern Forest
Central Forest
Northern Downs
Northern Forest

Weaner Production (kg/cow retained)
Weaner production (kg/cow) similar to steer live weight gain

$R^2: 0.38; \ y = 0.92x + 10.3$
You can not make something from nothing

Average live weight gain = Weaner production = 120 kg
Weaner weight = 175 kg

Therefore, 450 kg cow would be expected to lose 55 kg (~1 condition score) over the year up to weaning

BUT, a young cow expecting to gain 25 kg to match skeletal growth could lose 1.5 condition scores

Condition loss affects ability to re-conceive
What is the simplest way to measure herd production?

Group-based herd performance recording

Annual herd description at the end of the cattle year: numbers and average weight (even if this is estimated) for each gender x age group

Numbers, gender, weights and values at any branding, weaning, spaying, purchase, or sale as they occur

An annual summary of business income and costs by cattle, labour, depreciation and variable costs

This is simple but VERY powerful data for use in herd productivity and performance analysis
| From basic herd data | Heifer and cow weights  
Mortality rates  
Weaner weights  
Lactation rates |
|----------------------|---------------------------------------------------------------|
| Reproductive monitoring | Heifer pregnancies  
Lactating cow pregnancies  
Months of calving  
Pregnancy to weaning foetal and calf loss |
What are the key targets in rectifying performance?

Heifer performance: Live weight

Cow performance: Body condition

Both: Adequate pasture to satisfy intake; Genetics

These factors affect live weight gain, survival, lactating cow pregnancies, and calf loss
When do heifers reach puberty?

<table>
<thead>
<tr>
<th>Average</th>
<th>60% and 70% of mature live weight for <em>indicus</em> and <em>taurus</em>, respectively, with crosses in between (eg, 270 kg for a British breed with 450 kg mature wt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variation</td>
<td>2/3rds within 35 kg, 95% within 75 kg</td>
</tr>
<tr>
<td>Target</td>
<td>Group average weight ~60 kg above average weight at puberty to get 90% pregnant (350 kg by mid-mating)</td>
</tr>
</tbody>
</table>

Weaner size affects ability to reach target weights
Pasture nutrition is the key to financially-successful live weight gain management
Energy supplements are rarely viable
Why is body condition so important?

Energy reserve for survival, foetal growth and milk production

Support the 5-month process of producing a healthy egg at ovulation

Note: In low-growth environments (eg, 100 kg/year), better condition at mid-pregnancy means:

- More condition lost in late dry and lactation
- Lower mortality rates
- Not necessarily higher lactating cow conceptions

If BCS is not moderate (3) or better, what is wrong?
Mid-pregnancy condition by lactation pregnancies – low nutrition environments

Body condition score at pregnancy diagnosis muster

Means predicted for Northern Forest
What are the key elements in managing body condition?

Weaning
Pasture nutrition (quantity and quality)
Lactation months (avoid early dry season)
Genetics

Manage to reduce need for deficient nutrients
Supplements value-add good management

A guide to whether supplements may be valuable in breeding cattle: Would they increase net live weight production in steers, either through survival or post-compensation growth?
Other factors affect performance, and therefore production

Calf loss can increase by 4-7% if temperature-humidity index > 79 for >2 weeks in month of birth

Diseases: Botulism, campylobacteriosis, BVD (pestivirus)
Best return for breeding herd business?

Work out what is achievable in a specific situation
Use basic herd performance recording to monitor production and performance
Get weaning (and mating) management right
Do not plan to use grass you may not have – magic does not exist
Use supplements that will cost-effectively increase net live weight production per cow and value-add good management

Good decisions = More income
= New kitchen for the wife
Thank you
Acknowledgments

Kieren McCosker, Geoffry Fordyce, David Smith, Nigel Perkins, Peter O’Rourke, Tamsin Barnes, Louise Marquart, Don Menzies, Tom Newsome, Di Joyner, Nancy Phillips, Brian Burns, John Morton, Sandi Jephcott, Michael McGowan

Research team

Cash Cow producers and cattle vets
Location of Cash Cow properties by country type

Performance of ~78,000 cows managed in 142 breeding mobs located on 72 properties monitored over 3 to 4 years.
# Definitions: Performance

<table>
<thead>
<tr>
<th>Metric</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>In calf within 4 months</td>
<td>Lactating cow that has reconceived within 4 months of calving</td>
</tr>
<tr>
<td>Annual percent pregnant</td>
<td>Percentage of mated cows that conceived within a one-year period ending on 31 August</td>
</tr>
<tr>
<td>Reproductive wastage</td>
<td>Percent of pregnant cows that were not lactating at the muster following expected calving.</td>
</tr>
<tr>
<td>Missingness</td>
<td>A measure that includes cow mortality, cows that lost their identification and cows that were relocated (deliberately or otherwise) without a record</td>
</tr>
<tr>
<td>Weaning rate</td>
<td>Cows that wean a calf as a percentage of mated cows, calculated as annual percent pregnant × (1 − reproductive wastage)</td>
</tr>
<tr>
<td>Lactation rate</td>
<td>Cows lactating at the weaning muster after expected calving date as a percentage of closing numbers (number of cattle at the end of the cattle year) within a group</td>
</tr>
</tbody>
</table>
## Definitions: Production

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weaner production</td>
<td>Lactation rate multiplied by average live weight of weaners</td>
</tr>
</tbody>
</table>
| Live weight production        | Annual net live weight production per (retained) cow  
   = Average live weight of cows at the end of the measured period x (1 – mortality rate) + Average weight of weaners produced - Average cow live weight at the start of the measurement period |
| Live weight production ratio  | Annual net live weight production / Average live weight of cattle in the paddock over a cattle year  
   (The latter represents feed intake and = Average cow live weight over the year + Average weight due to weaners over the year)  
   eg, a live weight production ratio of 0.35 equates to 35 kg net increase in live weight for every 100 kg of cattle grazing that paddock on average over a one year period |
Performance & LW production ratio

Southern forest: 25 percentile - Median - Achievable

Central forest: 25 percentile - Median - Achievable

Northern downs: 25 percentile - Median - Achievable

Northern forest: 25 percentile - Median - Achievable
LW and Weaner production

25 percentile - Median - Achievable

kg/cow/year

Sth For: Wnr Prod
Cen For: Wnr Prod
Nth Dwn: Wnr Prod
Nth For: Wnr Prod
Sth For: LW Prod
Cen For: LW Prod
Nth Dwn: LW Prod
Nth For: LW Prod
## Performance & Production

<table>
<thead>
<tr>
<th></th>
<th>Live weight production ratio (kg/kg cattle/yr)</th>
<th>Live weight production (kg/cow/yr)</th>
<th>Weaner production (kg/cow/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>var /0.01</td>
<td>var /10 kg</td>
<td>var /10 kg</td>
</tr>
<tr>
<td>Pregnant 4 mths after calving</td>
<td>0.18 5.8%</td>
<td>0.43 5.7%</td>
<td>0.57 6.3%</td>
</tr>
<tr>
<td>Pregnant annually</td>
<td>0.27 2.8%</td>
<td>0.40 3.9%</td>
<td>0.61 4.5%</td>
</tr>
<tr>
<td>Pregnancy-weaning calf loss</td>
<td>0.16 -1.8%</td>
<td>0.20 -2.7%</td>
<td>0.34 -3.6%</td>
</tr>
<tr>
<td>Cow mortality</td>
<td>0.42 -0.9%</td>
<td>0.18 -2.1%</td>
<td>0.11 -3.4%</td>
</tr>
<tr>
<td>Average weaner weight</td>
<td>0.56 5.1kg</td>
<td>0.70 7.1kg</td>
<td>0.69 8.2kg</td>
</tr>
<tr>
<td>Cow live weight change</td>
<td>0.26 5.6kg/yr</td>
<td>0.29 9.9kg/yr</td>
<td></td>
</tr>
</tbody>
</table>
# Weaning management

## Example 1

<table>
<thead>
<tr>
<th>Achievable weaner production</th>
<th>150 kg/cow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lactation rate</td>
<td>90%</td>
</tr>
<tr>
<td>Average weaner weight</td>
<td>170 kg</td>
</tr>
<tr>
<td>Higher average weaner weight</td>
<td></td>
</tr>
<tr>
<td>with no extra inputs</td>
<td></td>
</tr>
</tbody>
</table>

_magic does not exist. Calves cannot be produced from nothing_

## Example 2

<table>
<thead>
<tr>
<th>Achievable weaner production</th>
<th>96 kg/cow</th>
<th>126 kg/cow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lactation rate</td>
<td>60%</td>
<td>70%</td>
</tr>
<tr>
<td>Average weaner weight</td>
<td>160 kg</td>
<td>180 kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No supp</th>
<th>Phos supp</th>
</tr>
</thead>
<tbody>
<tr>
<td>96 kg/cow</td>
<td>126 kg/cow</td>
</tr>
<tr>
<td>60%</td>
<td>70%</td>
</tr>
<tr>
<td>160 kg</td>
<td>180 kg</td>
</tr>
</tbody>
</table>