Why feed phosphorus?

Mick Sullivan
DAF
Rockhampton
Outline

• Why cattle need P
• Identifying a P deficiency
• Correcting a P deficiency
Why Phosphorous (P)?

**Cattle need phosphorus**
Essential for the chemistry of life, Building bones, producing milk, Achieving high feed intake and efficient feed utilisation

**P deficiency is often the most important nutritional constraint for cattle in northern Australia which we can economically fix**
In the dry season, first limiting nutrient is generally protein, then energy.

On Phosphorus deficient country, in the wet season the first limiting nutrient is Phosphorus.

Deficiencies of these are rare in extensive grazing operations.

Practical management of nutrition.
Phosphorus deficiency

Reduced appetite - intake of grass decreased by 10–30%

- Chewing bones and other objects – increased risk of BOTULISM
- Bone deformities – e.g. peg leg or abnormal walking
- Bone breakages when handling e.g. necks and hips in crush
Phosphorus deficiency

Reduced appetite and grass intake

Growing animals
• Reduced growth rates

Cows
• Lower heifer weights at mating
• Lower body condition
• Reduced conception & weaning rates
• Increased mortality
• Lower cull cow weights
Identifying a P deficiency

Observations and experience
• Symptoms in the cattle
• Cattle behaviour
• Cattle performance in different paddocks
• Ask the locals

Test the animals
• Blood plasma inorganic phosphorus (PIP)

Soil and pasture testing
• Cattle are very selective when grazing
• Soil and pastures vary across a landscape
• Very hard to choose sampling sites

Understand land types
• Varying fertility
• Different management options
Knowing your land types is important

Vegetation
- Woody
- Pasture

Soil
- Fertility
- Depth
- Structure
FORAGE reports on the Long Paddock website

Indicative Land Type report
## Soil P, what is low?

<table>
<thead>
<tr>
<th>Plants</th>
<th>Cattle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very low &lt;10 ppm</td>
<td>Acutely deficient 2-3 ppm</td>
</tr>
<tr>
<td>Low 10 – 20 ppm</td>
<td>Deficient 4-5 ppm</td>
</tr>
<tr>
<td>Moderate 20 – 40 ppm</td>
<td>Marginal 6-8 ppm</td>
</tr>
<tr>
<td>High 40 – 100 ppm</td>
<td>Adequate &gt;8 ppm</td>
</tr>
<tr>
<td>Very high &gt;100 ppm</td>
<td>Colwell P – bicarbonate extractable P ppm = mg/kg</td>
</tr>
</tbody>
</table>

If your land type sheet says phosphorus is low, further investigation is required.
Blood tests

- Blood P is the best diagnostic in growing cattle
- Breeders mobilize P from tissue and bones and replenish it
- P-Screen test was developed in 1990s
- Sampling kits and laboratory analysis available from DAF
- Bleed 25 head
- Diagnosis based on blood P and Faecal NIRS or faecal nitrogen (to estimate diet quality)
- Diet quality is important because P requirement increases with diet quality
When to test cattle for P deficiency?

- In the wet season energy and protein are at their highest. This is when phosphorus requirement is highest.
- Therefore testing in mid to late wet season is the best time
- Planning needs to start early
- Test animals cannot be fed P supplements during the wet season
- Target animals in 2020
  - No 9 & No 8 steers
  - Maiden heifers No 9s & No 8s
Testing breeder paddocks?

- Breeders can mobilize P from tissue and bones
- Test monitor group of young growing cattle in the breeder mob
- Put 30 steers in breeder paddock for wet season
- Assessing the mob/paddock using the growing cattle
- Maiden heifers can be monitor animals i.e. No 9s or No 8s in 2020
Faecal analysis

- Faecal P has been used to estimate diet P (No P or concentrate supplements)
- Faecal P/diet ME ratio is discussed in the 2012 Manual as an indicator of dietary P status (page 6)
- Recent research indicates this is not always reliable because of bone P mobilisation/replenishment
Phosphorus supplementation

- When to feed phosphorus
- How much phosphorus to feed
- How to feed phosphorus
- Cost of supplements and supplement selection
- Herd management to maximise benefits and reduce costs
Wet season

• Best response as animal requirements are highest when diet quality is good

• Challenge is protecting supplement from rain and getting it out

Dry season

• Lactating breeders need phosphorus with urea supplements

• Dry cattle show little response if losing weight
## How much phosphorus?

<table>
<thead>
<tr>
<th>Class of animal</th>
<th>Weight (kg)</th>
<th>Target weight gain (kg/day)</th>
<th>Acutely deficient</th>
<th>Deficient</th>
<th>Marginal</th>
<th>Adequate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steers &amp; heifers</td>
<td>200</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>Nil</td>
<td>Nil</td>
</tr>
<tr>
<td>Steers &amp; heifers</td>
<td>200</td>
<td>0.3</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>Nil</td>
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<tr>
<td>Steers &amp; heifers</td>
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<td>0.9</td>
<td>8</td>
<td><strong>5</strong></td>
<td>2</td>
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<tr>
<td>Steers &amp; heifers</td>
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<tr>
<td>Steers &amp; heifers</td>
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<td>4</td>
<td>1</td>
<td>Nil</td>
</tr>
<tr>
<td>Steers &amp; heifers</td>
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<td>9</td>
<td>6</td>
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<tr>
<td>Pregnant breeders</td>
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<td>-0.3</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>Nil</td>
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<tr>
<td>Pregnant breeders</td>
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<td>0</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>Nil</td>
</tr>
<tr>
<td>Pregnant breeders</td>
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<td>0.3</td>
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<td>4</td>
<td>1</td>
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<td>9</td>
<td>6</td>
<td>2</td>
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<tr>
<td>Lactating breeders</td>
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<td>-0.3</td>
<td>7</td>
<td>5</td>
<td>2</td>
<td>Nil</td>
</tr>
<tr>
<td>Lactating breeders</td>
<td>400</td>
<td>0</td>
<td><strong>9</strong></td>
<td>6</td>
<td>2</td>
<td>Nil</td>
</tr>
<tr>
<td>Lactating breeders</td>
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<td>0.3</td>
<td>11</td>
<td>7</td>
<td>2</td>
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</tr>
<tr>
<td>Lactating breeders</td>
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<td>0.6</td>
<td>12</td>
<td>8</td>
<td>3</td>
<td>Nil</td>
</tr>
</tbody>
</table>

200 kg steer on deficient country requires 5 g P/day for target growth of 0.9 kg/day

400 kg lactating cow on acutely deficient country requires 9 g P/day for maintenance
How to feed phosphorus

- Loose lick
- Blocks
- Water medication
Loose licks

- Lowest cost/kg P
- Mix can be changed to achieve target intakes
- Need shelters in wet
Loose lick in bulk bags

- Reasonably weather resistant
- Need lifting gear

5% limestone to harden
Wet season blocks

- High cost/kg P
- Weather resistant
- Fixed recipe and intakes can be low
- Easy to distribute before wet
Wet season lick sheds
Water medication

• Can be hard to consistently achieve target intakes in wet season

• No problems in dry season

• Water quality can present problems
Lick composition

- Mono and Dicalcium phosphate blends and Dicalcium phosphate products are main P supplements
- Salt can be an attractant or limiter depending on country and water
- Protein meal e.g. 10-30% can be used as an attractant
- Aim to feed as little attractant as possible to reduce costs
- GranAm can be used a limiter
- Phosphorus component of dry season breeder licks is based on lick intake and desired P intake. Usually 10-20% MDCP or DCP.
Supplement selection

Choose supplements on the basis of:

• Cost per unit of P
• Ability to consistently supply required P
• Ease of management
Managing supplements

• Training animals is critical for good intakes and ease of management

• Experiment with supplement composition to find out what works best

• Good intake records enable nutrient intakes (phosphorus & protein) and costs to be monitored
Herd management

- Stocking rate
- Weaning

- Critical to maximise benefits of supplementation
- Enable cattle to make best use of pasture and supplements
- Reduce P requirements to minimise costs