← Disclaimer →
This talk was prepared to discuss the main principles of Supplementary Feeding and specific strategies should not be developed on the information contained in this discussion alone.

Supplementary feeding: choosing the right feeding strategy

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Designing a feeding program

Target - what is it ?
- is it achievable ?
- are there other alternatives to feeding ?
- do all animals need to be fed ?

Available resources - pasture ?
- $$$?
- time ?

Based on the answers, the wisdom and likely profitability of feeding can be assessed

CONCEPT 1

Identify the target and be sure it is achievable.

Possible targets

Weaners - survival during dry season
- grow at 0.3 kg/day in dry season

Heifers - conception as first calf cow

Cows - survive dry season
- rear healthy calf each year

Steers - finish at 300 kg carcass wt in May, instead of September, to access high-value market (production)

Feeding options vary according to difficulty in achieving targets

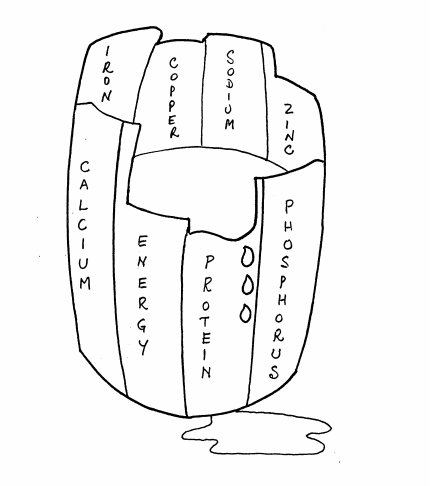
Features of a feed supplement

Supplements must - provide limiting (missing) nutrients
- be palatable to stock
- be balanced for nutrients, e.g., protein and energy

- be safe to feed
- be rumen neutral, i.e., not excessive levels of starch (acidosis), fat (depressed forage digestion), minerals etc.
- be easy to handle
- make optimum use of available pasture
- be cost-effective

Primary limiting nutrient

- Animals will respond to the primary limiting nutrient
- They will not respond to provision of a nutrient that is not (primarily) limiting production, i.e., when there are others more limiting



CONCEPT 2

Target the primary limiting nutrient.

ENERGY
PROTEIN
PHOSPHORUS

CALCIUM

SODIUM

COPPER

SULPHUR

VITAMINS

TRACE MINERALS

CONCEPT 3

Animal production is primarily a function of energy intake.
Question: How will this supplement increase energy intake?

Increase energy supply

Energy intake of cattle increased by:

1. Replacing pasture with higher quality type, e.g., legume
2. Supplement to increase intake of existing pasture
3. Supplement to replace pasture (in part)
4. Replace pasture in total with alternative feed (feedlot)

In grazing situation, should aim to optimise use of the pasture base

Increase energy supply

Increasing pasture intake

- Feed protein supplements
  - Pasture low in quality (protein, in particular) – no green leaf
  - Pasture not limiting in supply (bulk)
  - Best response with high leaf availability
  - Increase of 20 – 50% ??

This strategy usually restricted to dry season feeding

- Lower stocking rates

CONCEPT 4

Intake of pasture is determined by the rate it is broken down by rumen bugs and passed out of the rumen.

Increase energy supply

3 main limitations to increasing pasture intake for higher growth

1. As supplement intake is increased, pasture intake will :
   - Initially increase in response to added nutrients in the rumen (providing they are limiting)
   - Subsequently decline as higher intakes of supplement are achieved
2. Cattle unable to eat sufficient quantity of low quality pasture to sustain high growth responses

- Restricted to increase in intake of about 20 – 50% max.
- Pasture has low energy concentration so small increase in energy intake

Increase energy supply

3 main limitations to increasing pasture intake for higher growth

1. Increases in intake will only occur when pasture is of low quality, i.e., deficient in protein in particular
    - Usually respond when protein in pasture is less than about 6%
    - Lower or no response when green leaf available – wet season

300 kg steer eating low quality, dry pasture (5% protein, 6.5 MJ / kg)
Pasture intake - 2.0% BW / day = 6.0 kg / day DM
= 39 MJ energy / day (6 x 6.5)
Growth rate = 0 kg / day
Urea supplement fed – increases intake by 30%
Intake - 2.6% BW / day = 7.8 kg / day DM
= 51 MJ energy / day (7.8 x 6.5)
Predicted growth rate = 0.3 kg / day
Desired growth rate to meet market specs – 0.8 kg / day
Energy intake required = 79 MJ / day
Pasture intake required = 12.2 kg / day (4.1% BW) (12.2 x 6.5)
100% increase in intake of pasture required

Supplying additional energy

Additional energy required = 40 MJ / day

Additional energy can be supplied by:
6.9 kg pasture
3.6 kg barley
4.9 kg molasses
4.0 kg cottonseed meal

In the case of the supplements, this assumes no reduction in intake of pasture by the animal – a flawed assumption !!

CONCEPT 5

There is a limit to the extent animals can increase their pasture intake – beyond that, supplements are required to increase energy intake.

CONCEPT 6

Urea-based supplements produce small growth responses, and are not suitable for production or crisis feeding.

CONCEPT 7

For production feeding, cattle should be sold soon after feeding to reduce the effects of compensatory growth.

1. Low level (strategic) feeding

    1 Urea-based mixes
        urea blocks
        urea-molasses roller drum mix
        urea-salt dry loose mix
        urea in drinking water
    - Low daily cost / long term feeding
    - Start feeding early before body condition deteriorates
    - Small response (0.2 - 0.3 kg / day) – maintenance
    - Must be fed <u>daily</u>

1. Low level (strategic) feeding

    1 Urea-based mixes
    - Pasture supply not limiting – stimulates increase in intake
    - Suitable for - breeders 50 g urea / day
        - weaners 30 g urea / day
    - Must include sulphur in mix

    N : S = 10:1 Urea : Granam = 5:1

    - Urea can be toxic if consumed too quickly
    - Not a production supplement – survival insurance policy
    - No response on higher quality (i.e., green) pasture

    1. Low level (strategic) feeding

<u>Cost of feeding</u>: 5 months (June –October) - 50 g urea /cow /day
(R. Dixon: north Queensland)

1. Blocks (30% urea) $800 / tonne 25 kg / head
   $20 / head + feeding costs
2. Dry licks (30% urea) $400 / tonne 25 kg / head
   $10 / head + feeding costs
3. Water (50 g urea + S / day) $400 / tonne 8.4 kg / head
   $3 / head + <u>capital</u> + feeding costs

Effect of urea feeding in a severe dry season (R. Dixon)

Measurement	No urea	+ urea
LW June (kg)	**356**	**349**
LW Dec (kg)	**288**	**317**
LW change (kg)	**-68**	**-32**
Pregnant (%)	**50**	**64**
Weaner LW (kg)	**163**	**169**

Use supplements in conjunction with appropriate weaning strategy

1. Low level (strategic) feeding

2 **Protein meals**

cottonseed meal
copra meal
whole cottonseed

- Fed in small amounts – less than about 0.25% body weight
  i.e. 600 g / day for 200 kg weaner; 1 kg / day 400 kg cow
- Can be fed less than daily, e.g., twice weekly
- Higher cost but higher response than urea
- Safe

1. Low level (strategic) feeding

3 **Fortified molasses**

M8U (molasses / 8% urea)
MUC (molasses / 3% urea / 10% cottonseed meal)

- Fed in small amounts
  e.g. 1 kg / day for 200 kg weaner; 1-3 kg / day cow
- Higher cost but higher response than low intake urea mixes
- Production increased by inclusion of protein meal (e.g. CSM)
- Urea toxicity if not fed appropriately

2. High level (production) feeding

Options

grains (barley, sorghum, wheat etc)
fortified molasses
protein meals (cottonseed meal, copra meal etc.)
whole cottonseed

- Feeding for production or for drought (crisis)
- Higher daily cost / shorter term feeding (for crisis feeding)
- Feeding can commence when needs arise
- Greater response (up to 1 kg / day) - response depends on intake

2. High level (production) feeding

1 **Grains**

- intake of 0.5 - 2.0% BW (2 - 8 kg/day for 400 kg steer)
- intake must be controlled for safety – self-feeders etc.
- conversion rates – grain : additional gain vary widely - high rates (i.e. high grain intake / kg gain) on high quality pasture
- must include a N source or suffer poor utilisation of grain, e.g., 1-2% urea if it can be fed safely, otherwise protein meal
- high daily cost

2. High level (production) feeding

2 **Protein meals**

- provide both protein and energy to animal
- intake of 0.2 – 0.5% BW (0.8 - 2 kg/day for 400 kg steer)
- costly to feed at high intakes
- high response even at relatively low intakes
- can be fed less often than daily, e.g., twice weekly - safe
- difficult to distribute intake evenly across a group

2. High level (production) feeding

3 **Molasses**

- intake of 0.5 - 2.0% BW (2 - 8 kg/day for 400 kg steer)

- costly to feed at high intakes - cheaper than grain on coast
- animal response is proportional to intake
- must include a nitrogen source, e.g., urea or protein meal

Molasses + 3% urea + 10% cottonseed meal + 1% salt + 1% kinefos
N Qld: 0.9 kg / day response for steers eating 8-9 kg / day

CONCEPT 8

'Energy' type supplements (grain, molasses etc.) must include a protein source if they are to be used efficiently.

CONCEPT 9

Animal responses to supplement, and the cost effectiveness of feeding, decrease with increasing quality of the pasture.

Supplementary feeding concepts

1. Identify the target and be sure it is achievable
2. Target the primary limiting nutrient
3. Animal production is primarily a function of energy intake
4. Intake of pasture is determined by the rate it is broken down by rumen bugs and passed out of the rumen
5. There is a limit to the extent animals can increase their pasture intake – beyond that, supplements are required to increase energy intake
6. Urea-based supplements produce small growth responses, and are not suitable for production or crisis feeding
7. For production feeding, cattle should be sold soon after feeding to reduce the effects of compensatory growth
8. 'Energy' type supplements (grain, molasses etc.) must include a protein source if they are to be used efficiently
9. Animal responses to supplement, and the cost effectiveness of feeding, decrease with increasing quality of the pasture