

## Supplementary feeding of cattle

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### Introduction

Early in a drought there is usually plenty of poor quality dry feed, which animals cannot use efficiently. Supplementary feeding at this stage aims to make better use of this feed by supplying those nutrients that the pasture is deficient in, so that animals can be cheaply maintained while decisions are being made.

Supplementary feeding is an option **only** when there is paddock feed available. When availability of paddock feed becomes limited, survival feeding or production feeding must be implemented. 'Survival feeding' means providing an animal with the minimum feed it needs to stay alive; 'Production feeding' means, for adult stock, sufficient food for successful breeding or, for younger animals, sufficient food to meet growth and/or market targets.

### Supplementary feeding principles

To be effective, the supplement you choose must make up for the main nutrient deficiencies in the paddock feed. Dry feed is often deficient in protein and sulphur. In cases where the feed is green but very short, it is the low energy intake which limits production.

The following principles for efficient use of supplements should be followed.

- Identify the most limiting components, usually protein, sulphur and/or metabolisable energy.
- Select supplements containing high levels of the identified limiting components.
- Balance the supplement to ensure efficient rumen function (contact your local NSW Department of Primary Industries Livestock

Officer or Veterinary Officer for information on appropriate supplements for particular circumstances).

- Young and lactating animals have a greater need for protein.
- Choose feeding techniques which minimise disruption to the animals' digestive system.
- Cost out the program, taking into account alternative measures.
- Start feeding those animals with the greatest needs, for example pregnant cows of low fat score, or weaners below critical liveweights.
- Monitor feed consumption, liveweight and condition, so that you can confirm that your strategy is working.

### Outcomes of feeding supplements to stock

When supplements are fed to stock, there are three possible outcomes, depending on whether energy supplements or protein supplements are used and on how the pasture and supplement interact during digestion:

- **Supplementation.** The supplement is eaten and pasture intake is unchanged. This is a rare event.
- **Substitution.** The supplement eaten causes reduced pasture intake. This usually occurs when pasture is supplemented with a high-energy feed.
- **Complementation.** The supplement is eaten and pasture intake increases. This occurs when stock are grazing on dry pasture or crop stubble and the supplement improves the animal's ability to utilise the feed.

### Supplementary feeding

Table 1 provides supplementary feeding recommendations for various stock classes of beef cattle.

### Frequency feeding

Non-protein nitrogen sources – such as urea and sulfate of ammonia – dissolve quickly in the rumen,



and any surplus nitrogen is wastefully excreted. To be effective, the non-protein supplements must be fed little and often.

Protein meals, such as cottonseed meal or linseed meal, release their protein differently, allowing cattle to use the protein efficiently over a longer period. Twice-weekly feeding is as effective as daily feeding.

High-protein grains (e.g. lupins or peas) are more degradable, with a higher protein release rate, and should be fed every second or third day.

### Protein meals and seeds

Protein meals and high-protein seeds are excellent supplements when pasture digestibility is falling. Protein meals are oilseed crop by-products. The most common high-protein seeds are white ('fuzzy') cottonseed and lupins.

Both protein meals and seeds can be fed twice weekly in daily amount multiples (see Table 1). They are safe feeds and do not cause acidosis (grain poisoning).

### Block licks

Although commercial urea and protein blocks are convenient and can be used with moderate success as supplements to abundant dry feed (over 2500 kg dry matter/ha), they cost three to four times as much as high quality protein feed. Better results can be achieved at a fraction of the cost by using legume grains or protein meals.

Block licks are best used in the early drought phase.

If you wish to try the convenience of blocks, you can make your own much more cheaply by following the recipes given in Table 2b.

### Rollerdrums

Roller drums supply nitrogen from the urea in a molasses, urea and water mix. They are useful only when dry standing feed exists, and they are an alternative choice to protein block licks. Their 'window of usefulness' is when you want to maintain liveweight in a dry spell, and dry feed is plentiful. They work best with 'dry' cattle. Table 2a provides the recipes that must be followed.

Table 1. Supplementary feeding recommendations

Available feed	Class of stock	Supplement	Frequency
Plentiful dry feed – Digestibility of pasture limits intake – Protein supplements increase pasture intake	Cows and calves, dry adult stock	Urea/molasses, mix 60 g urea/head/day OR High-protein grains, 0.5–1.0 kg/head/day OR Protein meals, 0.3–0.7 kg/head/day	Continuous access  Feed every second day  Feed twice weekly
	Weaners	Supplement and frequency as for other classes of stock, but high-protein grains or meals preferred.	
Short green feed – Quantity of pasture limits intake – Feed energy supplements	Cows and calves	Good quality hay, 3–4 kg/head/day	Feed 2–3 times/week
	All dry cattle	Cereal grains, 1–2 kg/head/day Hay, 2–3 kg/head/day OR Cereal grain, 1–2 kg/head/day	
Deteriorating dry feed – Quantity and digestibility restrict intake – Feed energy/protein supplement mixes – Full hand feeding follows	Cows and calves	Molasses/urea/protein meal	Continuous access
	Dry stock	OR Grain/protein meal Grain/protein seeds or meals	
			Feed daily or 3 times/week Feed daily or 3 times/week

WARNING: Cereal grains and urea can be poisonous if fed in large amounts before cattle are used to them. Be sure to introduce them gradually to reduce this risk. Rations consisting wholly of grain are not recommended for lactating cows; instead, feed a mixture of 80% grain and 20% hay.

**Table 2. Mixes for supplementary feeding**

**a. Urea/molasses (roller drums)**

	First week	Second week	Third week
Water (litres)	100	100	100
Molasses (litres)	100	50	30
Urea (kg) - Prilled	15	15	15

*Each mix should last about 30 head for 10 days. To decrease the rate of consumption, reduce the proportion of molasses.*

**WARNING:** Urea can be poisonous to stock.

**b. Home-made protein blocks**

	Per cent by weight
Molasses	40
Protein meal	30–40
Coarse salt	5–10
Urea	0–10
Slaked lime	5
Cement	10
Kynofos 21®, DCP, or Biofos®	2

*Weigh all ingredients, combine in a concrete mixer, and pour into moulds (cardboard boxes, timber frames and fertiliser bags will all serve this purpose). Blocks harden gradually over a week or two.*

**Grain and hay**

In the early drought phase (dry standing feed), grains and hays tend to act as a substitute for paddock feed rather than a supplement. Supplements encourage the use of standing dry feed.

Cereal grains (such as oats or wheat) are not efficient supplements when paddock feed is dry. They produce lactic acid in the rumen, which slows down the digestion and consumption of fibrous paddock feed. You can reduce this effect by feeding small amounts every 3 days and by adding protein meals, grain legumes or white cottonseed. This will fill the gap between the protein level in the grain and the animal's need for 15% protein. In practice the high-protein alternatives, such as lupins, peas, or cottonseed meal, will give better results while paddock feed lasts.

Grains are more useful when feed is short and green. This is particularly so for dry cattle, which need less roughage. Hay is best for lactating cows on short green feed, particularly in the colder months. The main role of grains is in full feeding when available pasture is low, and cattle should be removed from paddocks to reduce the likelihood of erosion.

**White cottonseed**

**Warning**

White cottonseed (WCS) and de-linted cotton-seed (black cottonseed) may contain residue of chemicals applied to the cotton crop during the growing season. The Australian Pesticides & Veterinary Medicines Authority (APVMA) calculates maximum residue levels on the basis of a 30% maximum dry matter (DM) intake of cottonseed (WCS and black cottonseed) in the diet. This means that using WCS at levels above 30% of the total dry matter intake could result in excessive residues in cattle. This is particularly true for cattle destined for export markets, where the 30% limit set to comply with domestic MRLs may not apply. If you have fed WCS from crops treated with chemicals within 60 days of harvest (all cottonseed would be in this category) to cattle within 60 days of sending them for sale/slaughter, then you must disclose this at Question 7 of the National Vendor Declaration (Cattle). NSW Department of Primary Industries does not recommend the use of cottonseed at more than 30% of the total dry matter intake, even in severe droughts.

NSW Department of Primary Industries and the cattle and cotton industries recommend that cotton trash not be fed to livestock due to residue concerns.

White cottonseed is an excellent supplementary feed for all cattle except calves under 4 months of age.

White cottonseed mixes well with grain and protein meals. It is high in energy and protein, but because its high oil content may cause digestive upsets, it should make up no more than a third of maximum potential feed intake (i.e. two-thirds of intake should be from pasture).

- White cottonseed fed as a supplement to pasture is an excellent complete supplement.
- It can be fed whole, in dumps in the paddock, twice a week.
- Intake should be kept to a safe 2.5 kg/day for adult cattle.
- Do not feed where no roughage is available.

## Molasses

Cattle can be fed molasses-based diets fortified with protein meal and urea, provided there is roughage in the paddocks.

Molasses-based diets are versatile and can be used in the early drought stage as a production feed as well as being used in full feeding. Table 3 shows recommended molasses rations, which assume adequate roughage is available.

These fortified molasses mixes are distinct from roller drum mixes. Fortified molasses mixes give cattle performance that is superior (particularly in lactating cows) to that given by roller drum mixes.

## Sources of phosphorus

Traditional sources of phosphorus – MAP fertilisers (e.g. Starter 12<sup>®</sup>) and DAP fertilisers – are not recommended for use as stockfeed sources of phosphorus. These products now contain fluorine at levels that can cause fluorosis if fed for an extended period.

The new sources of phosphorus are monocalcium and dicalcium phosphates that are low in fluorine

and cadmium (see Table 4).

## Further information

The NSW Department of Primary Industries website has a wealth of information available at

[www.dpi.nsw.gov.au/drought](http://www.dpi.nsw.gov.au/drought)

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Check for updates of this Primefact at:

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Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (January 2007). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of New South Wales Department of Primary Industries or the user's independent adviser.

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Table 3. Recommended molasses rations (calculated assuming adequate roughage is available)

Class of stock	Molasses	Cottonseed meal	Urea	Monocalcium or dicalcium phosphate*
30 cows with calves at foot. – For lactation and successful rejoining. – Feed the mix twice weekly.	250 kg (1 drum)	50 kg	8 kg	3 kg
30 cows with calves at foot. – For scrub feeding. – Feed mix twice weekly.	250 kg	25 kg	8 kg	3 kg
30 weaners (200 kg). – For normal growth. – Feed mix twice weekly.	125 kg	50 kg	2 kg	2 kg
30 head of dry stock. – For maintenance of weight and condition. Also for scrub feeding dry cattle. – Feed mix twice weekly.	250 kg	–	8 kg	2 kg

\* Monocalcium phosphate or dicalcium phosphate should be included in phosphorus-deficient country.

Table 4. Suitable sources of phosphorus

Product	Ingredient	Phosphorus content
Kynofos 21 <sup>®</sup>	Monocalcium and dicalcium phosphate (50:50)	21%
Biofos <sup>®</sup>	Monocalcium and dicalcium phosphate (67:33)	21%
Palaphos <sup>®</sup>	Dicalcium phosphate	15.5%
DCP <sup>®</sup>	Dicalcium phosphate	18%