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Winter Feeding Guide - Cattle

A producers guide for supplementary feeding cattle during winter

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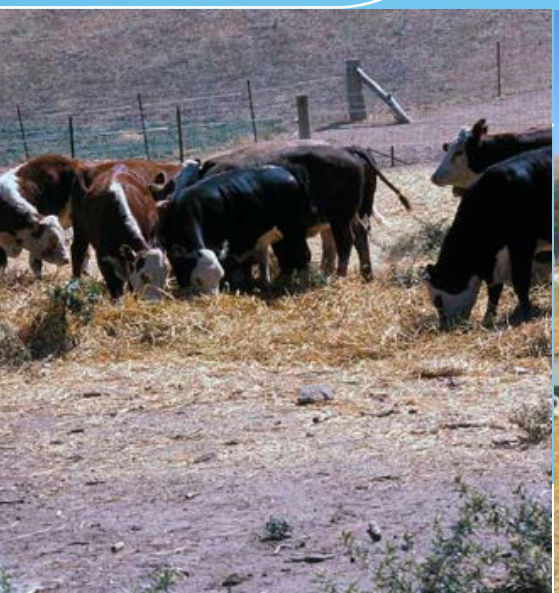

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PLEASE NOTE THE FOLLOWING BEFORE USING THIS GUIDE

- The tables in this guide have been calculated using Grazfeed and provide a guide to the level of supplementation required for beef cattle at various stages of pregnancy and into early lactation.
- **A number of pasture and livestock assumptions have been used when performing the Grazfeed runs. It is important to take note of these assumptions when applying the feeding rates to your own situation.** Remember, these tables are provided as a **guide only** and are designed to help producers fine-tune their feeding rates.
  - Cereal grains and grain-based pellets need to be introduced gradually to avoid acidosis. Refer to the NSW DPI Managing and Preparing for Drought 2018 for further information on how to safely introduce cattle to cereal grain or pellets (available online – click **here**).
- Cereal grains also tend to be low in both calcium and sodium. When feeding diets that consist mainly of cereal grain, add 1.5% of ground agricultural limestone (calcium carbonate) and 0.5% salt by weight to the ration to avoid calcium and sodium deficiencies (i.e. for every 100kg of grain add 1.5kg of lime and 0.5kg of salt).

Front cover photos provided by NSW Department of Primary Industries and Fiona Leech (LLS)

Managing cattle during winter

For late winter calving herds, energy requirements start to rise in late autumn and increase dramatically during the last 3-4 weeks of pregnancy. These requirements continue to climb until the cow hits peak lactation, which is around 8 weeks after calving. Figure 1 shows how energy requirements for a 550kg breeding cow change throughout the year, represented as megajoules of metabolisable energy required per day (abbreviated as MJ/day).

Pasture availability and quality during winter is highly variable from year-to-year and is largely determined by the amount of carry-over feed from the previous spring/summer period and when the autumn break occurs.

In trying to work out whether additional feed is required it's important to think through a range of factors including the quantity and quality of the pasture available, livestock condition and stage of pregnancy.

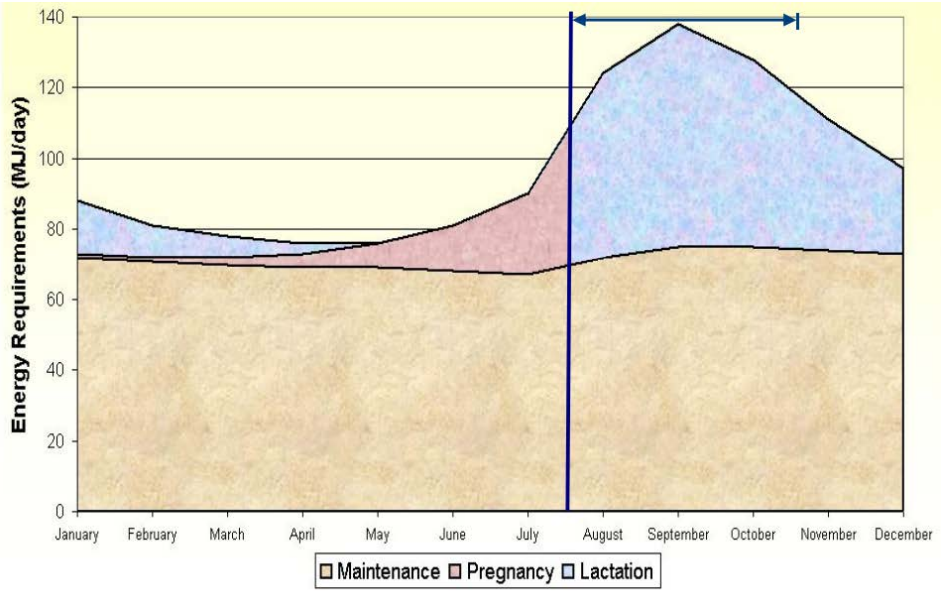

Figure 1: Energy requirements of 550kg British Breed Cow – unrestricted feed (calving 1 August)

Source: Jeff House 2016 (data obtained from Grazfeed)

Assessing pasture – how big is the nutritional 'gap'?

Paddocks during autumn and winter often contain a short green 'pick'. While pasture quality is generally very good during this period (i.e. digestibility of 70% +), lack of pasture height often restricts intake and performance.

Careful assessment of pasture conditions (both quantity and quality) is an important step in deciding where to graze stock (i.e. paddock selection) and level of a supplement is required. **Small changes pasture conditions (height and quality) have a big impact.**

If the pasture is very short (e.g. 1.5 – 2.0cm) it's likely that your cattle are only getting a portion of the daily energy needs. If a supplement isn't provided the end result is significant weight loss in the cow, reduced milk supply during lactation and increased risk of cows not getting back in calf.

Photo: M Lieschke

What condition are your cows in?

Fat score at calving, cow age and nutrition during early lactation all affect fertility at joining. Research shows that the higher the fat score at calving the greater the chance of getting back in calf again (Table 1).

Table 1: Impact of fat score at calving and the percentage of cows cycling after calving

Fat Score at calving	Days after calving, % on heat		
	50 days	70 days	90 days
1 – 2 (0-6mm P8)	34%	55%	66%
3 – 4 (7-22mm P8)	45%	79%	91%
4 – 5 (23mm + P8)	42%	96%	100%

The general target is to calve down in Fat Score 3. Cows that calve down below this target are at higher risk of not re-joining. As shown in Table 1, one third of cows in fat score 1–2 have not cycled by 90 days after calving.

Monitoring cow condition during pregnancy allows you to more accurately plan and manage nutritional regimes to ensure high fertility and productivity of the breeding cow herd. For example, if you are three to four months away from calving and majority of cows are in:

- Fat Score 2 - aim to increase body condition in the lead up to calving.
- Fat Score 3: aim to maintain/slightly increase condition
- Fat Score 4: aim to maintain cow condition/ slight weight loss

For late winter/early spring calving herds, cold conditions and lack of pasture availability during the winter months means that it's often difficult to put on significant condition in the lead up to calving. For this reason, weaning should be based on fat score to ensure that your cows are able to calve down in adequate condition. Early weaning can improve cow fat score dramatically when the autumn pasture is limiting and cows are losing weight.

As previously mentioned, nutrition is also a key factor, especially for heifers. Good nutrition in early lactation can help compensate for a sub-optimal fat score at calving.

See Appendix 1 for further information on Fat Scoring beef cattle.

Dealing with cows in poor condition

Once cows reach Fat Score 1 (see photo to the right) their energy reserves have been largely depleted and are considered to be 'at risk'. **Livestock in this condition must be managed to achieve weight gain.**

Cattle below this condition score become less valuable and more difficult to transport. **Emaciated cattle become unfit to load. It is better to sell early if you can not feed all the way through.**

Late pregnant cattle below Fat Score 1 that are continuing to lose weight due to an inadequate ration are at risk of death from a lack of energy to calve successfully or pregnancy toxaemia.

Photo: Jeff House

What supplement do I use and how much do I feed?

To be effective the supplement that you choose should make up for the main nutrient deficiencies in the paddock feed. Energy is generally the biggest limiting factor when cattle are grazing short green feed – the quality of the green feed is high but intake is restricted by the lack of height in the pasture. If a supplement isn't provided the end result is significant weight loss in the cow.

However, what is the definition of 'short' in a grazing sense for cattle, and what impact does pasture quantity/height have on the amount of supplement required?

To help fine-tune feeding programs the following feeding tables have been split accordingly:

PART A: when pasture is **2cm or less**

PART B: when pasture **is more than 2cm**

Important notes:

1) **The feeding recommendations in the following tables are assuming cattle are grazing short green pasture that is highly digestible (i.e. minimal dead herbage in the paddock). Intake will be limited by poor digestibility if cattle are consuming a significant amount of dead, poor quality pasture. In this situation feeding a supplement that is high in both energy and protein will be required to aid digestion and ensure livestock performance is not compromised.**

2) **The feeding recommendations are a guide. Small changes in pasture height and digestibility have a big impact, especially in late pregnancy and for lactating animals. Also, natural variation between cattle means that responses to feed levels will differ. It's important to monitor pastures and livestock condition regularly and adjust the diet accordingly.**

Choosing a supplement

When choosing a feed a number of factors need to be considered, such as:

Feed quality: feed quality refers to the digestibility of the feed and the amount of energy and/or protein contained in the feed. Diet quality becomes particularly important when cattle reach late pregnancy and into lactation due to

increasing demand. Hay is often fed out to cows, but hay is a bulky product that contains a lot of fibre. When paddock feed is limited, adding a high quality, energy dense 'concentrate' such as pellets or grain into the diet will give much better cow and calf performance. Hay also tends to be an expensive way to feed energy – adding a concentrate to the diet often reduces the overall feeding bill.

Storage, handling and feeding out: an important consideration and will largely determine what feeds are going to be suitable for your situation. Some products work very well, but require specialised equipment or are difficult to handle. It's important to choose feeding methods and systems that you can meet the ongoing time and physical commitment of, whilst minimizing disruption to the animals digestive system.

Cereal grains and pellets/nuts can provide the most cost effective way of feeding stock, but they need to be introduced slowly and fed daily over a two to three week period to avoid digestive upsets. Once adjusted, stock can then be fed every second or third day in daily amount multiples. Higher protein and fibre feed types such as lupins or cottonseed may be fed safely twice weekly without the risk of acidosis.

Refer to the NSW DPI Managing and Preparing for Drought 2018 for further information on how to safely introduce cattle to cereal grain or pellets (available online – click here).

Cost and availability: Availability of the feed is important as changing feeds can be tricky and brings additional risk of digestive upsets. It is also important to cost out different feeding options and compare them based on an energy basis. This can easily be done using either the Drought Feed Calculator (a free application that can be downloaded onto your mobile device) or the Feed Cost Calculator (available online).

Other limiting nutrients

Grass tetany (hypomagnesaemia) is a common metabolic disease in cattle, particularly when cattle are grazing short green grass with minimal roughage. While grass tetany can affect all classes of cattle, cows older than 5 years of age with calves at foot during winter and spring are most at risk. This is especially the case where cows are grazing short, grass dominated pastures under cold, wet, overcast conditions. Cows in the first 6-8 weeks of lactation are most prone to the disorder.

Unfortunately magnesium can't be stored in the body and therefore some form of supplement is required. This can be done in a number of ways:

- adding magnesium oxide (e.g. Causmag®) to hay. This is the preferred option (see below)
- adding magnesium oxide to grain or pellets
- magnesium lick blocks
- slow-release magnesium capsules
- loose licks in the paddock. These can be either purchased or made on farm. Home made options include:
    - a 1:1:1 ratio of magnesium oxide, lime and salt; or
    - a mix of magnesium oxide, salt and an attractant like dried distillers grain to help improve palatability and intake
- feeding ethanol syrup treated with magnesium oxide (20kg bag of Causmag added to 1000L of syrup). Syrup is fed in tubs *ad lib*.

Feeding hay treated with magnesium oxide (e.g. Causmag) is generally the preferred option as the roughage intake encourages rumination which increases magnesium absorption and results in a more even intake of magnesium across the mob. Intake can be highly variable between animals when using blocks or loose licks. When treating hay the recommended rate is 60-100g of Causmag/cow/day. For further information about grass tetany in cattle refer to Primefact 421.

Additional comments:

- First calf heifers and cows in backward condition (i.e. fat score 2.5 or less) are the highest priority and need to be carefully managed to ensure they get back in calf. The objective here is to maintain cow condition in the lead up to calving and allocate to the best pasture available post calving.
- Pre-calving is also an opportune time to administer your annual 5-in-1 or 7-in-1 booster shot. Vaccinating pregnant stock 4 weeks before calving not only provides ongoing protection for the cow, but it also enables passive immunity to be passed on to the newborn calf via the colostrum.

PART A: When pasture is 2cm or less…

Mid pregnancy (5 months pregnant)

Table 1: Energy intake and feeding requirements for **breeding cows in mid pregnancy** grazing highly digestible (75%), short green pasture ranging from 1.5cm - 2cm in height (500 – 700kg DM/ha)

Energy required (MJ ME/day)	Energy obtained from short green pasture (MJ ME/day)	Supplement	Daily feeding amount (kg/hd/day)	Comments
70 - 75	55 - 65	**Good quality hay** 8.5 ME; 6% protein	0.7 - 2.5	Because energy and protein requirements are still relatively low in mid pregnancy, a good quality oaten or pasture hay can be used to meet requirements. Better quality hays and silage (e.g. clover or lucerne hay) should be targeted at late pregnancy and lactation when nutrient requirements increase.
		Cereal grain + hay (80:20 mix) 11.7 ME; 10 % protein	0.5 - 2.0	**Cereal grain and grain-based pellets need to be introduced slowly to avoid grain poisoning -** Refer to the NSW DPI Managing and Preparing for Drought 2018 for guidance on safe introduction. Feeding rates will need to be increased if grain is below 12.5 ME.
		Dried Distillers Grain + hay (80:20 mix) 12 ME; 17% protein	0.5 - 2.0	While the feeding recommendation assumes a good quality hay is being used (e.g. 8.5ME cereal hay), a lower quality roughage could also be used as the majority of the energy and protein is coming from the DDG.
		Silage 10 ME; 16% protein (45% DM)	1.0 - 4.5	Silage can vary significantly in energy, protein and moisture content, all of which will impact on feeding rates and animal performance. Use a feed test to confirm these values.

Figures in Table 1 have been calculated using Grazfeed. The assumptions are:

- British breed cattle, 550kg mature cow weight (fat score 3)
- Cows are grazing a very short green pasture that is 1.5 – 2.0cm high (500 – 700kg DM/ha)
- Pasture is 75% digestibility and contains 15% legume. There is no dry standing feed (i.e. dead component)
- Cereal grain is 12.5 ME, 11% protein; cereal hay 8.5 ME, 6% protein; DDG 13ME, 20% protein; and silage 10ME, 16% protein.
- The above feeding rates do not taken into account wastage or the impact of cold weather.
- The above feeding rates also assume that livestock are healthy with no impact of internal parasites, mineral deficiencies etc.

Nutrient requirements in mid pregnancy are only slightly above a dry cow. As such, a wide range of supplements can be used, including good quality hay.

Late pregnancy (8 months pregnant)

Table 2: Energy intake and feeding requirements for **breeding cows in late pregnancy** grazing highly digestible (75%), short green pasture ranging from 1.5cm - 2cm in height (500 – 700kg DM/ha)

Energy required (MJ ME/day)	Energy obtained from short green pasture (MJ ME/day)	Supplement	Daily feeding amount (kg/hd/day)	Comments
85 - 95	55 - 65	**Legume/grass hay (legume dominant)** 9 ME; 15% protein	2.5 - 5.0	A very good quality hay (9ME) is needed to meet overall energy requirements when grazing pasture this short in late pregnancy. If hay is 8.0 ME then you would expect slight loss of body condition in cows (approx 10 - 15kg over a month)
		Cereal grain + hay (80:20 mix) 11.7 ME; 10 % protein	2.0 - 4.0	**Cereal grain and grain-based pellets need to be introduced slowly to avoid grain poisoning -** refer to the introductory program in the DPI drought feeding guide. Feeding rates will need to be increased if grain is below 12.5 ME.
		Dried Distillers Grain + hay (80:20 mix) 12 ME; 17% protein	2.0 - 4.0	While the feeding recommendation assumes a good quality hay is being used (e.g. 8.5ME cereal hay), a lower quality roughage could also be used as the majority of the energy and protein is coming from the DDG.
		Silage 10 ME; 16% protein (45% DM)	4.0 - 9.0	Silage can vary significantly in energy, protein and moisture content, all of which will impact on feeding rates and animal performance. Use a feed test to confirm these values.

Figures in Table 2 have been calculated using Grazfeed. The assumptions are:

- British breed cattle, 550kg mature cow weight (fat score 3)
- Cows are grazing a very short green pasture that is 1.5 – 2.0cm high (500 – 700kg DM/ha)
- Pasture is 75% digestibility and contains 15% legume. There is no dry standing feed (i.e. dead component)
- Cereal grain is 12.5 ME, 11% protein; cereal hay 8.5 ME, 6% protein; DDG 13ME, 20% protein; and silage 10ME, 16% protein.
- The above feeding rates do not taken into account wastage or cold weather
- The above feeding rates also assume that livestock are healthy with no impact of internal parasites, mineral deficiencies etc.

When grazing pasture less than 2cm, providing high quality, high energy supplements becomes increasingly important as the cow progresses towards the later stages of pregnancy

Early lactation (first 3 months)

Table 3: Energy intake and feeding requirements for **breeding cows in early lactation** grazing highly digestible (75%), short green pasture ranging from 1.5cm - 2cm in height (500 – 700kg DM/ha)

Energy required (MJ ME/day)	Energy obtained from short green pasture (MJ ME/day)	Supplement	Daily feeding amount (kg/hd/day)	Comments
120 – 130	70 - 85	**Legume/grass hay (legume dominant)** 9 ME; 15% protein	3.0 - 5.0	Digestibility limits intake, even with good quality hay. Feeding 3 - 5kg/hd/day is recommended to drive lactation and prevent excessive weight loss in the cows. Feeding an energy concentrate with the hay will give better results.
		Cereal grain + legume hay (80:20 mix) 11.8 ME; 12% protein	2.5 - 4.0	The lower end of the daily rate would be used where cows are in good condition at calving (i.e. Fat score 3 +) and you can afford to milk of her back. The higher end is recommended if fat score is less than ideal at calving and you are trying to limit excessive weight loss
		Dried Distillers Grain + hay (80:20 mix) 12 ME; 17% protein	2.5 - 4.0	As above
		Silage 10 ME; 16% protein (45% DM)	5.5 - 9.0	As above

Figures in Table 3 have been calculated using Grazfeed. The assumptions are:

- British breed cattle, 550kg mature cow weight (fat score 3)
- Cows are grazing a very short green pasture that is 1.5 – 2.0cm high (500 – 700kg DM/ha)
- Pasture is 75% digestibility and contains 15% legume. There is no dry standing feed (i.e. dead component)
- Cereal grain is 12.5 ME, 11% protein; cereal hay 8.5 ME, 6% protein; DDG 13ME, 20% protein; and silage 10ME, 16% protein.
- The above feeding rates do not taken into account wastage or cold weather
- The above feeding rates also assume that livestock are healthy with no impact of internal parasites, mineral deficiencies etc.

Providing high quality, high energy supplements is particularly important in early lactation when cows are grazing pastures that are less than 2cm high.

PART B: When pasture is more than 2cm high

Mid pregnancy (5 months pregnant)

Table 4: Energy intake and feeding requirements for **breeding cows in mid pregnancy** grazing highly digestible (75%), green pasture ranging from 2.5cm to 5.0cm in height (800 – 1500kg DM/ha)

Energy intake/ supplement required	Pasture Height (herbage mass - green component)			Comments
	2.5cm (800kg DM/ha)	3cm (1100kg DM/ha)	5cm (1500kg DM/ha)	
Energy required (MJ ME/day)	70 - 75			Where pastures are of high quality (i.e. 72% digestibility or better), cows in mid pregnancy (4 - 5 months) will be start gaining body condition once pastures reach around 1000 kg DM/ha (approx 3.0cm). The values in brackets in the table indicate the amount of 'maternal' liveweight gain of the cow that can be expected with different amounts of pasture. This weight gain is independent of any gain from the pregnancy (foetus and uterus)
Pasture intake (kg DM/day)	6.7	7.5	8.8	
Energy obtained from pasture (MJ ME/day)	76	84	100	
Amount of good quality hay (8.5ME) required to maintain cow condition (kg/hd/day) (cow daily gain: kg/hd/day)	**Nil**	**Nil** (0.2)	**Nil** (0.5)	

Figures in Table 4 have been calculated using Grazfeed. The assumptions are:

- British breed cattle, 550kg mature cow weight (fat score 3)
- Cows are grazing a very short green pasture that is 2.5 – 5.0cm high (800 – 1500kg DM/ha)
- Pasture is 75% digestibility and contains 15% legume. There is no dry standing feed (i.e. dead component)
- Cereal grain is 12.5 ME, 11% protein; cereal hay 8.5 ME, 6% protein; DDG 13ME, 20% protein; and silage 10ME, 16% protein.
- The above feeding rates do not taken into account wastage or cold weather
  The above feeding rates also assume that livestock are healthy with no impact of internal parasites, mineral deficiencies etc.

Once pastures reach around 2.5cm and above, daily energy and protein needs can be met by feeding a good quality hay. However, this is assuming that the pasture being grazed is of good quality and highly digestible.

Late pregnancy (8 months pregnant)

Table 5: Energy intake and feeding requirements for **breeding cows in late pregnancy** grazing highly digestible (75%), green pasture ranging from 2.5cm to 5.0cm in height (800 – 1500kg DM/ha)

Energy intake/ supplement required	Pasture Height (herbage mass - green component)			Comments
	2.5cm (800kg DM/ha)	3cm (1100kg DM/ha)	5cm (1500kg DM/ha)	
Energy required (MJ ME/day)	80 - 100			^ A good quality hay (8.5ME or better) can meet overall energy requirements provided that pastures are of high digestibility (e.g. 75%). Feed quality and the amount required are highly sensitive to pasture conditions - small changes in pasture height and digestibility have a big impact.
Pasture intake (kg DM/day)	6.8	7.5	8.9	
Energy obtained from pasture (MJ ME/day)	76	85	100	
Amount of good quality hay (8.5 ME) required to maintain cow condition (kg/hd/day)	**2.0 - 2.5^**	**0.5 - 1.0**	**Nil**	

Figures in Table 5 have been calculated using Grazfeed. The assumptions are:

- British breed cattle, 550kg mature cow weight (fat score 3)
- Cows are grazing a very short green pasture that is 2.5 – 5.0cm high (800 – 1500kg DM/ha)
- Pasture is 75% digestibility and contains 15% legume. There is no dry standing feed (i.e. dead component)
- Cereal grain is 12.5 ME, 11% protein; cereal hay 8.5 ME, 6% protein; DDG 13ME, 20% protein; and silage 10ME, 16% protein.
- The above feeding rates do not taken into account wastage or cold weather
  The above feeding rates also assume that livestock are healthy with no impact of internal parasites, mineral deficiencies etc.

Once pastures reach around 2.5cm and above, daily energy and protein needs can be met by feeding a good quality hay. However, this is assuming that the pasture being grazed is of good quality and highly digestible.

Early lactation (first 3 months)

Table 6: Energy intake and feeding requirements for **breeding cows in early lactation** grazing highly digestible (75%), green pasture ranging from 2.5cm to 5.0cm in height (800 – 1500kg DM/ha)

Energy intake/ supplement required	Pasture Height (herbage mass - green component)			Comments
	2.5cm (800kg DM/ha)	3cm (1100kg DM/ha)	5cm (1500kg DM/ha)	
Energy required (MJ ME/day)	120 – 130			^ High quality supplements (e.g. clover or lucene hay, good quality silage, cereal grain, pellets, dried distillers grains etc.) will need to be fed where pastures are very short (i.e. 2.5cm or less) to avoid excessive weight loss in cows and enable satisfactory milk production, especially in the first 6-8 weeks of lactation. Causmag can be applied to the hay to reduce the risk of grass tetany . Once available pasture is sufficient (i.e. 1100 - 1200kg DM/ha or above) magnesium can be supplemented by using other delivery methods.
Pasture intake (kg DM/day)	8.8 - 9.3	9.8 - 10.4	11.5 - 12.0	
Energy obtained from pasture (MJ ME/day)	100 - 105	110 - 115	130 - 140	
Amount of good quality hay (8.5 ME) required to drive lactation and avoid excessive weight loss in cows (kg/hd/day)	**2.0 - 2.5 ^**	**Nil**	**Nil**	

Figures in Table 6 have been calculated using Grazfeed. The assumptions are:

- British breed cattle, 550kg mature cow weight (fat score 3)
- Cows are grazing a very short green pasture that is 2.5 – 5.0cm high (800 – 1500kg DM/ha)
- Pasture is 75% digestibility and contains 15% legume. There is no dry standing feed (i.e. dead component)
- Cereal grain is 12.5 ME, 11% protein; cereal hay 8.5 ME, 6% protein; DDG 13ME, 20% protein; and silage 10ME, 16% protein.
- The above feeding rates do not taken into account wastage or cold weather
  The above feeding rates also assume that livestock are healthy with no impact of internal parasites, mineral deficiencies etc.

Once pastures reach around 2.5cm and above, daily energy and protein needs can be met by feeding a good quality hay. However, this is assuming that the pasture being grazed is of good quality and highly digestible.

Appendix 1: Fat Scoring Beef Cattle

Fat Score 1

(0–2 mm P8; 0–1 mm 12th rib)*

Animal is emaciated. Ribs and short ribs are sharp. There is no fat around the tailhead. Hip bones, tailhead and ribs are prominent.

Fat Score 2

(3–6 mm P8; 2–3 mm 12th rib)

No fat beside tailhead. Short ribs and long ribs are easily distinguished. Spines feel rounded rather than sharp. Hip bone and ribs are hard. Ribs are no longer visually obvious.

Fat Score 3

(7–12 mm P8; 4–7 mm 12th rib)

Short ribs are prominent, rounded but still easily felt. The ribs are easily felt using firm pressure to distinguish between them. Fat that is easily felt covers either side of the tailhead

Fat Score 4

(13–22 mm P8; 8–12 mm 12th rib)

Short ribs cannot be felt. There is some fat cover around the hip bone. Small mounds of fat which are soft to touch are present around the tailhead. Ribs are hard to feel.

Fat Score 5

(23–32 mm P8; 13–18 mm 12th rib)

Short ribs cannot be felt. Tailhead and hip bones are almost buried in fat. Ribs appear 'wavy' due to fat folds. There is fat in the brisket and udder, and squaring-off in the flank area.

Fat Score 6

(32+ mm P8; 18+ mm 12th rib)

Short ribs cannot be seen. Tailhead and hips are completely buried by large 'rounds' of fat. Ribs are 'wavy' due to fat folds. The brisket and udder are heavy. The flank is squared off and has a blocky appearance. The animal's mobility is reduced to a walk.

Source: NSW DPI 2006: Primefact 282 'Visual and manual assessment of fatness in cattle' (B McKiernan and B Sundstrom)

More information

For further information contact your Local Land Services Ag Advisor or District Veterinarian.