



Browser's Bulletin 61:

Energy Requirements of Small Ruminants

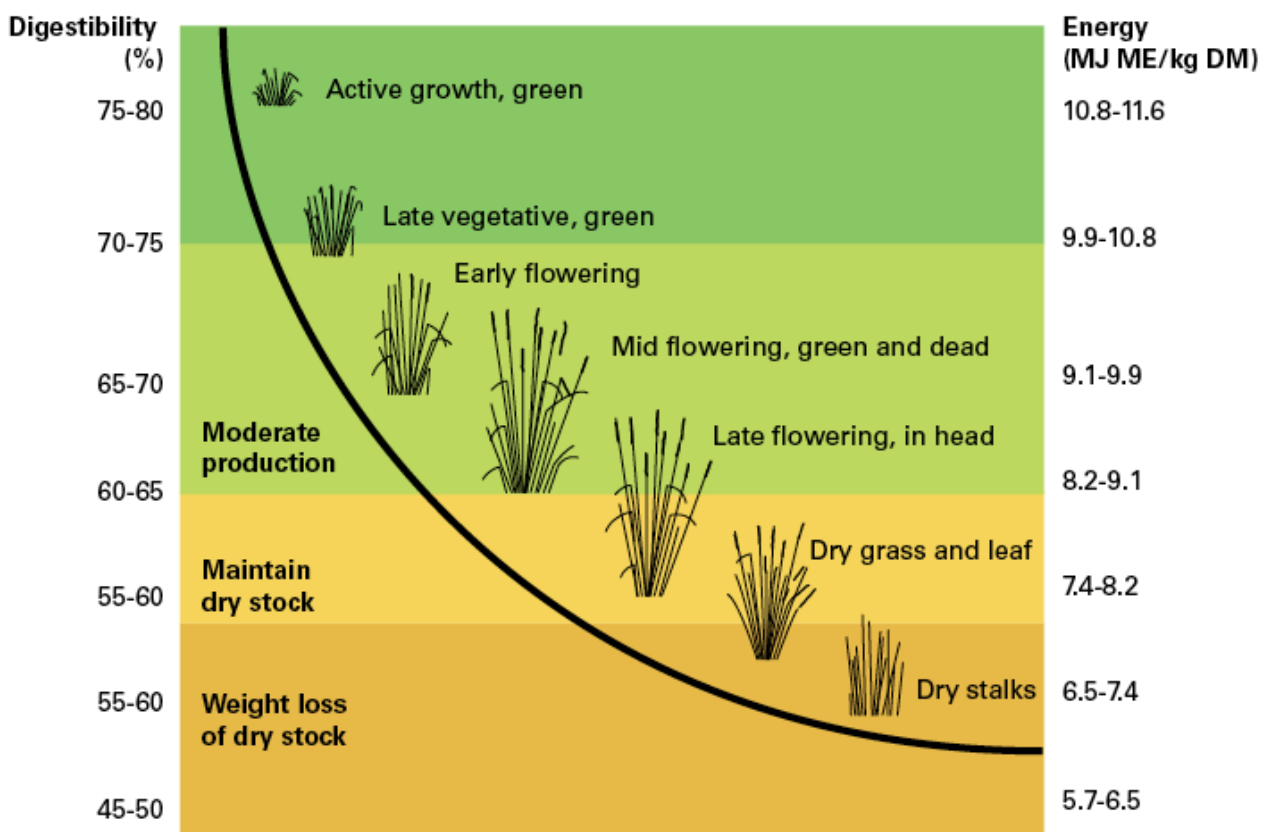
Last month we established stocking rates for the livestock on your property and calculated the DSE rating of your herd according to season of the year and stage of production (pregnant, lactating etc.). This month, I wanted to focus on Metabolisable Energy (ME). Energy is the main limiting factor to animal performance and survival. Metabolisable Energy (ME) requirements of your animals is dependent on the animal's level of production.

The amount of energy available from a feed depends on its digestibility. Digestibility will be given as a percentage. The higher the digestibility the more energy you get from the feed and less is passed through as waste products. Metabolisable energy is assessed as megajoules of metabolisable energy per kilogram of dry matter (MJME/kgDM). Dry Matter (DM) is the non-water component of a plant. It is difficult to accurately determine the intake and quality of the diet when goats are grazing native pastures. The MLA Pasture Ruler is a useful tool that you can download at <https://mbfp.mla.com.au/pasture-utilisation/tool-31-pasture-rulers-sticks-and-meters/> The Pasture Ruler estimates the pasture quantity and quality and gives a rough guide of what you can expect from your grazing animals.

Digestibility is heavily influence by fibre content and balance of nutrients in the diet. For example, if a goat is on a high fibre diet, they can only consume approx. 1.5% of their body weight (BWT) but if they were on a low fibre, high concentrate diet they can consume approx. 5% BWT.

Nutritional value of plants will change throughout the growth process. Young actively growing pasture can have 80% water content (only 20%DM) but higher ME, but as the plant matures it increases the DM (Dry Matter) content and decreases digestibility and ME content. The MLA (Meat & Livestock Australia) diagram below illustrates how the digestibility and energy levels vary with a plant's stage of growth.

MLA: a guide to the decline in digestibility as temperate pastures mature (Harrington et al 1984)



- Dry matter intake will vary with: Digestibility, moisture content, pasture sward height, pasture yield, stage of growth, palatability, pasture contamination (eg faeces), nutrient balance, stress on the animal (eg worms, disease, bullying), age and class of animal, milk yield, water quality)
- Fortunately, the US National Research Council have tables available of average figures of ME and Crude Protein levels as a guide for particular feeds. It is recommended to get a complete feed analysis done periodically for more accuracy. Feed analysis kits are available through your local LLS Office. <https://www.mla.com.au/globalassets/mla-corporate/generic/extension-training-and-tools/gig-nutrition.pdf> Table 8-page 27 US NRC Composition of Common Feeds
- The table below is a rough guide of ME values for different pasture mixes, hay, grain and straw.

Metabolisable Energy of common goat feed types (average values)	Metabolisable Energy MJ ME/kg DM
Temperate pasture mix: lush, green pasture	10.0–12.0
Temperate pasture mix: early summer pasture	7.0
Temperate pasture mix: late summer pasture (dry)	5.0–10.0
Temperature pasture mix: hay	1.0–9.0
Grain	13
Straw	5.8

A dry sheep equivalent (DSE) is the metabolic energy requirements of a 50kg Merino wether at maintenance and walking 7km/day = 9.44 MJ. From the table above we can estimate that the 50kg wether requires

- * **0.86kg Temperate pasture mix (lush, green pasture at 11MJME/kg DM)**
- * **1.4kg Temperate pasture mix (early summer pasture at 7MJME/kgDM)**
- * **1.8kg dry temperate pasture mix at 5MJME/kgDM**
- * **0.7kg grain**

If the diet is too high in fibre, the goat would not be physically able to consume the quantity required to meet the energy needs of the animal.

- **High Energy Feeds**= Barley, Corn, Wheat, Molasses, Lupins, Cottonseed
- **Medium Energy Feeds**= Brewer's grain, Lucerne Hay, Corn Silage
- **Low Energy Feeds**= Barley Straw, Wheat Straw, Corn Hulls
- **High Protein**= Cotton Seed Meal, Sunflower Meal
- Establish your own library of reference feed values from the US National Resource Council (US NRC), feed packaging information, feed analysis and other reputable references. Compare feed costs with feed value and place and rank feed in order of importance.
- Introduction of grains or pellets into the diet to increase the energy or protein levels should be introduced slowly over 2 weeks to prevent upsetting the healthy gut bacteria. Watch for clinical signs of grain poisoning (acidosis). These clinical signs would include sloppy poos (poo pancakes), decreased feed intake, lameness, and death. If goats are on a grain diet, it is recommended to have a limestone: salt (1:1) lick available or to mix 1% limestone and 0.5% salt into the grain mix. To prevent bladder stones (uroliths) when goats are on a grain or high concentrate diet, add 1% ammonium chloride to the diet. A buffer pellet is often used to prevent grain poisoning, but they need to ensure that it is palatable.
- A Clostridial vaccination should be given when there is any change is diet, to prevent Enterotoxaemia (commonly called 'Pulpy Kidney').
- Fibre is recommended at 15% of the diet to maintain a healthy gut and prevent grain poisoning.

- Supplementary feed should not be fed off the ground, not only will it increase wastage but also increase chance of disease (bacterial infections)
- If you are mixing your own diets, check feed in the bin daily to see if they are sorting out feed with their mouths and leaving parts of the diet behind.
- Change in weather can alter the feed intake and when they bounce back can induce acidosis
- When supplementary feeding, ensure there is enough room for all goats to eat and are not being bullied. If so, they should be removed and fed separately.
- Clean water daily. When on a grain/concentrate diet, the feed will get a lot of grain dust/debris and the water will taste off. Decreased water consumption will decrease feed intake.

There is so much more to the nutritional requirements of small ruminants and I am just skimming the surface. Hopefully it assists producers understanding how pasture digestibility changes and how the animal may not be able to physically eat enough of the feed to satisfy their feeding requirements for their stage of production. I would recommend further reading of the References and Resources listed below. If you have other questions and concerns about small ruminant nutrition, please send me an email at kylie.greentree@lls.nsw.gov.au

References and Resources

http://www.makingmorefromsheep.com.au/efficient-pastoral-production/procedure_12.5.html

http://www.makingmorefromsheep.com.au/healthy-contented-sheep/tool_11.1.html

<https://www.mla.com.au/globalassets/mla-corporate/generic/extension-training-and-tools/gig-nutrition.pdf>

<https://www.mla.com.au/globalassets/mla-corporate/generic/extension-training-and-tools/gig-nutrition.pdf>

<https://mbfp.mla.com.au/pasture-utilisation/tool-31-pasture-rulers-sticks-and-meters/>

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