



NUTRITIONAL MANAGEMENT

DURING HEAT STRESS

by **Cliff Harrington**

The year is flashing by and summer is fast approaching with all the problems associated with it – heat stress in particular.

““ Cows have a very limited ability to dissipate heat, doing so largely by panting, which is not really efficient. ””

Fermentation in the rumen is what gives ruminants the ability to digest and convert nutrients of relatively low digestibility into meat or milk. Unfortunately, this process creates a great deal of heat – beneficial in the cold but very negative when it is hot.

Cows have a very limited ability to dissipate heat, doing so largely by panting, which is not really efficient. This is exacerbated during high humidity. Dry matter intake (DMI) is negatively affected, probably in an attempt to reduce the amount of heat produced during fermentation. Nutrient requirements for a given production function (eg milk production) remain the same, and in fact increase with panting. Remember, the poorer the digestibility of a feedstuff, the greater the heat produced during fermentation. The fermentation and digestion of wheat straw produces far more heat than for example maize silage.

Energy density

The only effective means of countering the falling DMI is by increasing the energy density of the diet fed. For example, a 700 kg cow producing 45 l of milk (fat 3,5%, protein 3,2%) needs 325 MJ of ME/day:

DMI	Diet energy level
28 kg	11,6 MJ ME/kg DM
26 kg	12,5 MJ ME/kg DM

325 MJ ME/day

energy required by a
700 kg cow producing
45 l of milk
(fat 3,5%, protein 3,2%)

1,5% of
bodyweight
max NDF a cow will eat
per day

7% of ration DM

max total fat inclusion

Of course, do everything you can to maintain DMI; using fans and water cooling is probably the most effective, even for non-housed cows. Holding areas are normally the hottest places on any dairy farm. Cows tend to congregate here, generating more heat, which is why it is the most important and easiest place to cool cows, particularly on pasture farms.

Fibre

The fibre (NDF) fraction of a diet is largely negatively correlated with DMI, as cows seldom eat more NDF than 1.5% of their bodyweight. This means a 400 kg cow is highly unlikely to eat more than 6 kg of NDF in a given day. The most practical method of increasing DMI remains the reduction of diet NDF. This is, however, not without risk, as a certain amount of effective fibre is needed to maintain rumen health and the fat content of milk. The risk of acidosis increases when reducing the amount of effective fibre in the ration. It is therefore advisable to include a good buffer. Also, consider a yeast culture as it invariably increases the microbial population in the rumen and improves nutrient metabolism and digestion, especially fibre.

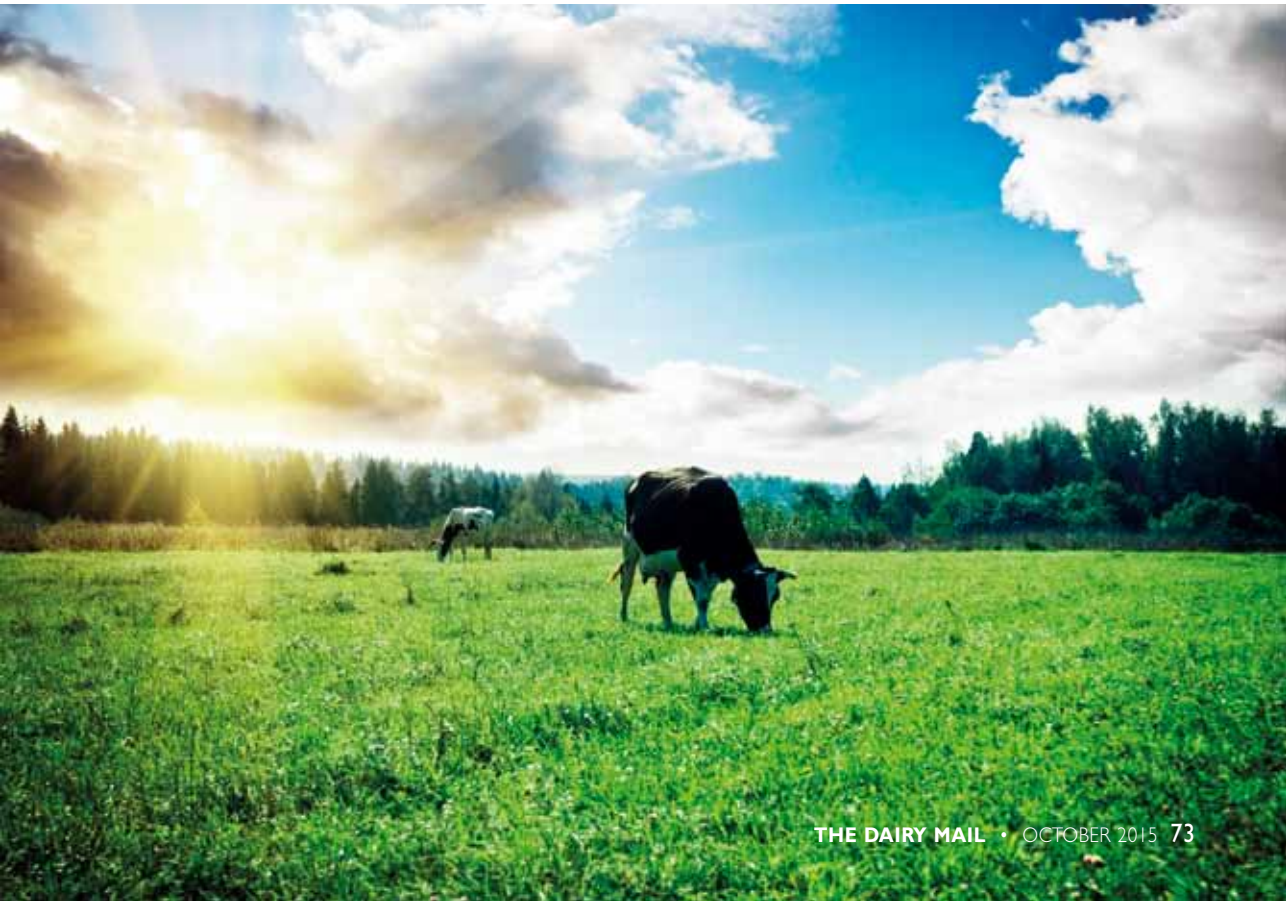
Fat

The inclusion of fat, which has a significantly higher energy concentration than any other feed, coupled with its low heat increment value, helps maintain energy intake during heat stress. It is, however, best to add it in a rumen-protected form to avoid any adverse effect on fibre digestion. The total fat content in a diet should not exceed 7% of diet DM.

Protein

The same principle applies to diet protein, where the reduced DMI forces us to look at the diet protein requirement slightly differently. The diet protein

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requirement, as with energy, remains the same, but take care not to feed excess rumen-degradable protein. An oversupply of rumen-degraded protein will make the cow use energy to convert the protein to urea and excrete it in the urine, causing a particularly high energy demand at a time when the cow is already under pressure. Increase the levels of rumen-undegradable protein rather than the total protein level alone. Also, remember that because the cow's DMI is lower, it will result in lower microbial protein levels. Reduce non-protein nitrogen (NPN) levels in the feed, as the cow is more dependent on dietary amino acids in times of heat stress. Cows on heavily fertilised pastures are already vulnerable, with up to 60% of the protein content of certain fertilised grasses being in the rumen-degradable form. Therefore, pay special attention to their diets.

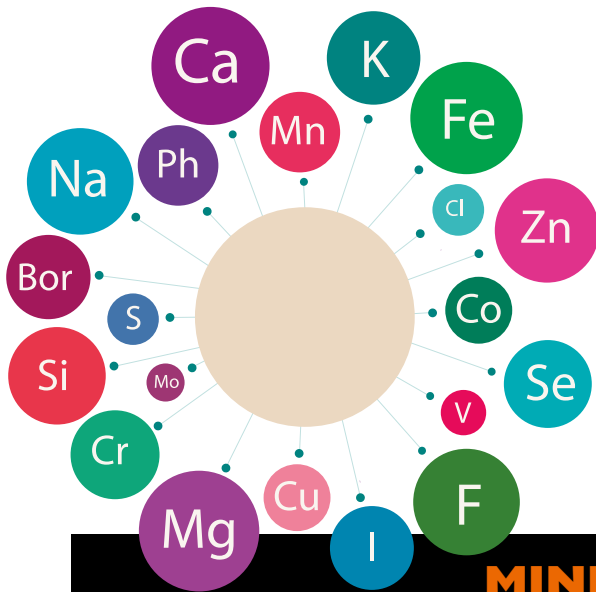
Roughage

We have seen that poorer-quality roughage invariably has a lower digestible value, which means slower digestion and even more metabolic heat. Save the best quality roughage for the peak summer months.



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Bear in mind that you should limit secondary fermentation as much as possible. In other words, only use fresh silage. The same applies to fermentation products such as brewers' grain – use as fresh as possible. It is also a good idea to include a toxin-binder in the diet, should you not do it as standard, as the risk of toxins greatly increases in summer. Bear in mind that all high-moisture feeds are at risk of secondary fermentation.



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MINERALS

As with other nutrients, mineral inclusion levels must increase. Cows will often salivate excessively during heat stress, leading to further loss of minerals, reducing the buffering capacity

of the metabolic system in which saliva plays a significant role. Demand for key minerals, such as phosphorus, potassium, sodium, chloride and sulphur increases further.

Management

Re-evaluate moisture levels of TMR diets. A small increase will often have a huge influence on DMI.

Cows will eat more at cooler times of the day, with maximum intakes occurring early in the morning and later in the evening. This includes the further benefit of maximum rumen fermentation and the generation of metabolic heat at a cooler time of the day.

Consider extra feeding times per day, especially for high producers; this tool can be used effectively for pasture cows as well. Push up feed for TMR cows more regularly.

Feed should be fresh, particularly for pasture-fed cows that have better intake on fresh grass.

Include a feed flavourant. *Capsicum* has shown very positive results in heat-stressed cows, with DMI holding significantly better.

Bear in mind that any function that increases the metabolic rate will lead to a poorer capacity to handle external heat. Cows at most risk are fresh cows, high producers, older cows and those in the final phase of pregnancy, not forgetting calves in hutches.



11 TOP TIPS

1. **Cool cows down** as much as possible.
2. **Ensure fresh, clean water** is available at all times.
3. **Reduce NDF levels in the diet, however, take the danger of acidosis and milk fat depression into account.**
4. **Consider the inclusion of rumen-protected fats.**
5. **Increase the level of rumen-undegradable protein.**
6. **Increase the mineral inclusion level.**
7. **Feed at optimum times.**
8. **Provide feed as fresh and palatable as possible.**
9. **Move cows as little as possible at times of peak heat.**
10. **Draw up a “battle plan for heat stress” with your technical advisor well before the onset of summer.**
11. **Try to maintain cow health at all costs and maximise margin over feed cost, even if the unit price of the feed may appear higher.**



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