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The current heatwave reminds us all about Heat stress in livestock; the comfort zone or thermoneutral zone for a dairy cow is wide varying from around -15°C to +25°C. Minus 15 ˚C is called the Lower Critical Temperature (LCT) and 25 ˚C the Upper Critical Temperature (UCT). At temperatures below the LCT the cow will increase her dry matter intake to keep warm or convert feed to heat rather than produce milk. At temperatures above the UCT, cows have two main control strategies to maintain their thermal balance:

1. **Increasing heat dispersion** - in particular evaporation, by increasing subcutaneous blood flow, panting, drooling etc. These activities increase the maintenance energy needs of the animal by an estimated 20% at 35°C. This means that part of the cow's production energy will be re-directed to thermal regulation.
2. **Limiting heat production** - by reducing all activity and changing the feeding pattern. As the majority of heat production in dairy cows is essentially due to rumen fermentations the cow will reduce her DM intake by 10-30%. She will also be selective in what she will eat - namely less roughages. The latter increase rumen activity and therefore heat production. Also, rumination, which produces heat, decreases dramatically.

If an animal fails to control her thermal balance, she becomes heat stressed, her feed intake will decline and so will her milk yield. As the ambient temperature increases above the UCT, milk yields can fall by as much as 20%. There will also be a reduction in fertility, including an increase in embryonic loss. There is also evidence of an increase in the risk of clinical mastitis. High-yielding cows generate more heat than dry cows irrespective of ambient temperatures. A cow yielding 18 litres per day will generate 28% more body heat than a dry cow. A cow yielding 31 litres a day produces 48% more body heat than a dry cow. In broad terms, each cow produces the same heat output as a 1.4kW electric heater. There is evidence that heat stress is most marked when it comes in short bursts with no time for the cow to adapt to the rising temperatures.

Whenever feed intake decreases due to heat stress, nutrient concentration should increase to maintain adequate intake of all required nutrients. Low quality, stemmy forages generate more heat by fermentation inside the rumen. High quality forages are digested faster and result in less heat being produced. Increasing the energy density might entail the use of greater amounts of concentrate and/or by-products. Increasing the energy density of the diet, using high quality forages and feeding more concentrates should help the animal maintain her energy requirements even though she consumes less dry matter. However, care should be taken to balance diets properly in order to avoid digestive disorders such as acidosis and displaced abomasums.

Provision of water is critical. Cows are unlikely to walk more than 250 metres to drink so it is essential that all fields and buildings are adequately supplied. As temperatures rise, cows will drink more. In hot weather, water intakes can increase by 10 - 20%, so it is essential that yards, buildings and grazing areas are well supplied by water troughs. When temperatures rise, cows can drink in excess of 100 litres / day, even the lower yielding cows. If cows have access to outside yards or grazing, it is very important that the water is close to shade and a source of feed.