

Avoiding Heat Stress

The weather has been really hotting up lately, which is good news for getting your silage in, but not such good news for your cows, particularly in dairy herds. Adult cows cope much better with low temperatures than high temperatures, mainly due to their high metabolic rate and the amount of heat produced by the rumen.

The temperature comfort zone or 'thermoneutral zone' for a cow ranges from -15°C to +25°C. Outside this range, cows have to use certain mechanisms to maintain a stable core temperature of 38.8°C +/- 0.5.

How do they keep cool?

There are two main mechanisms cows use to keep cool when the air temperature is high:

1. Increasing heat dispersion, mainly via evaporation. This is achieved by:
 - Directing blood flow to the surface of the skin
 - Panting and drooling

Doing this increases the animal's maintenance energy by around 20%.

2. Limiting heat production:
 - Reducing activity as much as possible
 - Changing eating patterns – as a majority of heat production comes from the rumen, a hot cow will drop her dry matter intake by 10-30%.

What does this mean in terms of productivity?

A decline in feed intake leads to reduced milk production.

Increased temperature also leads to an increase in early embryonic death, so a reduction in fertility.

High temperatures have also been shown to increase levels of clinical mastitis.

How can you tell if your cows are suffering?

Heat stressed cows will become lethargic, inactive and will often stand with heads bowed. They may be seen panting / drooling. Breathing may be rapid in an attempt to dissipate heat.



Strangely, heat stressed cows tend to stand close together in tightly packed groups.

Effect of Humidity

Relative humidity has a massive effect on the temperature at which cows will suffer from heat stress:

Temperature Humidity Index (THI)										
Relative Humidity %										
C	20	30	40	50	60	70	80	90	100	
22	66	66	67	68	69	69	70	71	72	
24	68	69	70	71	71	72	73	74	75	
26	70	71	72	73	74	75	77	78	79	
28	72	73	74	76	77	78	80	81	82	
30	74	75	77	78	80	81	83	84	86	
32	76	77	79	81	83	84	86	88	90	
34	78	80	82	84	85	87	89	91	93	
36	80	82	84	86	88	90	93	95	97	
38	82	84	86	89	91	93	96	98	100	
40	84	86	89	91	94	96	99	101	104	

No heat stress (Blue)

Moderate heat stress (Green)

Severe heat stress (Yellow)

Dead cows (Red)

Effect of relative humidity on temperature at which cows suffer from heat stress

As the table shows, in high humidity levels cows can become heat stressed at temperatures as low as 22°C.

The UK tends to have a very high relative humidity, and it can often reach nearly 100% in poorly designed housing.

Management of Heat Stress

Buildings

Shade, ventilation and cooling are the key measures to reduce heat stress.

Obviously, the installation of fans and sprinklers will provide a significant reduction in heat, however there are cheaper measures which may make a difference before these have to be employed.

Opening up side inlet vents and ridge outlets can provide additional airflow to help with cooling; as can removing vegetation and foliage around buildings which may be blocking natural airflow.

Smoke bombs can be used to assess ventilation and see where improvements can be made – increased airflow massively increases evaporative heat loss from the skin. Research from the USA suggests an increase in airflow of up to 10km/hour can reduce respiration rates by 50%!

If mechanical ventilation is decided to be the best option, the use of fans and water sprayed onto the cow can drastically reduce heat stress. Water should be applied for a short period, followed by a period of increased airflow to assist evaporation and heat removal.

Care must be taken as to where to apply the water; wetting of the beds can lead to increased mastitis levels. Applying water and fan cooling in the collecting yard is a good idea as it is one of the worst places for heat stress due to crowding of cows. If this is undertaken, it is essential that careful teat disinfection and drying takes place prior to milking to prevent mastitis from any water that may have trickled onto the teats.

Roof insulation for housed cows can reduce solar penetration and so lower temperatures in sheds but this can be

expensive. Painting over roof lights is an option to reduce solar penetration. For new builds consider installing fewer roof lights on the south facing side.



Be aware that heat stress can still be a problem in the winter in crowded, poorly ventilated sheds, mainly due to high humidity.

Feeding times

In summer, feeding 60% of the ration between 8pm and 8am can increase intakes – cows consume less in the day, eating little and often. At night, when the temperature drops, they will eat more. They also tend to sort feed more, choosing feeds which produce less heat during digestion (such as grains and proteins) so mixing of rations is important.

Water

Provision of water is critical – cows are unlikely to walk over 250m to drink so it is essential all areas are adequately supplied. As well as being close enough, sufficient space at water troughs is also essential – at least 10cm per cow trough space is needed. It is also important to ensure there is a rapid enough flow rate to keep troughs topped up.

In hot weather, water intake increases by 10-20% – even lower yielding cows may drink more than 100l/day. If cows are in outside yards, it is important water is located close to shade and feed.

Finally, don't forget that heat stress can also occur in grazing animals – ensure there is always shelter available and a good supply of clean, cool water.



All the best, Sarah

New Thermometers

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