3-15 Managing heat stress in dairy cows

What is heat stress?

- Heat stress occurs when a dairy cow’s heat load is greater than her capacity to lose heat, and is sometimes referred to as hyperthermia.
- Although effects of heat stress are more severe in hot climates such as in parts of America and Australia, dairy cows in areas of New Zealand are affected by heat stress during summer (Bluett et al. 2000).

What causes heat stress?

- The most important factors affecting heat stress are air temperature, humidity, solar radiation and air movement
- When air temperature is greater than about 23°C and relative humidity is greater than 80%, cows begin to experience heat-induced depression of feed intake, and lower productivity (Flamenbaum et al. 1986)
- High relative humidity decreases evaporation and reduces the cow’s ability to lose heat by sweating and breathing
- Cows radiate heat during the night to the cooler surroundings, so high temperature, humidity and cloud cover at night can also reduce cooling.

What also affects heat stress?

- Individual cows respond differently to heat stress situations
- High producing cows have greater metabolic activity and produce more body heat than low producing cows and consequently experience more severe heat stress
- Different breeds of cows differ in their ability to cope with heat stress, i.e. Friesian cows appear more affected than Jerseys
- Shade is even more effective for reducing respiration rates of black cows. Black cows absorb heat more quickly than white coats, but also lose it quicker
- Cows with thick coats also suffer more from heat stress than cows with sleek coats.

What are the symptoms of heat stress?

To cope with a hot environment cows use a variety of strategies including:

- Increased breathing rate
- Increased water intake
- Increased sweating
- Decreased feed intake
- Decreased milk production
• Change in milk composition, e.g. fat % and protein % declines
• Change in blood hormone concentration, e.g. increased prolactin
• Changed behaviour:
  - Seek shade
  - Crowd together
  - Refusal to lie down
  - Change orientation to sun
  - Stand in water
  - Stand next to water trough.

If these strategies fail and the cow's heat load exceeds the body's removal ability, her body temperature will increase.

It has been estimated that with each 0.5ºC increase in body temperature above 38.6 ºC, milk yield will decline by 1.8 kg/day (15 g MS/cow/day) (Johnson et al. 1963).

The critical cow body temperature is 42ºC. Severe heat stress symptoms include extended head, protruding tongue, panting and drooling.

**What can you do?**

Minimum protective measures can be viewed as a form of insurance against possible milk production losses. These include:

<table>
<thead>
<tr>
<th>Water</th>
<th>Providing access to clean drinking water. Lactating cows will typically require more than 100 litres/cow/day and will drink between two to six times per day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Making water available to cows leaving the dairy</td>
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<tr>
<td>Feed</td>
<td>Ensure summer pasture is of high quality. Feed with a high fibre content can increase the heat of fermentation in the rumen, increasing the heat load on the cow (e.g. non-irrigated summer pasture)</td>
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<td>Provide supplementary feed at night when it is cooler</td>
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<td>Shade</td>
<td>Use paddocks with shade trees during periods of heat stress</td>
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<td></td>
<td>Providing shade at the shed if possible will help cows deal with warm weather</td>
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<td>Management</td>
<td>Reduce the walking distance and speed to the dairy</td>
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<td>Reduce the time spent in holding yards</td>
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<td>Minimise handling stress</td>
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<td>Isolate cows most severely affected by heat stress and provide shade and cooling</td>
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<td>Later afternoon milking times</td>
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<td>Cooling</td>
<td>Sprinklers can be used over the dairy yard to wet the cows coat and aid in evaporative cooling for between two to six hours after milking. However, sprinkling can increase the humidity around the cows, especially when they are held close together. The effectiveness of sprinkling depends on the removal of water vapour by air movement, ideally by using a fan</td>
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</tbody>
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**NOTE:** Farmers have an obligation under the Animal Welfare Act 1999 to ensure that cows have sufficient water and adequate shelter (two of the 'five freedoms').
References

