Tackling summer heat stress

Heat stress can affect fertility as well as milk yields so it is something dairy farmers need to be aware of. Genus ABS technical services director Huw Lloyd considers the problem and what can be done to reduce the risk.

Everyone likes to see cows out grazing on a bright summer’s day but it is important to appreciate that weather conditions can cause problems for dairy cows, explains Huw Lloyd. “Heat stress is a more common problem than is often appreciated and can have a marked impact on current and future performance.”

He explains it is not just a matter of temperature. Heat stress occurs when temperature and, critically, humidity act to increase the cow’s body temperature above normal limits.

“Milking cows are particularly sensitive to heat stress because they are working very hard and so have a high metabolic heat production. They are generating a lot of heat of their own so don’t really appreciate warm conditions. Heat stress can be a problem sooner than many think. Cows start to be affected by heat stress when the temperature reaches just 22°C (72°F).”

“The symptoms and effect of heat stress are many and varied and include reduced dry matter intake, increased water requirement, increased respiratory rate, greater water loss as evaporation, higher body temperature and changes to metabolic and hormonal rates. Given this list it is easy to see why both yield and fertility can be affected.”

Mr Lloyd explains that cows are under heat stress if they show one or more of the following symptoms:
- Body temperature above 39.2°C.
- Respiratory rate over 60 breaths per minute.
- 10% reduction in dry matter intake.
- Yield down more than 10%.

Measuring heat stress

“Measuring rectal temperature can indicate the level of heat stress,” he says. “As a rough rule of thumb, if more than seven out of 10 cows have rectal temperatures above 39.2°C in the afternoon, they are at risk of reduced yield and fertility. Respiration rate should be assessed at the same time, counting the number of breaths/flank movements for 30 seconds and multiplying by two.”

The extent of heat stress depends on the combination of temperature and humidity and advises

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the likely impact can be measured using the Temperature-Humidity Index (THI). Based on environmental temperature and humidity readings, it can be used to estimate the level of heat stress cows are suffering (see table 1). When THI index exceeds 72, reproductive efficiency can be affected.

"While there may only be a few days in a year when environmental temperatures and humidity increase the THI, the living environment of dairy cows can provide a greater risk, especially as it can increase humidity."

Reproductive efficiency

Mr Lloyd says the effect of heat stress on fertility is complicated as cows suffering from heat stress can be affected in several ways due to the physiology of the reproductive cycle and the stage within the cycle that cows are at when affected by heat stress.

"Firstly, heat stress reduces the length and intensity of heat expression oestrous events, with reduced activity and mounts. Heat stress has a direct impact on the follicle developing in the ovary, reducing the levels of oestrogen produced which accounts for the reduced signs of heat.

"Reduced oestrogen production has further consequences. Extended follicular dominance and delayed ovulation can lead to persistent follicles. Compromised follicles impact the resultant corpus luteum, leading to reduced progesterone production. Progesterone is the hormone responsible for maintenance of pregnancy and low levels are associated with reduced fertility.

"Heat stress also damages the developing oocytes in the ovaries and this, combined with the other effects can result in conception rates declining by 10% to 20% leading to a decline in 21 day pregnancy rate and overall reproductive efficiency. As oocytes develop over a period of time, sub-fertile oocytes can be present for several months, which can explain lags in reproductive performance after heat stress.

"Even after fertilisation has occurred heat stress can affect the embryo itself. The initial 24 hour period after the onset of oestrus and during the initial time post-breeding is challenging for a susceptible embryo during heat stress. Reduced embryo growth for the first 17 days can influence reduced conception success."

Mr Lloyd believes there is a sound economic case for trying to reduce the impact of heat stress on fertility and suggests there are many things that can be done quickly and reasonably cheaply to reduce the impact.

"If you spot the physical symptoms of heat stress, it is probably already too late as fertility will have been affected. While taking action to reduce the impact once symptoms are spotted will undoubtedly help, the aim must be to look at prevention, taking measures to stop cows being affected in the first place. To help your cows, you must support their ability to disperse heat through the four mechanisms available to them—conduction, convection, radiation and evaporation."

Maintaining good rumen health and preventing acidosis prevention is critical. Cows with heat stress ruminate less frequently, reducing natural saliva production so adding rumen buffers and yeast to the diet can help maintain rumen pH.

Diet formulation

He advises looking at diet formulation too. "Forages produce seven times more heat than concentrates in the rumen, so under heat stress conditions it may pay to reduce
forages and increase concentrates, particularly high fibre concentrates. Work with your nutritionist to reduce the forage to concentrate ratio sensibly. Feed good quality digestible fibre, and adjust protein supply to minimise excess rumen degradable protein (RDP) and ensure adequate supply of digestible rumen undegraded protein (DUP).”

**Water is crucial**

High yielding cows drink up to 150 litres of water per day, so provide access to plenty of fresh clean water at all times during the day including in collecting yards and immediately after milking. Check water pressure so troughs fill quickly, and clean troughs regularly. He advises setting a target of a minimum of 10cm linear water trough access per cow in sheds and outside and suggests installing extra temporary water troughs to increase access.

“Take steps to reduce exposure to the weather conditions that cause the stress. Make sure cows have access to sufficient shade and consider allowing cows back off grazing on hot days. In very hot weather it might be better to keep cows in by day and allow them to graze between afternoon and morning milking.

**Avoid overcrowding**

“Confined environments are a risk, so avoid overcrowding the collecting yard, perhaps bringing smaller groups in.

“Make sure buildings have efficient natural ventilation and consider forced ventilation using fans, ideally using fresh air.

“Finally, pay close attention to high risk groups such as the transition group and high yielding open cows.”

Mr Lloyd believes that with a proactive management approach, it is possible to reduce the impact of heat stress and achieve increased summer fertility, greater milk production and maximise cow comfort.

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