# Heat load in feedlot cattle: Are you prepared?

As we move further into warmer months, it is important for all feedlots to be conscious of heat load. This document will run through what is heat load, how it is caused and what tools and tips you need to mitigate your risk.

What is heat load?

To remain healthy, an animal must maintain it's body temperature within an optimal range. This means balancing the metabolic heat produced and the heat lost to the surrounding environment.

Cattle actively manage their 'heat load'. If the amount of metabolic heat produced internally by the animal and the heat gained from the external environment begins to exceed that lost, the animal starts to store heat, that they accumulate a heat load.

Heat produced internally by metabolic processes + Heat gained by external environment − Heat lost to external environment = Heat load
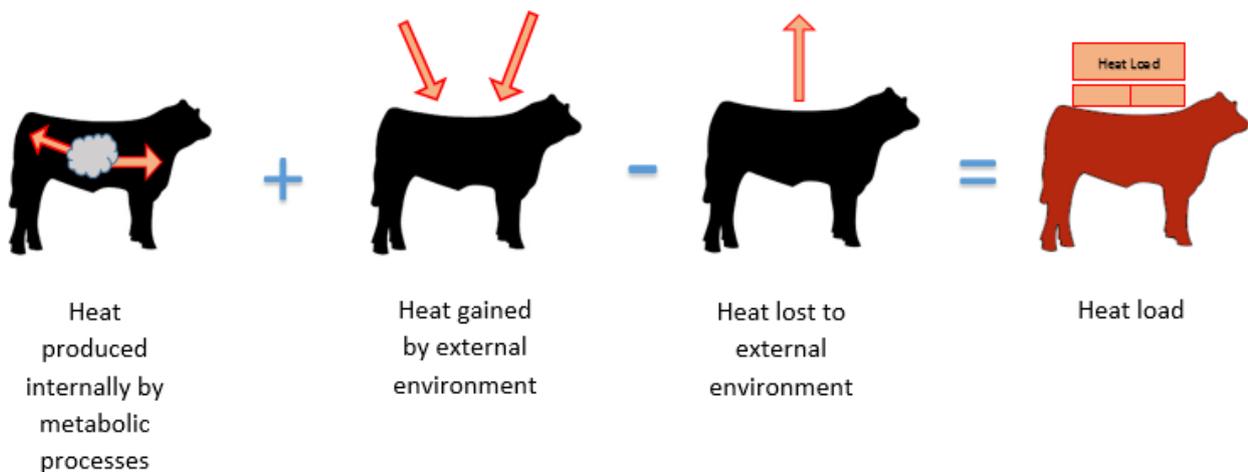
Although metabolic heat production is the major contributor to body heat load, cattle also take in additional heat from solar (sun) radiation, reflected radiation from the feedlot pad and other physical structures in the pen, and from the air itself, if air temperature is higher than the animal's body temperature.

Heat into system	Heat out of system
Metabolic (can be up to 70% of heat load into the system)	Conduction through contact with cool surfaces (only very minor unless cattle are lying down)
Radiation (direct sun and also reflective surfaces)	Air movement {convection} (either forced or natural) takes hot air away from the body surface
The air (if ambient temperature is greater than skin temperature, heat will transfer from the air to the body)	Radiation (only at night, and optimised if clear sky as opposed to cloudy)
Conduction through contact with hot surfaces (only very minor unless cattle are lying down)	Evaporation of moisture through sweating or panting
If heat into the system is greater than heat out of the system then heat will be stored. This is called a heat load.	

Evaporation is the major mechanism cattle use to dissipate heat. When the air is humid the ability for the air to evaporate is limited. **Therefore cattle are more likely to gain heat if the conditions are humid.**

What happens to a beast with Heat Load?

With severe or prolonged elevations in body temperature above acceptable levels body tissues and organs can be damaged and the animal may die. Along with the increased risk of cattle deaths, the impact of increased core body temperatures in such situations has been shown to result in production losses of $10 - $30 per head over a three month period from reduced feed intake. In some cases, severe or prolonged elevations in body temperature during heat load events can result in permanent productivity losses through tissue and organ damage. However, proactive management of heat load in cattle not only leads to improved animal welfare outcomes but also improved feedlot productivity and profitability. If you have not done so already, now is a good time to ensure that your feedlot is prepared for an excessive heat load event.

Observable signs of Heat Load
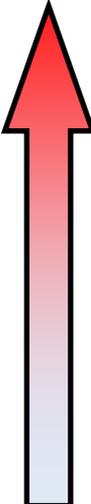
Death
Collapse, convulsions, coma
Down and unable to move
Drooling excessively
Open mouthed panting
Grouping to seek shade from herd mates
Rumen contractions reduced or halted
Agitation and restlessness
Crowding around water trough
Reduced feed intake
Refusing to lie down
Seeking shade
Increased breathing rate

Proactive not Reactive: Heat Load Action Plan

It is important that management of heat load be proactive rather than reactive. A pre-season review of each feedlot's risk profile, infrastructure and resources together with the development of heat load monitoring strategies and action plans will assist you in minimising heat load before an event occurs, rather than simply responding to an event, if and when it does occur.

There are four key components to an effective Heat Load Action Plan to consider:

1. Pre-summer review and preparation

2. Managing and monitoring heat through the summer period

3. Responding to a specific Excessive Heat Load Event

4. Deactivation and review

Pre-summer review and preparation

- Conduct a risk assessment to establish at what Heat Load Index (HLI) value your main populations of cattle will begin to accumulate Heat Load. You can access a Risk Analysis Program (RAP) Calculator via Katestone's Cattle Heat Load Toolbox (CHLT). *(Note: RAP 2.0 was launched in September 2017)* Also determine what impact additional water points, shade and manure loading may have on your Accumulated Heat Load Unit (AHLU) threshold.

- Access the Katestone Cattle Heat Load Tool Box **(CHLT)** and set up a site specific forecast service for your particular feedlot location by supplying CHLT with your GPS co-ordinates. Also consider setting up the functionality of providing CHLT the data sourced direct from your feedlot's weather station.

- Set up SMS and/ or email heat load alerts on your CHLT account based on your risk assessment results

- Ensure your Heat Load (HL) Action Plan is up to date with specified practical actions listed upon certain triggers such as risk assessment scores being reached

- Service and maintain equipment and infrastructure including weather stations, backup generators, watering systems and sprinklers

- Ensure contingency plans are in place for power, water and communications including internet access

- Ensure pen conditions are optimal and additional water troughs available

- Undertake staff training on responsibilities under your HL Action Plan including assessment and reporting of animal behaviour and condition, panting score (MLA Tips and Tools for managing heat load in feedlot cattle, or access the Pant Score toolbox with your CHLT subscription).

- Consider undertaking an heat load event simulation to prepare your staff

- Consult with a nutritionist to determine heat load ration and heat load feeding strategy

- Confirm location of mass burial site (pit should be 3 cubic metres per dead animal).

Managing and monitoring heat through the summer period

- Check the Katestone CHLT for Heat Load Outlook

- Note SMS alerts will be sent (to CHLT subscribers) for Accumulated Heat Load Unit (AHLU) above 50 units for the threshold set for your site

- Commence daily monitoring of your selected monitoring points including potential heat load impact on cattle using a risk based approach and ensuring those groups of cattle most vulnerable to heat load events are targeted including heavily finished cattle, newly received cattle, hospitalised cattle, *Bos taurus* breeds and black animals.

Responding to a specific Excessive Heat Load Event

- Once an heat load event is confirmed either via forecasts or the identification of trigger events you should respond to the event by implementing the actions of your feedlot's Heat Load Action Plan. The table below gives a number of suggested triggers and actions that may be appropriate to your site

- Focus on monitoring and responding to cattle behaviour such as bunching activity, breathing condition and panting score

- Inform feedlot manager of events/triggers and record their timing and all actions undertaken.

TRIGGER	ACTION/S
Weather forecast predicts rainfall followed by several days of high temperatures, high humidity and low wind speed.	Inform feedlot manager of weather forecast; instigate HL Action Plan.
AHLU and/ or HLI's are forecast (via the Cattle Heat Load Toolbox website forecast) to exceed your feedlot's calculated risk assessment threshold.	Instigate HL Action Plan; notify vet and nutritionist; move high risk cattle to shaded pens.
AHLU's exceed your risk assessment threshold at the coolest time of the day (usually 6am or at dawn or just after), and/ or; Finisher ration intake falls > 10% from previous day, and/ or; Cattle showing signs of heat stress.	Monitor cattle panting scores every 2-3 hours between 6am-6pm using a risk based approach (at least 10% of total); notify vet and nutritionist; introduce HL ration and heat load feeding strategy; cease unnecessary cattle movements and be aware of, and consider, heat load of destination for exit cattle; avoid moving cattle from shaded to unshaded pens; Introduce additional water troughs into pens.
>10% of cattle in production pens have panting scores of >2.5 at the coolest time of the day and/or > 5% of cattle in hospital pens have panting scores of >2 at any time	Monitor cattle panting scores every 2-3 hours using a risk based approach (at least 10% of total); monitor weather stations hourly; regularly check all water troughs have clean, cool water; scrape any wet material from pens at night and consider use of appropriate bedding; consider letting cattle out of pens (if feedlot is small and there is sufficient pasture, shade and water nearby).
Cattle begin to die	Inform feedlot manager; inform vet and nutritionist; inform slaughter plant and trucking companies of potential impact on supply; remove dead animals at night; conduct post mortem at burial site; refer to the *Incident Reporting* section in your QA manual for NFAS notification thresholds to confirm reporting levels.
Cattle deaths exceed NFAS notification threshold (refer to updated NFAS standards auditable from March 2018)	Inform ALFA.

What can you do now to minimise the risk from an excessive heat load event?

In reviews of excessive heat load incidents in recent years there have been a number of recurring recommendations from the Incident Response Group Review Panel. These include:

Provide shade If indicated by your risk assessment, consider the provision of appropriate shade for all cattle. For example, if you feed Bos Taurus cattle such as Angus in a high temperature, low rainfall area, access to shade for these cattle will assist to keep their core temperatures low. However, shade in pens may not be required, or even recommended. For example, if you feed Bos Indicus cattle, which cope better with high temperatures, or if your feedlot is located in a low temperature, high rainfall area, shade may not be necessary.	**Update and communicate contingency plans** It is important that emergency contingency plans and the agreed chain of command are communicated and understood by everybody before a heat load event. This includes outlining contingency arrangements if key management staff are not able to be present at the feedlot (due to isolation from floods etc) and if power/ phones are inoperable. Make contact with your consultant veterinarian and nutritionist prior to the anticipated onset of a heat load event so everyone is aware of the situation. The contact details of alternative consultants if required at short notice should also be sourced.
Manage days on feed Manage scheduling to prevent having cattle in pens nearing the end of their days on feed during the high risk period. Cattle with high days on feed are likely to have more difficulty mitigating heat stress due to their weight and fat cover.	**Reduce pen stocking density** High pen stocking densities, even if they are consistent with legislative and license obligations, can aggravate the heat generated and felt by cattle within pens. Consider reducing pen stocking densities during this high risk period.
Provide extra water troughs The increased stocking density created by sharing of water troughs either within, or between, pens can exacerbate excessive heat load conditions. Cattle suffering from excessive heat load are also likely to want to drink more in an attempt to cool themselves down. Consider the installation of additional water troughs in each pen to help cool and disperse cattle during excessive heat load events.	**Maintain pen conditions** Wet pens or ones with high manure loads increase solar radiation (as they have a darker surface) whilst raising humidity levels. Manure also increases ammonia levels which are also thought to negatively affect the ability of cattle to cool down. The effect of physical exertion to move through muddy pens also adds heat load risk to cattle. Implement a more regular pen maintenance schedule to optimise pen conditions during high risk periods.
Implement your heat management feeding strategy Your heat management feeding strategy should be implemented just prior to, or during, an event to reduce the impact of adverse conditions. This is likely to include a heat load ration, so ensure that there are sufficient commodities on hand so the heat load ration canbe introduced preferably 24 – 48 hours before the anticipated onset of a heat load event and be in place for a period up to 48 hours after the event.	**Ensure all staff are trained** The heat load risks over the summer period are exacerbated due to an increased likelihood that staff rostering will be different from normal, including increases in the employment of casual/holiday staff. Therefore it is important that all employees, staff members and management have an appreciation of the strategies in place to reduce the impact from heat events and recognise the warning signs and steps to be taken during a heat load event.

Further information on preparing for and managing during an excessive heat load event is available for free in the registered users section of the Cattle Heat Load Toolbox. The website also includes handy charts and templates to assist with daily heat load monitoring, plus details on where to go for further information (http://chlt.katestone.com.au).

ALFA Technical Services Officer, Jeff House is also available on 0419 262 207 or jeff.house@feedots.com.au to provide information or advice on managing summer heat.