

Hyperthermia, its causes and management in cattle

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Introduction

Hyperthermia is a general systemic state in which there is an increase in core body temperature due to physical cause, generally caused by excessive heat production, or deficient heat loss. Hyperthermia means the body temperature rises, but not due to infection. The brain's temperature setting remains normal, the body is just unable to lose heat fast enough. The common causes of hyperthermia in cattle are heat stress during hot weather, transport stress (especially in trucks without proper ventilation), exposure to direct sun for long periods. Hyperthermia does not respond to fever medicines like antipyretics. If not treated quickly, it can lead to collapse, organ failure, or even death.

Causes of hyperthermia

The major causes of hyperthermia are high environmental temperature and prolonged, severe muscular exertion. The fatty animals with heavy hair coat are more susceptible for hyperthermia. Hyperthermia can also be observed during transportation. It is more seen in lactating cattle than the non-lactating one, as the non-lactating is more heat tolerant. There is marked difference between species to species, breed to breed and individual to individual for the susceptibility of hyperthermia.

Excess heat affects body in following ways

If the body stays hot for too long, it starts to damage important systems and cells:

- The proteins and enzymes in cells stop working properly.
- The cell membranes (outer layers of cells) get damaged.

- More stress on the body can harm organs over time.
- Breeding problems, like early loss of pregnancy or poor semen quality in bulls.
- Weaker immune system, making cows more likely to catch diseases.
- Less milk production and poor feed efficiency.
- If the heat becomes extreme and isn't managed, the cow can go into heat stroke, which can cause:
 - Loss of coordination (cow may walk abnormally or stumble)
 - Shock
 - Collapse
 - Death

Ways in which body overcome hyperthermia

When a cow's body gets too hot (due to hot weather, poor ventilation, or overexertion), the body tries to cool down using the following ways:

- Blood vessels near the skin widen, so more heat can escape through the skin.
- The cow breathes faster (pants) to let out heat through moisture in the breath.
- More saliva is produced to help cool the body.
- Feed intake goes down because digesting food produces heat, so cows eat less to stay cool.

Common signs and symptoms

- Rectal temperature is increased by 3 to 4°C (4–7°F) as compared to normal body temperature.

- An increased heart rate and respiratory rate with weak pulse of large amplitude.
- Sweating and salivation occur initially, followed by a marked absence of sweating.
- The animal may show restlessness but soon becomes dull, not able to walk properly, and finally tends to lie down.
- The respiratory rate is primary indicator of heat stress in adult ruminants. The respiratory rates up to 40 to 60 breaths / minutes indicating low, 60 to 80 breaths / minutes indicating moderate and 80 to 120 breaths / minute indicating severe heat stress.
- Decreased urine concentration or diluted urine due to increased water intake and decreased appetite and milk production can be observed.



1. Make sure there is cool, clean water available for the cattle to drink and provide plenty of space in troughs to access the water easily.
2. Use shades and intermittent sprinkler systems to keep the cattle cool. It is important to make the cattle wet for a short period of time followed by longer periods to dry off, as continuous wetness can make them feel hotter
3. Improve airflow by using fan, cooler or creating mounds for the cattle to stand on.
4. Adjust their feeding schedule in such a way that they can eat a larger portion of their food during the cooler hours.
5. Try to minimize handling of the cattle during the hottest time of the day. Keep the animal in the areas having shade, under the trees or some cooler place.
6. Choose cattle breeds, which coat characteristics are better suited to heat resistance. For example, heavy black cattle are more susceptible to heat stress.
7. Electrolyte & hydration therapy can be given for early relief and for this crystalloid fluid (0.9% NaCl) can be administered.
8. Vitamin B-complex, Vitamin C, Vitamin E & Selenium, Niacin, Ionophores, Lipoic and Linoleic acids can be added for additional benefits.
9. Oxygen therapy can be given as per the requirement.
10. Antipyretics, antiallergic and corticosteroids can also be given as per need.
11. Following primary feeding cares should be taken
 - a. Correct the energy balance of the cattle.
 - b. More emphasis should be given on energy rich diet and avoid the bulk feeding.
 - c. The pH of the diet should be monitored properly.
 - d. Feeding should be practiced in the cooler hours of the day
 - e. Crude protein content should be approximately 17 percent and dietary fats approximately 7-8 percent of the feed.
 - f. Buffers, Bicarbonates, Chromium, K and Na salts can be added in the diets.

Treatment measures and management of hyperthermia in cattle



Wetting the cattle

In order to help dairy and feedlot cattle cope with heat stress, there are several important control measures which should be adopted.

Following these measures, we can help the dairy and feedlot cattle stay healthy and comfortable during the times of heat stress.

Hyperthermia is a medical emergency — we need to cool the animal immediately using:

- 1) Shade
- 2) Fans
- 3) Spraying water
- 4) IV fluids if necessary

History is important

If the cow was exposed to sun, or overcrowded in a truck, think hyperthermia.

If the cow shows other illness signs like cough, mastitis, or diarrhea, think fever

Conclusion

Hyperthermia in cattle is a critical condition marked by a dangerous rise in body temperature due to external factors like extreme heat, inadequate ventilation, or overexertion, rather than infection.

Preventive and management strategies are essential and include efficient cooling (using shade, fans, and sprinklers), uninterrupted access to clean water, dietary adjustments, and minimizing handling during peak heat periods. Additionally, medical interventions such as electrolyte therapy, vitamin supplementation, and immediate veterinary care may be required in severe cases. Prompt recognition and appropriate management not only reduce mortality but also help safeguard productivity and welfare in cattle during periods of heat stress.