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Highlight of the article

This article on summer management discusses what heat stress is and its serious effects on dairy animals during hot weather. It focuses on dairy cattle and buffaloes, particularly in India, where rising temperatures and climate change increasingly threaten livestock productivity. It explains why summer management is important, as heat stress reduces milk production, fertility, feed intake, and increases disease occurrence, causing major economic losses to farmers. The article addresses when interventions are needed, especially during extreme summer months and temperatures above 35–45°C. It describes how heat stress can be prevented through proper housing, shade, ventilation, sprinklers, foggers, wet gunny bags, buffalo wallowing, adequate water supply, balanced nutrition, and timely monitoring of animals for early signs of distress.

Keywords: Economic losses ; Heat stress; prevention; signs of distress

As of May 2026, India remains the world's largest milk producer, contributing roughly 25% (26.67%) of global output with production projected to hit 221.4 million metric tonnes (MMT) in 2026. According to Thornton *et al.* 2022, Climate stress is projected to reduce bovine productivity by around 25 per cent over the next 5 decades. India is also witnessing severe losses in milk production due to heat stress, resulting huge financial losses. Heat stress also has detrimental effects on reproduction by decreasing oestrus expression, conception rate, and by increasing the length of service period and dry period. In this regard, let us understand the critical factors that can influence heat stress in livestock.

Factors influencing susceptibility of dairy animals to heat stress.

Certain factors make some dairy cattle more susceptible to heat stress. Understanding and managing these factors, is essential to alleviate adverse conditions on the farm, improve outcomes and minimise losses.

- **Breed:** Lighter coat colors offer better heat tolerance. Dark coloured animals

suffer more from heat stress like Buffaloes show more sensitivitiy to heat stress compared to white cattle.

- **Body Condition:** Heavier cattle struggle more in hot weather. Weak and debilitated animals may also have poor heat tolerance.
- **Health Status:** Cattle with existing health issues cope poorly with temperature fluctuations. The animals that have recovered from diseases also face the risk of poor heat tolerance. For example, animals affected by foot and mouth (FMD) virus may become panthers.
- **Age:** Very young and old animals are at higher risk of heat stress. The increased heat has a greater effect on the growth of calves. Hence, special emphasis should be given to calves, as they are our future productive stock. Today's calves are tomorrow's cows.

Though indigenous breeds of cattle are more thermo-tolerant, crossbred and exotic breeds of cattle are highly sensitive to heat stress.



Hence the more productive animals are at increased risk. Buffaloes are more prone to heat stress owing to their black skin, which absorbs more solar radiations (Kirchoff's law) and fewer sweat glands, only one sixth that of cattle, compromising heat dissipation through evaporative heat loss.

IMPACT OF SUMMER ON DAIRY ANIMALS

Hot weather can present a significant challenge to the physiology of dairy animals. Heat stress, can cause a decrease in feed intake and milk yield, but it does not stop there. It also has a detrimental effect on fertility, both during and immediately after periods of hot weather.

- **Economic losses:**

All the changes associated with heat stress lead to loss of productivity, reduced breeding efficiency and even loss of life in extreme cases. Milk production can decrease by up to 30% after temperatures rise above 35⁰ C. The composition of milk also changes, as the amount of fat and protein in milk decreases. After milking, the shelf life of milk is also get effected due to high temperatures, leading to nutritional unavailability for consumers and wastage of already produced milk.

- **Reproductive losses:** A heat-stressed cow may not come into heat regularly, and may also show lower conception rates. Heat stress can cause pregnant cows to miscarry or give birth prematurely.

- **Production losses:**

Summer stress in dairy animals leads to various physiological changes that directly affect milk production. High THI (Temperature-Humidity Index) causes decreased appetite. There may also be an unmet demand for trace minerals such as Zn, Mn, and Cu, along with excess salivation and increased breathing rate. Poor nutrient and energy absorption, can result in low and poor-quality milk.

- **General health:**

Due to the imbalance of salts in the body, the animal may suffer from acid indigestion and watery diarrhoea. Animals consume less feed, particularly roughage, and as a result, the rumen function less efficiently, to the point that ruminal acidosis may occur. Heat stress affects the health of the animal's udder and the hormones that control milk production. During this period, mastitis, hoof diseases and lameness are likely to increase (PV Patil & MK Patil 2023).

- During summers, there is higher incidences of summer mastitis predominantly in dry cows and pregnant heifers. Vector borne and hemoparasitic infections like Anaplasmosis, Bovine Babesiosis and Theileriosis, take upper hand, as peak vector activity during hot months. Ocular problems include Infectious Bovine Kerato-conjunctivitis (IBK/ Pink Eye) caused by *Moraxella bovis* species, respiratory issues like summer pneumonia/ Bovine Respiratory Disease complex may prevail in poorly managed sheds during summer months.

- Due to lack of lush green pastures during summer months, the cattle tend to graze on dry, short pastures leading to increased ingestion of soil borne bacterial spores like *Clostridium chauvoei* causing acute, necrotizing myositis (often in hindquarters- Black Quarter).

- Cutaneous and mucosal infections: Foot rot (Bovine digital dermatitis), and calf diphtheria (Necrotic laryngitis) caused by *Fusobacterium necrophorum* often attacks the flock by taking advantage of oral mucosal and hoof abrasions caused by dry, coarse summer forage.

Hence, for an effective dairy farming, protection of livestock from excessive heat and risk of infectious- non infectious diseases, associated grazing scarcities is utmost

important. If the temperature goes above 45 degrees Celsius, heat stress occurs in animals.

Detecting Heat stress through symptoms:

Recognizing the signs of heat stress in livestock is crucial for timely intervention. These signs can be classified into following categories:

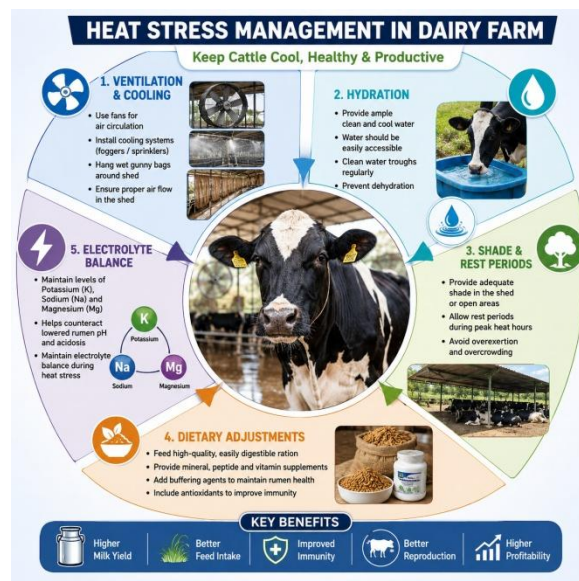
- **Clinical Indicators:** Elevated body temperature, increased respiration rate and later drymouth. Rapid and weak pulse, Rapid but shallow breathing. Abnormal vital parameters such as elevated heart rate, respiration rate, rectal temperature etc. In case of heat stroke, body temperature is very high—sometimes as high as 106 – 108°F.
- **Behavioral Indicators:** Reduced dry matter intake, crowding in cooler areas, gathering around water sources.
- **Physical Indicators:** Panting, breathing with mouths open, extended necks, reduction in milk production.

MEASURES TO PREVENT HEAT STRESS.

21ST century is the era of climate change and adverse climatic conditions witnessing across the world. In this regard, Micro environment around the farms has to be managed to alleviate from heat stress. The prime thing to be noted here is “Heat stress can occur both indoors and outdoors”. The following managerial practices can be followed to prevent the heat stress in livestock.

Housing:

- Animals need more than average space to move around in a barn space and proper ventilation for hot air to escape and cold air to enter. If the same space is overcrowded, it takes longer for the heat to dissipate, resulting heat trap.
- It is necessary to provide maximum shade to the animals in order to avoid direct exposure to sunlight, planting large trees around shed the best option.
- While building the cowshed, its roof height should be kept high. Thatched roof of a minimum height of 9 feet should be provided.



- Water sprinklers can be installed on the roof of the shed for regular cooling sessions. The body of animals should be watered by sprinklers, foggers (Fig.1). It helps the animal's body to stay cool. There are studies that has proven that more frequent and prolonged cooling sessions, effectively mitigate heat stress, improves physiological parameters, enhanced feeding behaviour, and increased milk yield (Hussain *et al.*, 2023).



Fig.1. Cooling sessions: Sprinkling of cool waters on body of the animals

- A row of wet jute gunny bags or a water-holding cloth should be tied around the cowshed (Fig.2). So that the hot air coming in gets cold, as a wind barrier, and the cold air inside will stay inside. It is highly effective, low-cost method to manage heat stress in dairy farms.





Fig.2. A row of wet gunny bags hanged from the open side of a dairy farmbarn to cool the air for the cows inside.

- Keep the cubicles clean and dry to prevent mastitis and hoof related problems by prevention water logging ,uneven floor.
- The most effective way of combating heat stress in buffalo is wallowing in the water pond (Fig.3).



Fig.3. Wallowing: domestic water buffalo exhibiting wallowing behaviour within aquatic environment.

Nutrition

- Plenty of clean, cold water should be provided to the animals in the cowshed itself. The water tanks should be made of cement so that the water in the free-flowing cowshed remains cool. Bear in mind that cows can drink more water in a shorter amount of time when the water is 20°C compared to when the water is very cold.

- Animals need to chew more fodder should be given in the morning or evening. Because extra heat is generated in the animal's body for biting the fodder.
- Adequate amount of salts should be given to balance the disturbed salts in the body to bear the stress during this period.

CONCLUSION

Preventing heat stress in dairy animals involves providing heat, ample clean water and in house cooling measures. Ensuring proper ventilation, adjusting feeding schedules and careful observation for signs of distress for timely veterinary intervention can minimise heavy losses, keep animals healthy and comfortable. The economical losses to the farmer community and our country as a whole can be minimised with proper understanding and implementation of heat mitigation measures. Here, the mass media advertisements made by our Veterinary & Animal Husbandry department are noteworthy.

