

## Strategies to contract Heat Stress

There are a number of strategies to minimize the effect of heat stress on dairy cattle. The two primary options are making ration adjustments and altering the environment that the cow lives in.

### 1) Ration adjustments:

The goal is to adjust rations to increase energy and protein intake while maintaining rumen and cow health. The following strategies may be considered during dietary adjustments.

1. Select and feed higher quality forages
2. Lowering ration fiber (ADF, NDF) levels slightly while maintaining effective fiber levels. (ADF Acid -detergent fibre. NDF, neutral-detergent fibre.)
3. Addition of some fat to the ration. Total ration fat levels should not exceed 5 – 5.5% of total ration dry matter.
4. Selection of feed ingredients with a high digestibility in the animal. This lowers the heat produced by nutrient utilization within the animal.
5. Balance ration protein levels to minimize high levels of soluble and rumen degradable protein. Animal must expend energy to excrete excess protein from the body.
6. Adding buffers (sodium bicarbonate, magnesium oxide, and sodium sesquicarbonate) to help in maintaining a normal rumen environment.
7. Increasing ration potassium levels to counteract the higher potassium losses in heat-stressed cows. Ration magnesium levels may also need to be increased.
8. There may be some benefit to adding yeast or yeast cultures to the ration.

### 2.) Feeding management:

Some of the key considerations in this area are:

1. Fresh, palatable, high quality feed should be in the feed bunk at all times to provide maximum opportunity for feed consumption. If the feed in the bunk is warm, musty or spoiled, it needs to be removed and discarded.
2. Uniform mixing and delivery of rations on a daily basis.
3. Provision of separate feeding manager for each cow.
4. Addition of water or molasses may help the feed stick together better.
5. It may be useful to shift feeding times to match cow behavior. Cows tend to change meal patterns and eat more feed during the cooler times during the day.
6. Provision of clean and fresh water throughout the day and after milking.
7. There should be at least 2-3 inches of water space per cow.
8. Provision of more than 1 watering device for each group of cows may encourage water consumption and decrease competition.

### 3.) Housing and facility adjustments:

1. Minimize overcrowding of cows
2. Provision of shade to cows reduces the effect of radiation.
3. Proper ventilation with the addition of fans will be required to assist in increasing air flow.
4. Provision of misters or sprinklers to increase evaporative cooling by wetting the skin. The goal is to wet the cow not soak the cow.

## Types of Stress

### 1. Caloric

Solar radiation, wind speed, air temperature and humidity are all factors which are concerned with the presentation of heat stress. An early reproductive responses to heat stress are the decrease in the intensity of estrus and consequently low fertility. It is known that mammalian females are more sensitive to heat stress, during the 12 days before estrus, increasing this sensitivity on day 2 before.

### 2. Nutrition

In 1998, Zapiola said that in cattle, stress during transportation, has a detrimental effect on the physiology of the animal that the stress caused by lack of food and drink, for a period of equal length, which is because the blood flow is diverted from the internal organs, to the peripheral tissues in an attempt to reduce the body temperature by increasing heat losses. This mechanism leads to a reduction of blood flow, aimed at internal organs such as the uterus, fallopian tubes and ovaries, decreased blood supply to these organs also implies low nutrient availability and therefore low functional capacity.

### 3. By Handling

The interactions between employees and animals influence the response of cattle to stress management known as. Studies was indicated that the way to handle livestock, animals may produce an unnecessary handling stress, which may affect the biological mechanisms of reproduction and the immune response. On the other hand, electrical bites, immobilization and other stress factors management weaken the female reproductive functioning.

There are many driving situations can cause stress seriously affecting the reproductive process of the species, such as excessive mobilization of inseminated females before, the use of aggressive or driving the separation of animals, mobilization of animals on the sleeve of management for different purposes, etc..

The time when stress management, represents greater adverse effects on reproduction, it is just no time to estrus.

ADF : The detergent fibre analysis scheme was introduced to overcome inadequacies in the use of the traditional acid–alkali crude fibre estimation when applied to fibrous forage feeds for ruminants.

ADF : An insoluble matrix prepared by the extraction of food plants and mixed feeds in a solution of sodium dodecyl sulphate (SDS) and ethylene diamine tetraacetic acid (EDTA) in a phosphate buffer at pH 7.