Abstract #41

**Genetics of thermotolerance in Brangus heifers – the role of sweating rate and coat score**

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Cattle raised in tropical and subtropical environments are exposed to harsh environmental conditions. Heat stress can drastically limit the production efficiency of cattle raised under these conditions. With the forecasted global climate change, heat stress will increasingly impact beef cattle production around the world. Thermotolerance, the ability to maintain optimal growth, feed intake, and reproduction in the presence of heat stress, varies among individual animals and breeds. The overall goal of this study is to identify genetic markers associated with thermal tolerance, thus allowing genetic selection for improved thermotolerance in cattle herds exposed to high temperatures. Interactions of beef cattle with their thermal environment begins at the skin–hair coat interface. A temperature gradient is formed between the hair-coat surface and the skin when an animal is exposed to environmental heat making the hair coat a factor that can affect the rate of heat dispersion. The length of the hair coat affects conductive, convective and evaporative loss of heat from the skin. The color of the hair coat affects absorption of solar radiation. Sweating is one of the primary autonomic responses exhibited by cattle under heat stress. It allows heat loss through evaporation of water from the skin (sweating). When air temperatures are between 10° and 20°C, perspiration is responsible for 20 to 30% of total heat loss, but when temperatures exceed 30°C, it becomes the dominant mode of heat loss, accounting for approximately 85% of total heat loss, with the rest due to respiratory evaporation. The study was conducted with a total of 724 two-year old Brangus heifers. Each animal was assigned a coat score of 1-4 based on a visual assessment of the length and thickness of the hair coat. Coat scores are as follows: (1) excessively smooth, (2) fairly smooth, (3) long coat, and (4) wooly coat. Hair coat color was also recorded. In addition, hair samples were collected by pulling a small section of hair off the back. Hair length and thickness will be measured using computer software. Perspiration rate was measured using a Vapometer (Delphin Tech. Ltd., Kuopio, Finland), which is a digital moisture sensor that calculates water lost through the skin. Additionally, vaginal temperature was measured every five minutes for five days by I-button data loggers attached to a blank CIDR. A blood sample was collected from each heifer, which will be used for DNA extraction and genotyping. Data on weight, and temperament of each heifer was also recorded. Additionally, breeding records will be collected after artificial insemination. Environmental variables such as humidity and temperature in the sun and shade was also collected through the course of the experiment with the use of HOBO data loggers.