BEEF CATTLE RESEARCH UPDATE

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Effect of Water Sprinkling on Incidence of Pathogens in Feedlot Cattle

Water sprinkling has become more common in feedlots in an effort to reduce heat stress and control dust. Recently, Texas researchers[1] looked at the effect of sprinkling water on the incidence of common pathogens such as Salmonella and E. coli in the feces and on the hides of feedlot cattle. Crossbred beef heifers (850 lb initial weight) were fed from June 25 through October 2, 2001 at Texas Tech University. Treatment lots were sprinkled with water for two minutes every hour from 11 am to 5 pm on days when temperature exceeded 86℉ (a total of 64 days during the 98 day study). Body weights, fecal samples and hide swabs were taken 5 times during the study. Sprinkling did not affect feed intake, daily gain, feed efficiency, or any carcass traits during the trial. Feed bunks for both control and sprinkled cattle were shaded. It is likely that this shade reduced the potential for sprinkling to positively affect performance. Water sprinkling also did not change the incidence of Salmonella or E. coli in the feces or on the hides.

Temperature and Behavior Associated with Moving feedlot Cattle

The effects of physical activity on body temperature are important if temperature is used as an indicator of health status. An elevated temperature induced through physical activity or high ambient temperature could lead to cattle being pulled that are not sick. Nebraska researchers[2] conducted four experiments with yearling feedlot cattle fed high-energy finishing diets to determine the effects of moving cattle various distances in the feedyard on tympanic temperature (TT). Tympanic temperatures were measured using thermistors placed in the ear canal of an animal and attached to data loggers secured on the inside of the ear.

In a January experiment (1168 lb body weight), TT increased 1.17℉ and 1.04℉ by moving cattle 656 yards in morning and afternoon, respectively. Moving cattle (1003 lb body weight) 164 and 656 yards in August elevated TT by 0.54℉ and 1.21℉, r espectively. Moving cattle (913 lb body weight) 328, 656, and 985 yards in June elevated TT by 1.22℉, 1.31℉, and 1.40℉, respectively. The amount of time required for the peak TT to decline to levels equal to or below the control TT averaged 3.5 hr in the winter, but ranged from <1 hr to about 2 hr in the spring and summer.

Moving cattle decreased feed intake by about 2.2 lb per day for up to 48 hr after moving was complete. Moving cattle in the morning also decreased the number of animals resting in the afternoon and increased the number of animals panting throughout the day.

In summary, these data indicate that the effects of cattle movement and handling on body temperature need to be taken into account when monitoring animal health status. Minimal handing of cattle during hot days is recommended for maintaining optimum animal well-being and comfort.

Effects of Temperature and Temperature-Humidity Index on Pregnancy Rate in Beef Cows

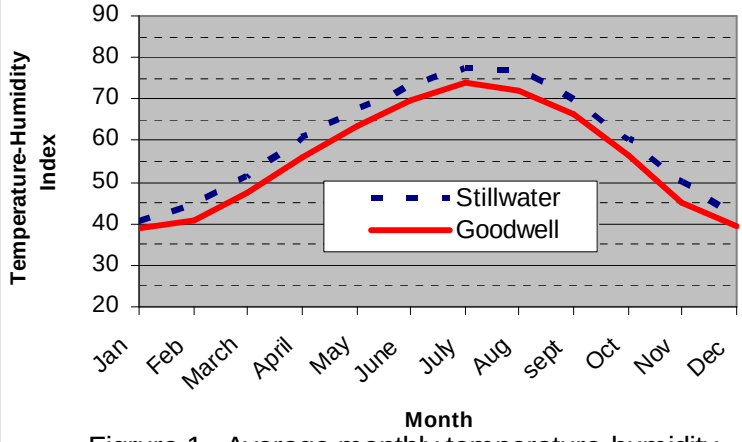
Nebraska researchers[3] recently reviewed ten years of calving records from a spring-calving beef cow herd (Angus/continental crossbreds) in southeast Nebraska to determine the effect of temperature and humidity on pregnancy rates in beef cows. This research suggested that conception rates are lower during summers when it is hot during the breeding season as compared to cooler summers.

These researchers found that for each degree increase in temperature during the first 30 days of the breeding season that pregnancy rate during these 30 days decreased by 1.08%. However, average temperature did not significantly affect pregnancy rate during the entire breeding season (63 day average). It was also reported that if the average temperature-humidity index (THI) was greater than 65 for the first 30 days of the breeding season that pregnancy rate was reduced by 1.6% per unit increase in THI above 65. THI did not affect pregnancy rate over the entire breeding season. These results indicate that beef cows can acclimate to high temperatures and humidity if given enough time with the bull (60 days or more in this data set). These data suggest that a 30 to 45 day breeding season may not allow cows to adjust to high temperatures and humidity thus pregnancy rate may be reduced. In cows with some Brahman influence, the negative impact of heat stress on pregnancy rate should be reduced.

To put this data in perspective, I compiled weather data collected since 2000 at Goodwell, OK and Stillwater, OK. The daily average temperature (℉) and daily average relative humidity (RH) were used to calculate the THI for each day using the following equation: THI = ℉ – (0.55-(0.55 X (RH/100))) X (℉ – 58). These daily averages were then used to calculate monthly averages. Monthly average THI for both Goodwell and Stillwater are shown in Figure 1. These data suggest that with an early spring calving season (February and March) that during the breeding season (late April thru June), heat stress would be of minimal concern during the first half of the season. However, during the last half of the breeding season, heat stress may reduce conception rate.

Management steps that producers can take during the breeding season to minimize heat and humidity stress on cow herds include:

- Minimize cattle activity and movement during the breeding season. Nebraska feedlot research highlighted in this newsletter shows that moving cattle can increase body temperature by 1 to 1.5℉.
- If cattle must be worked or moved, do it early in the morning when it is cooler.
- Provide plenty of clean water.
- Provide shade or a place for cattle to cool off.
- Control flies to discourage physical activity associated with fighting flies.
- Black cattle are more susceptible to heat stress than lighter colored cattle.



Figrure 1. Average monthly temperature-humidity index for the years 2000 – 2005 for Goodwell and Stillwater, OK.

[1] Morrow, J.L., F.M. Mitloehner, A.K. Johnson, M.L. Galyean, J.W. Dailey, T.S. Edrington, R.C. Anderson, K.J. Genovese, T.L. Poole, S.E. Duke, and T.R. Callaway. 2005. Effect of water sprinkling on incidence of zoonotic pathogens in feedlot cattle. J. Anim. Sci. 83:1959-1966.

[2] Mader, T.L., M.S. Davis, and W.M. Kreikemeier. 2005. Case study: Tympanic temperature and behavior associated with moving feedlot cattle. Prof. Anim. Sci. 21:339-344.

[3] Amundson, J.L., T.L. Mader, R.J. Rasby, and Q.S. Hale. 2005. The effects of temperature and temperature-humidity index on pregnancy rate in beef cows. Nebraska Beef Cattle Report MP 83-A:10-12.