Nutrition of Newly Received Feedlot Cattle

Chris Reinhardt, PhD[a,*], Daniel U. Thomson, DVM, PhD[b]

KEYWORDS

• Feedlot • Stress • Calves • Diet • Nutrition • Water • Rumen

KEY POINTS

- The stress of transition from pasture to the feedlot environment creates unique and variable nutritional challenges.
- The more time that calves do not have access to good-quality feed and water in the course of this transition process, the greater the level of challenge and the greater the urgency to reestablish some normalcy to the rumen environment.
- The factors that are used to assign a risk category for the likelihood of developing bovine respiratory disease include time in transit from their origin, which is likely to be highly correlated with the amount of time away from quality feed and water.
- A high risk of developing respiratory disease is likely to correlate well with the animals' suppressed appetite immediately after arrival.

HIGH-RISK CALVES

Water

High-risk calves are subjected to various degrees of physiologic and psychological stress, physical exhaustion, immune system suppression, viral and bacterial respiratory pathogen challenge, and water and feed deprivation. Therefore, there are 3 primary needs that must be addressed soon after arrival: water, feed, and rest.

Any discussion of either human or animal nutrition must begin with a discussion of water. Cattle under no abnormal stress typically drink 3 times their normal dry matter intake (DMI) in water; during heat stress conditions, cattle may increase that amount to 5 times their feed intake to compensate for water lost through extensive evaporative cooling from the lungs and the surface of the skin. Arias and Mader[1] suggest that during extremely warm weather daily water consumption can more than double (**Fig. 1**).

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[a] Department of Animal Sciences and Industry, Kansas State University, 136 Call Hall, Manhattan, KS 66506-1600, USA; [b] Diagnostic Medicine and Pathobiology, Kansas State University, 1-D Trotter Hall, Manhattan, KS 66506-1600, USA
* Corresponding author.
E-mail address: cdr3@ksu.edu

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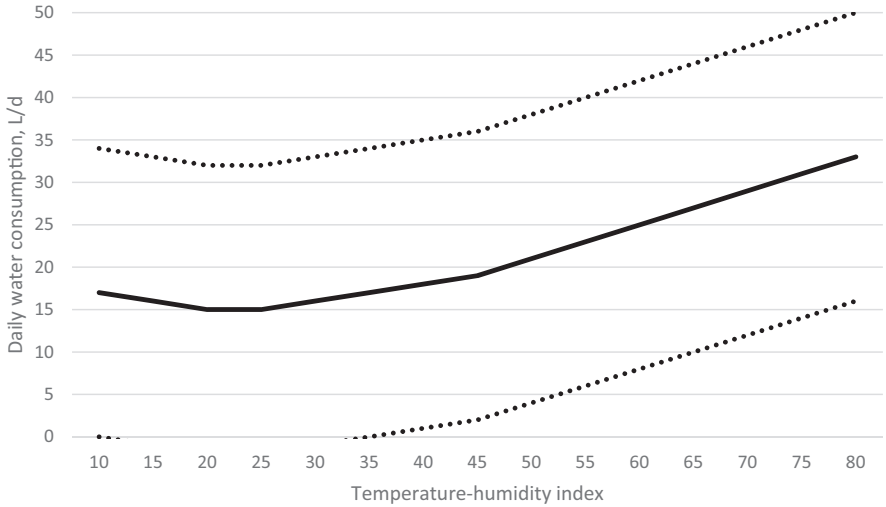

Fig. 1. Effects of temperature humidity index on daily water consumption. Daily water intake = 22.224 − 0.651x + 0.0175x^2 − 8.7e−5x^3; Adj. R^2 = 0.61. Dotted lines indicate the 95% confidence interval. (*Data from* Arias RA, Mader TL. Environmental factors affecting daily water intake on cattle finished in feedlots. J Anim Sci 2011;89:245–51.)

During warm weather, extra water sources may need to be made available, such as large, metal, portable tanks. Water should be clean, cool, and fresh. For cattle that have never used an automatic water trough, the floats may need to be fixed open. The sound of the flowing water may help attract the calves, and this also prevents calves from being spooked by the sound of a sudden rush of water filling the emptying trough while calves are drinking. Water tanks may be placed on the perimeter of the pen to provide additional drinking space for calves. Calves often walk the perimeter of their new pen, and placing tanks in their path helps make them aware of the water source. Other critical elements that increase the need for additional water sources include whether calves have been off feed and water for an extended period, whether calves have never used an automatic water trough, whether water pressure in the feed yard cannot accommodate a high volume of water demand over a short time, and whether some calves are extremely timid and will not compete with the group for access to water.

The rumen and its microbial populations function best when the animal's own physiology is able to closely regulate the rumen environment within the range of normalcy. Under ideal circumstances, the animal consumes forage and chews the forage to reduce the particle size and provide access for microbes. The forage is buffered by saliva and then swallowed; that forage is fermented for a time, is regurgitated, rechewed, rebuffered, and reswallowed. The volatile fatty acids produced from forage fermentation are absorbed through the rumen wall or pass out with the liquid phase; acids produced through normal fermentation are buffered by saliva. After the physical rumen fill is sufficiently reduced through digestion and passage out of the rumen, the animal grazes for additional forage substrate. This repeated cycle of consumption, buffering, breakdown, and removal of fermentation end products and undigested forage results in a fairly controlled ruminal pH and environment, optimizing fermentation.