



Ridin' Herd

by Rick Rasby, beef specialist, University of Nebraska

Water is an important nutrient

Many times we often overlook the importance of water for beef cattle. We get caught up in balancing beef cattle diets for energy, protein, vitamins and minerals for a given targeted level of performance. Of the nutrients listed, water is most critical. The minimum requirement of cattle for water is a reflection of that needed for body growth, for fetal growth or lactation, and of that lost by excretion in the urine, feces, or sweat or by evaporation from the lungs or skin. Anything influencing these needs or losses will influence the water needs of livestock.

What determines water needs

A number of factors interplay and make water requirement and needs difficult to assess. Because feeds themselves contain some water and the oxidation of certain nutrients in feeds produces water, not all must be provided as drinking water. Feeds such as silages, green chop or pasture are usually high in moisture, while grains and hays are low. Feeds high in water content reduce water intake when cattle consume them. High-energy feeds produce more metabolic water compared to low-energy feeds.

As you think about water intake, it is mainly influenced by environmental temperature, class of livestock and weight. This just makes sense. Water needs increase as temperature increases. Lactating cows have a greater need for water as compared to non-lactating cows.

Data suggest that bulls have a greater daily water requirement than non-lactating cows, which is likely a function of weight. As feeder cattle get heavier, daily water intake increases.

A University of Georgia (UG) publication lists the estimated water requirements for cattle in different production stages if the daily high temperature is 90° F. The data suggest for cattle in this environmental condition, a growing animal or a lactating cow needs 2 gallons (gal.) of water per 100 pounds (lb.) of body weight. A non-lactating cow or bull needs 1 gal. of water per 100 pounds of body weight.

As an example, spring-calving cows will

need close to 24 gal. per day for themselves and another 5-10 gal. of water for their calf in these high-temperature environmental conditions. On days with extreme heat, expect the water usage to go up even further.

Remember, some of that water will come from feed they eat, and vegetative grass is high in water content. Also, for the nursing calf, a portion of the daily water needs will come from the dam's milk.

Water quality

Providing clean, fresh water is always a goal for the livestock producer. There are a number of items that affect water quality. Producers need to adapt management practices that do not negatively affect water quality.

Salinity. Water that contains high amounts of total dissolved salts (TDS) can result in reduced performance. Cows will adapt to some salt in their water. Care must be taken

if salt is used to limit intake of a feed in a free-choice supplementation management strategy.

Cattle actually prefer water that contains very small amounts of salt. Research would suggest that water that contains a TDS of 5,000 parts per million (ppm) results in about a 10% reduction in performance. Guidelines suggest that water that contains 3,000 ppm TDS or less is usually satisfactory for most livestock. Water that contains 5,000-7,000 ppm TDS should not be used for pregnant or lactating females.

Nitrates. Nitrates themselves are not poisonous to cattle; however, in the rumen, nitrates are converted to nitrites, and nitrites are absorbed into the bloodstream and convert hemoglobin to methemoglobin. Methemoglobin does not bind to oxygen, and the oxygen-carrying capacity of the blood is reduced.

Cattle can be adapted to nitrates, but it must be done slowly. However, it is still advised to avoid high-nitrate water as a source for livestock. A safe level of nitrate nitrogen in the water for cattle is less than 100 ppm. Water over 100 ppm NO₃-N needs to be managed when used as a part of cattle's diet.

Remember, total nitrate intake would be the sum of the nitrates contained in both the feed and water consumed.

Sulfates. Animals can become acclimated to the sulfates in water. Consider diluting high-sulfate water with low-sulfate water for newly arrived animals. The sulfate recommendation for calves is less than 500 ppm (167 ppm sulfur as sulfate). For adult cattle, the recommendation is less than 1,000 ppm (333 ppm sulfur as sulfate).

Caution is required in evaluating sulfate levels in water because of interactions with copper and molybdenum and the inhibiting effect compounds such as sodium fluoride have on sulfate absorption for the digestive tract. In addition, high levels of sulfates may also contribute to an increased incidence of polioencephelomalacia (PEM), a brain disorder found in cattle.

If copper deficiency problems are suspected, water sources should be analyzed for sulfates to determine if high sulfate levels are contributing to the problem.

Remember, distillers' grains can be high in sulfur and sulfur intake is the amount from the feeds and water consumed.

Blue-green algae. Stagnant water is an excellent environment to develop blue-green algae that can be toxic to cattle. The scum that you see on the inside of stock tanks is algae. Ponds seem to be the most common reservoir for blue-green algae. Toxicity is most common after rapid bloom normally occurring in late summer when cattle have their greatest water consumption.

Toxicity as a result of blue-green algae

is difficult to predict. Algae blooms can be controlled in a pond by using copper sulfate (blue stone). Be aware that a rapid die-off of algae may result in killing fish. Copper sulfate treatment may be ineffective if alkalinity of the water is less than 300 ppm.

The maximum tolerable level of copper sulfate in water is 2.7 (sheep) and 6.8 (cattle) per acre foot. Contact your extension person for guidelines as to the amount of copper sulfate to use. The best way to control blue-green algae is to eliminate the source of nutrients entering the pond.

Your water system will affect grazing distribution.

Final thoughts

Water is the most important nutrient for cattle. Daily provide a clean supply of water for your cattle. As you think about developing grazing systems, the water system will affect grazing distribution. If you need to test the water supply that is used for cattle, contact your extension office to determine a laboratory nearest to you that will test

livestock water. The laboratory will likely have sampling instructions and a sampling bottle. Take a representative sample and

properly identify and label the bottle. Make sure the bottle is sealed tightly.



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Editor's Note: "Ridin' Herd" is a monthly column written by Rick Rasby, professor of animal science at the University of Nebraska. The column focuses on beef nutrition and its effects on performance and profitability.