K-STATE
Research and Extension

Healthy Cattle Need Healthy Water

Water is by far the most vital nutrient to all living things, including cattle. It accounts for about 60 percent of body composition and an even higher percentage in younger animals. Water supports nearly every bodily function.

Water Quantity

Size, age, pregnancy, lactation, feed consumed, ambient temperature, and humidity influence daily intake. Water consumption for beef cattle ranges from approximately 10 gallons for feeder calves up to 30 gallons for mature, lactating cows.

Water Quality

Water directly impacts cattle health and performance. Adequate intake is paramount for cattle health. Water consumption can be hindered when cattle consume water with high levels of contaminants. This decline in water consumption reduces feed intake and overall performance. Protecting and managing the water source is critical for maintaining the overall health of cattle.

Water quality can be determined by appearance, odor, taste, pH and contaminants. Contaminants can include minerals (total dissolved solids), manure (coliform), microorganisms, nitrates, and algae. Water sources for cattle include ponds, streams, wells, or springs. Rural water may be available, but the cost per thousand gallons varies depending on the water district.

Previous Research

- A 23 percent greater weight gain in heifers watering from well or spring as compared to pond.
- Cattle avoid consuming water with 0.005 percent fresh manure.
- Cattle drink from a tank rather than pond 76 percent of the time, even with access to both.
- Cattle consuming rural water (1,019 ppm TDS total dissolved solids) versus well water (4,835 ppm TDS) showed increased water and dry matter intake, increased daily gain and feed efficiency, and decreased morbidity/mortality.

Range cattle prefer water sources in this order:

1. tank water from well or spring
2. tank water from pond
3. pond
4. pool in stream
5. flowing stream

If given the opportunity, cattle will loaf in and along water banks for long periods of time. The longer they remain, the greater the level of contamination from manure and urine expelled into the water and the more erosion along the sides of the water source.

Cattle preference and voluntary water intake can be altered by contaminants that diminish quality. Common contaminants that can seriously impair the health of cattle include:

- microorganisms such as fusobacterium, leptospirosis, coliform, and salmonella;
- dissolved solids, including minerals such as salt or sulfur; and
- nitrates.

Microorganisms

Fusobacterium, which is one of the most common microorganisms affecting range cattle, is the predominant bacteria that causes footrot. Bacteria enter through cuts or abrasions on the skin between the toes. Damp conditions predispose the skin to damage as water softens this area of the foot. Standing in ponds contributes to the problem. Fusobacterium can cause other health problems such as laryngitis (wheezer) and liver abscesses. This contaminant is passed in manure and can live in the environment for between one and 10 months.

Leptospirosis is a bacterial disease that can affect cattle. There are many different serovars of leptospirosis, hence the 5-way vaccine. Leptospirosis can cause abortion and mastitis in cows and death or severe anemia in calves. It is spread in the urine of carrier animals. Transmission to cattle occurs when cattle ingest contaminated water, but the disease can be spread by rodents and other wildlife species.

Coliform bacteria are manure pathogens that contaminate water, including *E. coli*, *Klepbsiella* sp., and *E. aerogenes*. Water with high levels of these bacterial species have been implicated in mastitis, urinary tract infections, diarrhea, and other septicemic events in cattle.

Salmonella causes many issues in cattle including septicemia, diarrhea, and even death. Carrier animals shed the bacteria in manure and ingestion of contaminated water is a chief cause of infection. The disease can be spread by wildlife species, including flies, and can survive in soil or water for up to five years.

Improve watering sources by controlling access. This minimizes contamination from manure and urine and decreases pond erosion.

All of these pathogens are spread through manure and water. Fencing ponds and limiting access to restricted watering points or having the pond gravity-feed a tank downslope from the pond dam can reduce cattle's risk of exposure. For more information on developing livestock water sources, visit the Kansas Center for Agricultural Resources and the Environment (www.kcare.k-state.edu/pubs/index.html).

Contaminants

Total dissolved solids (TDS) are contaminants commonly found in water. Dissolved solids refer to any salt, mineral, or metal dissolved or suspended in water. TDS include salts such as calcium, magnesium, potassium, and sodium. Salty water depresses intake and can cause diarrhea and weight loss in cattle. Water with TDS under 3,000 mg/L is considered satisfactory. Levels above 5,000 mg/L hinder cattle performance, and amounts above 7,000 mg/L pose a high risk to pregnant and lactating cattle. Cattle should not consume water with TDS of 10,000 mg/L or more.

Sulfur contamination can cause polioencephalomalacia (polio or PEM), a neurologic disease caused by production of hydrogen sulfide in the rumen. Hydrogen sulfide interferes with cellular energy usage and results in brain damage and areas of necrosis. Cattle on pasture consuming water with more than 1,000 ppm sulfur are at risk.

Nitrate by itself is not toxic, but is reduced to nitrite in the rumen. Nitrite inhibits hemoglobin in the blood from carrying oxygen, turning the blood brown. This contaminant can come from fertilizer runoff or improper manure management. Nitrate nitrogen is toxic at levels above 300 ppm.

Blue-Green Algae has become a serious water quality issue. It is actually not algae, but a cyanobacteria, which thrives in stagnant water during the summer. Blue-green algae release dangerous toxins, which are typically neuro or liver toxins. Cattle may experience liver failure or sudden death after drinking contaminated water. It affects wildlife and pets as well as cattle.

Water Testing

Cattle producers should monitor water for contaminants. Some water sources may need to be sampled yearly. Sampling also may be indicated for wells that are shallow, or at risk from contaminated runoff, in times of drought, or when a problem (algae bloom) is suspected. Your local K-State Research and Extension agent or K-State watershed specialist can help identify a laboratory for you to submit a water sample for analysis. If contaminants are found, a proper management plan can be implemented to correct the issue and decrease the risk to livestock.

Additional K-State Resources

Waterers and Watering Systems: A Handbook for Livestock Producers and Landowners (S147)
www.bookstore.ksre.ksu.edu/pubs/S147.pdf

Alternative Livestock Watering: Covered Concrete Waterer (MF2737)
www.bookstore.ksre.k-state.edu/pubs/mf2737.pdf

Identification and Management of Blue-green Algae in Farm Ponds (MF3065)
www.bookstore.ksre.k-state.edu/pubs/MF3065.pdf

Estimating Water Requirements for Mature Beef Cows (MF3303)
www.bookstore.ksre.ksu.edu/pubs/MF3303.pdf

How Water Quality and Source Affect Animal Performance (MF2672)
www.bookstore.ksre.ksu.edu/pubs/MF2672.pdf

References

Surber. G, Williams, K; Manoukian, M; Drinking Water Quality for Beef Cattle An Environment Friendly and Production Management Enhancement Technique. Anim. Rang. Sci., Ext Serv. Montana State University.

Patterson, H.H., Johnson, P.S., and W.B. Epperson. 2003. Effect of total dissolved solids and sulfates in drinking water for growing steers. Proc, West. Ameri. Soc. Anim. Sci. Vol 54.

Willms, W.D., Kenzie, O.R., and T.A. McAllister. 2002. Effects of water quality on cattle performance. Jour. Ran. Man. 55:452-460

A.J. Tarpoff, DVM
Beef Extension Veterinarian

Jeff Davidson
K-State Research and Extension Watershed Specialist

K·STATE
Research and Extension

Kansas State University Agricultural Experiment Station and Cooperative Extension Service
K-State Research and Extension is an equal opportunity provider and employer. Issued in furtherance of Cooperative Extension Work, Acts of May 8 and June 30, 1914, as amended. Kansas State University, County Extension Councils, Extension Districts, and United States Department of Agriculture Cooperating, J. Ernest Minton, Interim Director.

MF3249 September 2018