



# Vet Call

► by **Bob Larson**, Kansas State University

## Water

*When beef producers, nutritionists, range scientists and veterinarians talk about planning grazing seasons and winter diets, the importance of water may be overlooked. Water has many functions in the body, and making sure that cattle have water that is plentifully available and of good quality should be the first consideration when talking about cattle diets.*

### Access

The amount of water that cattle require is affected by a number of factors, including the environmental temperature and humidity, the salt content of the diet, the amount of moisture in the diet, and whether the animal is lactating or not. Some cattle may require as little as 6 gallons (gal.) of water per day in cool weather, while during hot weather, adult bulls, feedlot cattle and lactating cows can require 20 gal. or more of water per day.

When cattle are eating feeds with high water content, such as silage or green pasture, or if snow is readily available, drinking water intake is reduced; while dry forage, grain, and any feed with high salt content will increase the amount of drinking water needed.

Both well-water sources and surface-

water sources such as ponds and streams must provide sufficient amounts and access to water so cattle can drink all they need without competition. While unlimited access to ponds or streams usually offers plenty of room for many cattle to drink at once, this



type of access causes damage due to hoof action, which leads to soil erosion and development of mud

holes. Most experts recommend that ponds (and streams where possible) should be fenced off and serve as a reservoir for a float-controlled automatic water source with a concrete slab or rock base.

For fenced-off surface-water and well-water sources, adequate trough size and flow rate are important to ensure a proper water supply. Two feet (ft.) of water tank perimeter should be provided for every 25 head in

situations where cattle drink throughout the day; however, if the entire herd drinks at once, 2 ft. of tank perimeter is necessary per head.

For pasture or range systems, use water tanks with a capacity that can provide at least a one-day supply. Because range cattle usually all drink within a short period of time, one or two times per day, the watering system (pump, pipe diameter, reservoir, etc.) should be able to supply the entire day's supply within 4 hours.

Drylot watering systems require tanks with at least 50% of a one-day supply available, and the system should be able to provide the day's supply within 8 hours. Inadequate water capacity will result in water filling that cannot keep pace with water consumption. Water sources that are not accessible due to mud or erosion will also result in reduced feed intake. To prevent this problem, tanks and waterers should be placed on concrete slabs that extend at least 10 ft. in each direction.

### Toxicity concerns

Besides making sure that your cattle have access to enough water and that all cattle have adequate access, it is also important that the water quality is good. The factors that are most commonly considered when determining suitability of water for livestock are levels of nitrate, sulfate, total dissolved solids, and the risk of toxins such as blue-green algae.

Cattle are fairly sensitive to nitrate/nitrite toxicity, but the sources that cause problems are usually nitrate-accumulating plants such as forage sorghum, cornstalks, and, less commonly, alfalfa and other plants such as weeds. While the recommended acceptable limit for water nitrate is less than 440 milligrams (mg) per liter, and water nitrite is 33 mg per liter, the total dietary intake of nitrate (water + diet) is more important than the water level alone.

Therefore, water sources with apparently acceptable nitrite/nitrate levels can be high enough to combine with marginally high levels in the feed to cause health problems. While water from deep wells with intact casings is usually free of nitrates, water from ponds or shallow wells fed by runoff from heavily fertilized or manure-treated fields can have dangerously high levels of nitrate.

In some geographic areas, the soil and

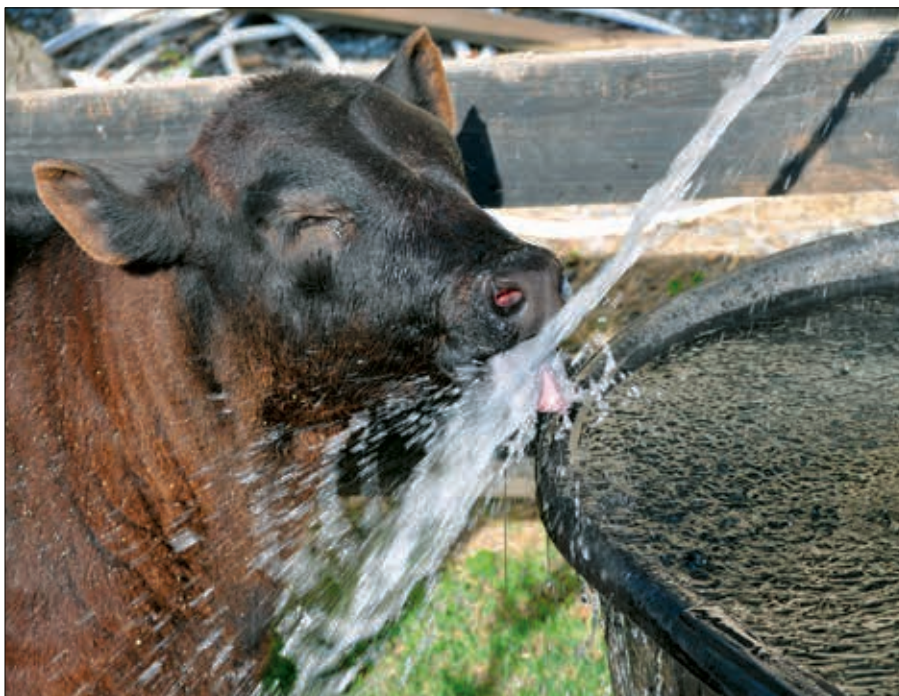


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rock through which groundwater moves can be high enough in sulfur minerals to result in high levels dissolved into the well water. Moderate levels of sulfate in the water can cause cattle to consume less water than they should, resulting in decreased average daily weight gain and poorer feed efficiency. With higher levels of sulfur (usually in combination with high-sulfur feeds), cattle can have a nervous system disease called polioencephalomalacia (also called polio, PEM, or brainer).

The recommended sulfur intake for beef cattle is 0.15% of the ration, and the maximum acceptable limit is 0.4% of the ration on a dry-matter basis. Water can contribute significant quantities of sulfur as sulfate toward total daily sulfur intake. Effects of high sulfate levels in water are greatest during warmest weather when water consumption is increased. However, problems associated with excessive sulfur consumption can be seen any time of year if the sulfur content of the ration is also elevated. It is possible to reduce adverse effects by making adjustments to the ration, such as decreasing the sulfur content during summer months if water sulfate concentrations are high.

“Total dissolved solids” is a measure of the total amount of dissolved material in the water, such as magnesium, calcium and sulfate. Total dissolved solids in water in excess of 3,000 mg per liter, or 0.3%, may result in diarrhea and water refusal in cattle. Almost all (97.7%) of water samples collected for a recent USDA survey contained total dissolved solids of less than 3,000 mg per liter.

### **Blue-green algae**

Another important water-quality consideration is the risk of blue-green algae blooms. Blue-green algae are actually bacteria named cyanobacteria. They can cause problems in many parts of the United States during hot weather. Occasionally, blue-green algae multiply rapidly and form blooms that look like scum on the water’s surface — often changing the water’s color to bright green, blue-green or gray, but occasionally red or brown.

Such blooms are typically most severe in stagnant areas, such as coves or inlets, where there is little wind and water temperatures are higher. Floating algae scums may accumulate at the downwind shores of ponds or lakes. The causes of harmful algal blooms are not completely understood, though they are associated with hot, sunny weather with little wind and they are related to increased nitrogen and phosphorus concentrations in water. However, the exact relationships between nutrient

concentrations and blooms are complex and difficult to predict. Toxin levels in a pond can be very different in different areas of the pond, so it is necessary to sample water from multiple places. Generally, if measurable toxin levels are found in any sample, it is best to consider the entire pond to be a risky water source.

If blue-green algae toxins are found, livestock producers who are relying on the pond as a water source have a few options. To be most certain to avoid the risk, producers may choose to provide an alternative water source for livestock or to move them off the pasture with the affected pond.

It is possible to kill the blue-green algae with several compounds, including copper sulfate. However, there are problems with this strategy. As the blue-green algae die, they release toxin that will spread throughout the pond. Copper sulfate will also kill competing organisms such as green algae, which keep blue-green algae populations lower. In addition, the high level of copper in the pond water is toxic for sheep and some other animals — but considered safe for cattle.

Another strategy is to spread wheat or barley straw in a thin layer across the surface of a pond to prevent the algae from having the direct sunlight they need to survive and multiply. This strategy has the advantage of

not using any toxic compounds, but the straw will need to be replaced as it sinks.

An affected pond can be a risk to cattle anywhere from a few days to several months — and it is difficult to predict how long the risk will last in any given situation. In general, cool, cloudy and windy weather will reduce the amount of time that the problem lasts. Before allowing cattle to drink water from a pond that had a blue-green algae bloom, you must send water samples to a laboratory that can run the appropriate tests to be sure that the toxins are no longer present.

To summarize, making sure that cattle have access to plenty of good-quality water is one of the most important things that producers must do for their herds. Insufficient space for animals to drink, low flow rates, low storage capacity, high mineral or toxin content, and unfamiliar taste can all discourage water consumption to the point that feed intake is reduced or can directly cause severe health problems.



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