MANAGEMENT

Vet Call

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Ensure adequate water supply, quality

Many times when producers, veterinarians and nutritionists talk about important nutrients for cattle growth and health, we give little attention to the cheapest and most abundant nutrient, water. However, the importance of water as a nutrient should be emphasized. Water makes up 65%-85% of animal body weight at birth and 45%-60% of body weight at maturity. Water accounts for 90%-95% of blood, and many tissues contain 70%-90% water. Water functions in the transportation of nutrients, chemical reactions, body temperature regulation, cell structure, and the lubrication and cushioning of joints and organs in the body cavity.

Water quality factors

The amount of water required and consumed is affected by a number of factors, including environmental temperature and humidity, dry-matter consumption, salt content of the diet, moisture content of the diet, whether the animal is lactating and water quality. The factors that are most commonly considered when determining suitability of water for livestock are nitrite, nitrate and sulfate content, and total dissolved solids.

Nitrate itself is not a particularly potent toxin; however, it is readily converted to highly toxic nitrite within the rumen. In a 2000 National Animal Health Monitoring System (NAHMS) survey of water quality in U.S. feedlots (263 feedlots from 10 states), nearly 41% of samples had a nitrate concentration that was undetectable or less than 10 milligrams per liter (mg/L). Approximately one-quarter (23.4%) of the samples had 45 to 132 mg/L nitrate, and 4.2% had greater than 220 mg/L nitrate. No water samples exceeded the recommended limit of 440 mg/L.

In general, nitrate concentration increased with the age of the well and in shallow wells. These differences were most likely due to damaged casings in old wells or because shallow wells are more readily contaminated by nitrogen compounds than deep wells.

Although the recommended tolerable limit for water nitrate is less than 440 mg/L, the total dietary intake of nitrate (from water and diet) is the number of greatest interest. Therefore, the acceptable water nitrate content may vary with the content of nitrate and nonprotein nitrogen in the ration.

Nitrate can accumulate in some forages, including forage sorghum, cornstalks, less commonly in alfalfa, and other plants (such as weeds). Forage analysis is recommended whenever there is suspicion of excessive nitrate content.

The recommended sulfur intake for beef cattle is 0.15% of the ration, and the maximum tolerable limit is 0.4% of the ration on a dry-matter basis. Water can contribute significant quantities of sulfur, as sulfate, toward total sulfur consumption.

Sulfur constitutes one-third of the molecular weight of sulfate. So, if an animal consumes 30 grams (g.) of sulfate by drinking water, it in effect consumes 10 g. of sulfur. Sulfur and sulfate are relatively nontoxic; but, like nitrate, sulfate/sulfur is readily converted in the rumen to highly toxic products. These potent toxins are collectively known as sulfides and produce hydrogen sulfide (known for its rotten egg smell).

Concentrations of water sulfate that result in excessive total sulfur consumption can result in decreased water consumption with subsequent decreased average daily gains (ADG) and poorer feed conversions.

Elevated rumen sulfide is also associated with a nervous system disease of cattle, polioencephalomalacia (PEM) also known as polio, or brainer. In the NAHMS water-quality survey, 77.4% of the samples had safe water sulfate concentrations (<300 mg/L). However, almost 8% of samples had a water sulfate concentration of 1,000 mg/L or greater.

Effects of elevated water sulfate are greatest during the warmest months of the year 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 — such as magnesium, calcium and sulfate — in the water. One component of total dissolved solids, calcium carbonate, is important in determining water hardness. Total dissolved solids in water in excess of 3,000 mg/L, or 0.3%, may result in diarrhea and water refusal in cattle. Almost all water samples collected for the NAHMS survey (97.7%) contained total dissolved solids of less than 3,000 mg/L.

Encouraging water consumption

Water must be available in sufficient quantity so cattle have ready access without competition. Insufficient space for animals to drink, low flow rates, low storage capacity, high mineral content, or unfamiliar taste can all discourage water consumption to the point that feed intake is reduced or health is compromised.

Adequate trough size and flow rate are both important to ensure a proper water supply. Two feet (ft.) of water tank perimeter should be provided for every 25 head if 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 four hours.

Feedlot watering systems require tanks with at least 50% of a one-day supply available, and systems should be able to provide the day's supply within eight hours. Water sources that are not accessible due to

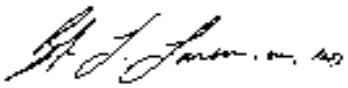
Goals for beef cattle water quality

Water quality factor	Nitrite	Nitrate	Sulfate	Total dissolved solids
Level generally considered safe for most livestock	‹33 ppm	‹440 ppm	‹300 ppm	‹0.3% (3,000 ppm)

Source: National Academy of Sciences
* mg/L is equivalent to parts per million (ppm).

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. Ponds should be well-maintained to allow adequate access, or they should be fenced off and serve as a reservoir for a float-controlled automatic water source with a concrete slab or rock base.

Poor accessibility to water, inadequate quantities of water available or poor water quality can all cause health problems, reduced feed intake and poor performance. Ensuring that all pens and pastures have adequate water supplies and delivery is an important first step when designing the herd's nutrition program.



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GRAZIER

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established pasture, seeding can be done in February, March or April.

- ► Grazing can begin when crabgrass is 4-6 in. tall. Dalrymple recommends that crabgrass be used in a rotational grazing system. This allows for more regrowth and more overall forage to be produced than under continuous grazing, he reports.
- ► Crabgrass won't grow in low-fertility soil, Dalrymple cautions. Thus, applications of nitrogen fertilizer or manure will need to be part of the overall management.
- ► Most important, crabgrass is an annual; but if managed properly it won't need to be reseeded every year.

To help generate repeated annual crabgrass growth, fields should be left ungrazed or unharvested long enough each year to produce volunteer seed for the following year. Hence, livestock should be removed from crabgrass pastures three to six weeks before the end of active growth to allow sufficient seed production for next year's crop.

Dalrymple advises light tillage in early winter or spring to promote a better volunteer stand being established each year. Doing so can double or triple forage yields the following grazing season.

For more information on Red River crabgrass, contact Dalrymple's private seed company, Elstel Farm & Seeds, Ardmore, Okla., at 1-800-858-7333.