

Quality Counts



Water quality proves crucial to cattle herd health and reproductive success.

by Haley Stark

While scientists are quick to indicate how water is the most important nutrient in livestock physiology, cattlemen often overlook it in a holistic approach to herd health, says Craig Gifford, a beef Extension specialist at New Mexico State University (NMSU).

In fact, it only takes a 10% loss in body water to be fatal in cattle, he explains.

In range cattle situations, conditions with poorer water quality can negatively impact water intake and lead to subclinical dehydration and production problems, Gifford says.

Often producers analyze and optimize their vaccination strategies and feed supplementation to cure production deficiencies, but they fail to test their subsurface water sources, he adds.

“It’s not an all or nothing deal,” Gifford says. “It’s hard to tell if it’s elements in the water causing the problems or if it’s reducing their intake so they’re in a dehydrated state. In all those cases, water was one of the last things they looked at.”

From a producer perspective, if a breeder is experiencing decreases in performance parameters like calf gains, reproductive rates, feed supplementation and body condition scores, but he or she



cannot pinpoint the cause, a water quality test could identify an underlying problem, Gifford says.

“From the experiences we’ve had with producers in poor water quality areas, [elements in the water] have impacted cow health, calf gains, breed back percentages and breeding back quickly within the first 21 days of the breeding period,” Gifford says.

Water plays several crucial roles in herd health like lactation, says David Lalman, an Oklahoma State University (OSU) professor and Extension beef cattle specialist.

“In a cow-calf operation, one really obvious thing people may not think about is that milk production requires water,” he explains. “Milk is somewhere in the neighborhood of 85% water, so the more milk a cow gives the more water she has to drink during the day just to meet milk production requirements.”

Gifford says water also aids in waste elimination, the regulation of blood osmotic pressure, the synthesis of body fluids, thermoregulation and feed intake.

The role of elements

Many elements can affect cattle health but the three major pollutants are sulfates, nitrates and total dissolved salts (TDS), Gifford says.

Sulfates are often confused with sulfides, which are better known by a sulfur smell, he adds.

Hydrogen sulfide is a non-soluble gas resulting from decomposing plant or animal material. It has the distinct sulfur odor, but is usually at harmless levels Gifford says.


Sulfate, on the other hand, comes from naturally occurring minerals in soil, rock and sediments. Sulfate is an odorless, nongaseous form of sulfur.

Gifford says location can play a dominant role in water quality based on topography and climate, adding how the western region of the country is more prone to sulfate issues.

“Sulfates are the biggest elements we deal with,” Gifford says. “Sulfates can cause health problems at 2,000 parts per million, and once they start exceeding that, production losses occur.”

He says an excess of sulfates can lead to a nutrient deficiency called polioencephalomalacia

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(PEM), or blind staggers. This can cause blindness, separation from the herd, loss of appetite and arched neck.

When sulfate interacts with molybdenum, it can inhibit liver copper stores in the body and create a copper deficiency, Gifford explains.

Copper has been linked to immune function, reproduction, health and hair-coat quality, Gifford says. Copper is also involved with establishing and maintaining pregnancy.

Nitrates are not as prevalent as sulfates, but in areas where nitrate levels are higher, runoff is usually the issue, he says.

“There’s a lot of compounds that can cause abortion in any stage of pregnancy,” Lalman says. “Nitrate would be a good example of this.”

Lalman says poor water quality will reduce water intake, especially in times of heat stress so it is important to analyze water quality factors, like total dissolved solids (TDS).

This refers to water salinity and once TDS exceeds 5,000 parts per million, health problems can arise, he explains.

TDS reduces feed consumption and causes diarrhea more than anything.

Management strategies

Some management practices, however, combat high levels of elements affecting water quality like sulfates, nitrates or TDS, Gifford says.

If cattle are suffering from PEM as a result

of excess sulfates, a thiamine injection can be administered to counteract the subsequent copper deficiency, Gifford explains.

He also says producers should consult a nutritionist to develop feeding strategies because most producers do not realize how water contributes to the mineral status.

“A lot of people don’t consider water a mineral source, but it can be,” Gifford says. “We develop mineral packages where we increase copper levels to compensate for our producers in areas with high sulfates in the water.”

Because water treatment can be expensive, Gifford suggests running a water test first to identify what elements are found in the highest levels.

While water treatment may be inevitable in some cases, cattle can adjust to some elements in the water, Gifford says.

“In a couple of weeks, the rumen microbes will adjust,” he says. “If you’re moving cows to a pasture, put them in there with high-quality water. If the water is of poor quality, give them time to adjust before the start of breeding season.”

Gifford says using pastures with high quality water sources will alleviate reproductive issues.

Yet, the cyclical nature of agriculture can pose a problem when water sources become scarce because of weather conditions.

Poor water quality also can become more apparent during drought conditions, Gifford says.

“Cows can obtain some of their water



requirements through the water content of feed and forage,” he explains. “In the case of a drought, cows aren’t getting any water from feed and forage because it’s scarce, so cows are forced to drink more from a poor quality water source.

“If that water source is high in a particular contaminant, they’re going to consume more of it during a drought,” he adds.

While a drought year may be unpredictable, producers can still be proactive, Lalman says.

“Folks just need to plan long term for a drought because it’s going to happen,” he says. “Planning a pasture-grazing system with drought conditions in mind is a good idea. You either need a backup water source or a reliable one.”

Emerging studies

While the research behind water quality, drought conditions and corresponding health issues may still be limited, several studies are in the works, Lalman says. Kelsey Bruno, an OSU animal science doctoral student, has spent the last four years researching the impact of water restrictions on feedlot cattle performance.

The project puts feedlot steers through water restriction to simulate a drought, Bruno explains.

The goal is to get a better understanding of what happens to cattle during drought conditions and to see if water restriction can be used as a management tool, she adds.

“If we could use water restriction as a

management tool for cattle, only offering them a percentage of a normal water intake, we can try to conserve water and make it last longer,” Bruno says.

Bruno and her colleagues will not receive the full research data until April, she says, but she is hopeful the results will develop parameters for producers to follow in times of drought.

“Overall, we didn’t have any animals die and we didn’t have any serious health issues [with the lack of mortality],” she says. “That really showed us that cattle are a lot more resilient than we realized.”

Lalman says he also hopes to gain more data about the topic with a recently approved USDA grant for a water-quality research project.

The study will consist of mature cows and growing heifers, he says.

“We’ll look at water with high salt or high dissolved solids within a natural water source — in Oklahoma that’s called primarily brackish water — and we’ll look at different levels in between,” Lalman explains. “We’ll look to see if brackish water reduces intake or reduces the digestibility of what cows do consume, like feed and forage, and compare it back to that of high-quality water.”

While the first water quality study will stay relatively small scale, Lalman says he is hopeful this research project will quantify water requirements and help clarify health issues caused by poor water quality. [A](#)

Editor’s note: Haley Stark is a freelance writer from DeLeon Springs, Fla.