

PRIME CUTS



Do My Cattle Have a Water Quality Problem?

John Paterson, Extension Beef Specialist / Professor of Animal Science
Montana State University

This Weeks Question: How does water quality affect performance of my cattle?

Recent news reports from Montana have implicated poor water quality as the cause of cattle deaths. The Great Falls Tribune in the October 29, 2011 edition was quoted as indicating that "Lab test results have confirmed that 33 cattle discovered dead earlier this month most likely died from drinking water with toxic concentrations of salt".

Water high in salt content can compromise performance and health of cattle in three ways: 1) reduced water and feed intake; 2) toxic levels of sulfur ingestion; and 3) induced trace mineral deficiencies. Beef cattle may voluntarily consume less poor quality water, which in turn results in reduced consumption of dry matter. Factors that affect water requirements include size, dry matter intake, physical exertion,

lactation, and temperature. Dr. Trey Patterson conducted a series of well designed experiments evaluating the effects of "salts" in drinking water. The first consideration is to define what these "salts" really are. Earlier work showed that cattle performance was not depressed when sodium chloride (table salt) was added to cattle drinking water. However, when sodium sulfate was added to drinking water, water consumption was reduced by 35%, feed consumption by 30% and there was more weight loss in heifers compared to heifer's drinking water without sodium sulfate. Water with very high levels of sulfate has been shown to cause a condition called "star gazing" or polio or more correctly polioencephalomalacia (PEM). Symptoms noticed in animals with polio include lethargy, anorexia, blindness, muscle tremors, gastrointestinal stasis, incoordination, staggering, weakness, convulsions and death. This photograph demonstrates the condition of "star gazing" by an steer which has consumed excessive amounts of sulfate from drinking water.



Photo from Dr. Trey Patterson

In the following table, Dr. Patterson reported that as the level of sulfate in the drinking water increased, daily gain, feed intake and water consumption all

declined. The biggest decline occurred when sulfate level increased from 2900 to 4600 ppm.

Intake and performance of growing steers consuming water with increasing sulfate levels (Trey Patterson, 2002)

Item	Water sulfate level, ppm			
	400	1700	2900	4600
Initial Weight, lb	642	640	640	640
ADG, lb/day ^a	1.79	1.65	1.48	0.62
DM Intake, lb/day ^a	20.8	20.6	18.9	13.2
Water Intake, gal/day ^a	15.0	13.4	11.9	9.5

^a Significant decline (P<0.05)

Dr. Cathy Bandyk recently published a summary (Cattle Sense) of studies which showed that when dietary sulfur (not sulfate) went from .42 to .65% of dry matter intake, intakes were depressed by 9%, gains were reduced by nearly 12% and carcass

weights were reduced by 40 lbs. Workers at the University of Nebraska showed that when sulfur (not sulfate) in the diet was .46%, the incidence of polio was just .13% but when the diets contained .56% sulfur, over 6% of the cattle exhibited polio.

How do I know the quality of my water?

Testing your livestock water will give you a reasonable idea as to its quality. The following tables give you guidelines for water quality based on water sulfate level and then secondly on water TDS (total dissolved solids). TDS are an estimate of the total salts in the water and not just sulfates.

Interpretation of Water Sulfate Levels for Cattle	
Sulfate level (ppm)	Interpretation
< 500	Safe
500-1500	Generally safe. Trace mineral availability may begin to be reduced. May decrease performance in confined cattle.
1500-3000	Marginal. May be considered poor for confined cattle during hot weather. Sporadic cases of polio may be seen in confined cattle. Performance may be reduced.
3000-4000	Poor water. Sporadic cases of polio are probable, especially in confined cattle. Performance of grazing cattle may be affected.
> 4000	Dangerous. Health problems expected. Substantial reductions in performance expected.

Interpretation of Water Quality Based on TDS (total dissolved solids) for Cattle		
TDS (ppm)	Interpretation	Suggested Action
Less than 2000	Safe. Levels greater than 1000 may have some laxative effect and may reduce availability of trace minerals	None required
2000-3000	Generally safe. May reduce performance, should not affect health	Monitor water, especially as weather gets hot
3000-5000	Marginal. May reduce performance and affect health	Test water for sulfates. Monitor water.
5000-7000	Poor water. Performance and health depression expected in times of high temperatures	Test for sulfates. Use for low producing stock
7000-10,000	Dangerous. Performance and health depression expected.	Do not use for pregnant or lactating cattle. Sulfates likely to be high.
Greater than 10,000	Extremely Dangerous. Not suitable for livestock	Do not use

I have had several questions this month about livestock water quality. After the recent drought, I suspect the quantity of water in stock ponds declined and concentrated the salts and made this water less suitable for cattle. If you need help in evaluating your water, please contact me, your MSU county agent or feed salesman for assistance. *Give me a call at 406.994.5562 or email at johnp@montana.edu and we can visit.*



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