



Extension FactSheet

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Water Effects on Livestock Performance

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Limitation of water intake reduces animal performance quicker and more dramatically than any other nutrient deficiency (Boyles). Water constitutes approximately 60 to 70 percent of an animal's live weight and consuming water is more important than consuming food (Faries, Sweeten & Reagor, 1997). Domesticated animals can live about sixty days without food but only about seven days without water. Livestock should be given all the water they can drink because animals that do not drink enough water may suffer stress or dehydration.

Signs of dehydration or lack of water are tightening of the skin, loss of weight and drying of mucous membranes and eyes. Stress accompanying lack of water intake may need special considerations. Newly arrived animals may refuse water at first due to differences in palatability. One should allow them to become accustomed to a new water supply by mixing water from old and new sources. If this is not possible, then intake should be monitored to be sure no signs of dehydration occur until animals show adjustment to the new water source.

Water Requirements are Influenced by Physiological and Environmental Conditions

Consumption may vary greatly depending on the kind and size of the animal, physical state, level of activity, dry matter intake, quality of water, temperature of water and the environmental temperature. The minimum requirement of water intake is reflected in the amount needed for body growth, fetal growth or lactation and that lost by excretion in urine, feces or perspiration. Anything that influences these needs will influence the minimum requirement. Not all water must be provided as drinking water. Feeds that are high in moisture such as green chop, silage or pasture will provide part of the requirement, while feeds such as grain and hay offer very little moisture.

Water requirements are measured by voluntary up-take of water under a variety of conditions. Results imply that thirst is a result of need and animals drink to fill that need. This is brought about by the increased electrolyte salt concentration

in the body fluids which activate the thirst mechanism. Livestock may also increase water intake during hot months for its cooling effect. Table 1 shows estimates of daily consumption of water for various livestock groups.

Table 1	Est. Gal./Day
Cows, Dry & Bred	6-15
Cows, Nursing	11-18
Bulls	7-19
Growing Cattle	4-15
Dairy Cattle	15-30
Sheep & Goats	2-3
Horses	10-15

Water Functions

Water in the body performs many functions. Water helps to:

- 1) eliminate waste products of digestion and metabolism,
- 2) regulate blood osmotic pressure,
- 3) produce milk and saliva,
- 4) transport nutrients, hormone and other chemical messages within the body, and
- 5) aid in temperature regulation affected by evaporation of water from the skin and respiratory tract.

Water Quality

Water quality, as well as quantity, may affect feed consumption and animal health since poor water quality will normally result in reduced water and feed consumption. When evaluating water quality for livestock, consider whether livestock performance will be affected; whether water could serve as a carrier to spread diseases; and if the acceptability or safety of animal products for human consumption will be affected.

Most elements in water do not cause problems because they do not occur at high enough levels in soluble form. Cobalt, copper, iodide, iron, manganese and zinc may be toxic in excessive concentration but rarely are seen at levels high enough to cause problems.

Water quality problems affecting livestock are more commonly seen with high concentrations of minerals (excess salinity); high nitrogen content; bacterial contamination; heavy growths of toxic blue-green algae; or accidental spills of petroleum, pesticides or fertilizers. Factors such as age, diet, condition and kind of animal determine tolerance of minerals in water. Decaying plant or animal protein, nitrogen fertilizer, silage juices and other factors may contribute to high levels of nitrogen forms in surface waters.

Water Access and Quality Improve Performance

Water access and quality can affect livestock performance. Farm managers with high producing dairy cows have reported substantial increases in milk output when cows have readily accessible water. Two to five additional pounds of milk per cow per day is not uncommon.

Pasture utilization can be greatly enhanced when animals do not have to travel far for water. A study from Missouri researched distances beef cattle traveled to water and how that affected grazing distribution and utilization of available forage. The study results on the 160 acres tested showed that pasture carrying capacity could be increased an additional 14 percent by simply keeping livestock within 800 feet of water.

Other research from Wyoming concluded similar results under rangeland conditions. Their results showed cattle do 77 percent of their grazing within 1,200 feet of their water source. In this study, approximately 65 percent of the pasture was more than 2,400 feet from water, but supported only 12 percent of the grazing usage.

A study from Alberta, Canada implies water quality greatly affects the ability of cattle to produce pounds of gain. As Table 2 indicates, animals in the test all averaged .5 lbs per day or more gain as a result of drinking trough (clean) water versus dugout/pond (muddy) water where reduced or negative gains resulted. This research continues with a focus on animal performance. While other tests have not confirmed the same amount of increase due to water quality, generally it's accepted that stale, poor tasting water can cause a reduction in water consumption and this type of water could be a host for disease organisms.

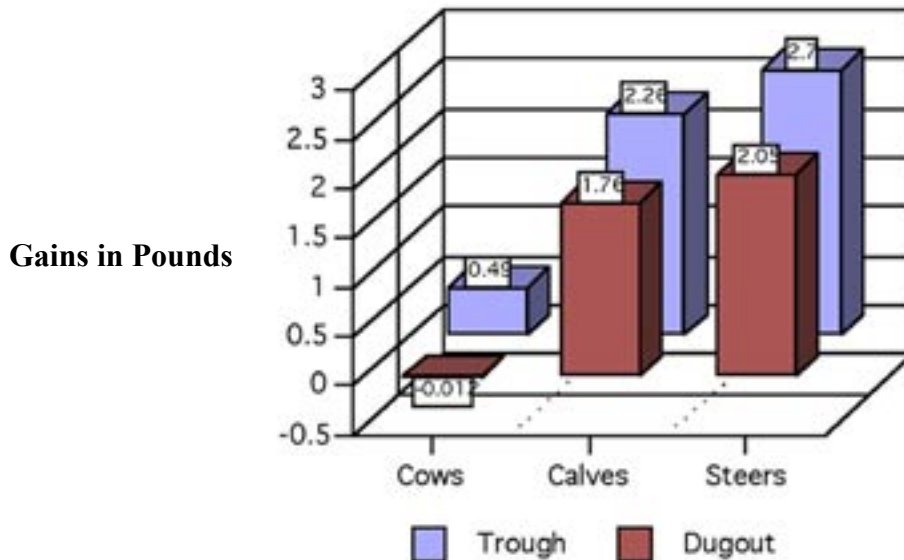
To evaluate water quality in relationship to livestock health problems, it is imperative to obtain a thorough history, make accurate observations and submit suspect water samples to a qualified laboratory if problems occur.

Other Affects

Today's concerns about water quality for not only cattle, but human consumption lead to questions about care being given to the water resource. Using a "watering system" where livestock do not have to have direct access to a stream or dugout/pond not only protects the water resource, but may also increase nutrient distribution throughout the field. Through management of available water and tank placement, one can increase pasture productivity by promoting more uniform grazing. Uniform grazing results in uniform manure and urine distribution.

A grazing cow returns 79 percent of the nitrogen (N), 66 percent of the phosphorus (P) and 92 percent of the potassium (K) she eats to the pasture (Bartlett, 1996). If allowed, live-

Table 2: Animal Weight Gain: Dugout Versus Trough Water (per day)



Source: Wilms, W.D., 1996. *Agriculture and Agri-Food Canada and Alberta Agriculture, Stavelly, Alberta.*

stock will move nutrients from the pasture and deposit those nutrients in locations not beneficial to pasture growth. Examples are under shaded areas or around water tanks. A study from Missouri tested P and K levels of distribution in relationship to water placement. Soil test levels were not altered when water was less than 500 feet from the farthest part of the pasture. When stock had to travel 1,100 feet to water, changes in soil P and K were much greater nearer the water.

Summary

Monitoring water intake for livestock is mandatory for a farm manager. Ample supply of good quality water is necessary for maximum production. Consumption of water is determined by many factors and basic life functions require it. Easy access to quality and plentiful water supplies may increase livestock productivity. Management of the water source can lead to more uniform distribution of nutrients excreted through livestock waste. Sound environmental practices may be enhanced by correct use of a water source.

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