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Livestock Water Requirements

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Providing adequate water to livestock is critical for animal health and production. A 10 percent loss of body water is fatal to most species of domestic livestock.

Water accounts for more than 98 percent of all molecules in the body and between 50 and 81 percent of an animal's total body weight at maturity. Water is required for regulation of body temperature, growth, reproduction, lactation, digestion, lubrication of joints, and eyesight.

Livestock water requirements vary significantly depending on the species. Water consumption is influenced by a number of factors, including age, rate of gain, pregnancy, lactation, activity, type of diet, feed intake and environmental temperature. Livestock obtain water to meet their requirements from wells, fountains, surface water and moisture found in feedstuffs.

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Beef Cattle

Water requirements of beef cattle are a function of the stage of production, lactation and environmental temperature **(Table 1)**. Beef cattle water requirements increase as the weight of the animal increases, during pregnancy and lactation, and with elevated temperatures. Water requirements also vary depending on the moisture in feedstuffs **(Table 2)**. Limiting water intake reduces feed consumption and animal performance.

Table 1. Estimated daily water intake (gallons per head per day) for beef cows based on temperature and level of production.

	Growing Cattle			Finishing Cattle			Pregnant Cows		Lactating Cows	Mature Bulls	
Temp.	400 lb	600 lb	800 lb	600 lb	800 lb	1,000 lb	900 lb	1,110 lb	900 lb	1,400 lb	16,000 lb
40	4.0	5.3	6.3	6.0	7.3	8.7	6.7	6.0	11.4	8.0	8.7
50	4.3	5.8	6.8	6.5	7.9	9.4	7.2	6.5	12.6	8.6	9.4
60	5.0	6.6	7.9	7.4	9.1	10.8	8.3	7.4	14.5	9.9	10.8
70	5.8	7.8	9.2	8.7	10.7	12.6	9.7	8.7	16.9	11.7	12.6
80	6.7	8.9	10.6	10.0	12.3	14.5			17.9	13.4	14.5
90	9.5	12.7	15.0	14.3	17.4	20.6			16.2	19.0	20.6

Adapted from Nutrient Requirements of Beef Cattle: Seventh Revised Edition: Updated 2000, 2000, NRC

Table 2. Water consumption estimates for beef cattle based on thermal environment and dry-matter (DM) intake.

Thermal Environment	Water Requirements
> 95 F	8 to 15 pounds of water per pound of DM intake
77 to 95 F	4 to 10 pounds of water per pound of DM intake
59 to 77 F	3 to 5 pounds of water per pound of DM intake (young and lactating cattle require 10 to 15 percent more water)
29 to 59 F	2 to 4 pounds of water per pound of DM intake
< 29 F	2 to 3 pounds of water per pound of DM intake (increases of 50 to 100 percent occur with a rise in ambient temperature following a period of very cold temperatures; for example, a rise from minus 5 to 30 F.)

Adapted from Effects of Environment on Nutrient Requirements of Domestic Animals, 1981, NRC

Dairy Cattle

Water constitutes 87 percent of milk with, approximately 30 percent of water consumed by dairy cattle being lost through milk. Thus, dairy cattle water requirements are strongly influenced by the stage of production and level of milk production **(Table 3)**.

The majority (about 83 percent) of water consumed by dairy cattle is consumed by drinking, with the remaining water coming from feedstuffs. Water requirements are influenced by the animal's diet and will increase with increases in dry matter, salt and protein.

Table 3. Water requirements (gallons per head per day) for dairy cows based on level of production.

Class	Age	Milk Production	Water Intake
		(lbs milk/day)	
Calves	1 to 4 months		1.3 to 3.5
Heifers	5 to 24 months		3.8 to 9.6
Milking cows	24 + months	30	18 to 22
Milking cows	24 + months	50	23 to 27
Milking cows	24 + months	80	30 to 36
Milking cows	24 + months	100	35 to 41
Dry cows	24 + months		9 to 13

Horses

Horse water intake is highly variable. Water intake is a based on body weight, age, diet, exercise intensity and duration, lactation and temperature **(Table 4)**. Horses fed a fiber-rich forage-based diet require more water than those fed a more digestible grain diet. Horses that are hot from exercise should have limited access to water to prevent colic, laminitis and/or exertional rhabdomyolysis (tying up).

Table 4. Estimated daily water intake (gallons per head per day) for horses as influenced by class, activity level and temperature.

Class	Activity Level	Body Weight	Temp.	Water Intake
		(lb)	(F)	
Yearling	Moderate	661	14	4.8
Yearling	Moderate	661	68	5.0
Pregnant		1,102	68	8.1
Lactating		1,102	68	13.5
Mature	Idle	1,102	-4	11.1
Mature	Idle	1,102	68	8.2
Mature	Idle	1,102	86	12.7
Mature	Moderate	1,102	68	10.8
Mature	Moderate	1,102	95	21.7

Adapted from Nutrient Requirements of Horses: Sixth Revised Edition, 2007, NRC

Sheep

Table 5 lists water requirements for different categories of sheep. Sheep are able to obtain most of their water requirements from forage consumption. In addition to weight and level of production, water intake also increases in response to increases in environmental temperature.

Table 5. Water intake (gallons per head per day) for sheep.

Class	Weight	Water Intake
	(lbs)	
Lambs	5 to 20	0.1 to 0.3
Feeder lambs	60 to 110	1.0 to 1.5
Pregnant ewes	175 +	1.0 to 2.0
Lactating ewes	175 +	2.0 to 3.0
Rams	175 +	1.0 to 2.0

Swine

Table 6 provides water requirements for swine based on level of maturity and weight. Other factors that influence swine water requirements include diet, temperature, housing and feeding methods.

Water intake increases as protein and salt increase in the diet. Swine fed a high-energy diet that are deprived of water (such as can occur during power outages) then are allowed free access to water (power restored) are at risk of salt poisoning (cerebral edema). They should be given access to water sparingly until fully rehydrated.

Table 6. Water requirements (gallons per pig per day) for swine.

Class	Water Intake
Nursery (up to 60 lbs)	0.7 to 1
Grower (60-100 lbs)	2 to 3
Finishing (100-250 lbs.)	3 to 5
Nonpregnant gilts	3 to 5
Pregnant sows	3 to 6
Lactating sows	5 to 7
Boars	3 to 6

Dehydration

Limited water access, limited water availability, environmental temperatures, stress and illness can result in dehydration or lack of water. Common signs of dehydration include lethargy, tightening of the skin, weight loss, and drying of mucous membranes and eyes.

Here are some other symptoms:

Cattle and sheep – The eyes will appear sunken and dull. In lactating dairy cows, dehydration results in a near cessation of milk production.

Horses – Dehydration reduces skin elasticity. One way to determine if a horse is dehydrated is by skin folds. Pull the skin over the shoulder and hold a moment. Release and count the seconds until the fold disappears. If the horse is dehydrated, the skin will stand for several seconds.

Swine – Dehydration can result in salt poisoning and often is fatal. Early signs of dehydration in swine include thirst, constipation, skin irritation and lack of appetite. This often is followed by nervousness, apparent deafness and blindness. Pigs affected by salt poisoning will be uncoordinated and have intermittent convulsions.

Stress

Reduced water consumption can be a sign of unfamiliarity, sickness or other stressors. New animals initially may refuse water due to unfamiliarity of water sources and differences in palatability.

Water intake in new livestock should be monitored carefully to make sure they have located the source and are consuming water. With lightweight calves and sheep, be sure the watering source is of adequate height to allow access because animals may not be able to reach the source.

Water Quality

Water consumption can be impacted by water quality. Livestock that are provided low-quality water will have reduced water and feed intake, resulting in reduced production. Certain salts and gases in solution, such as those consisting of sodium, potassium, calcium, magnesium, chloride and sulfate make water more palatable. However, these same salts and gases can be toxic if present in excess.

Livestock never should be forced to drink dirty or contaminated water. Dirty or stale water can reduce water consumption. Providing grazing livestock with fresh water has been shown to increase weight gains.

Dirty water is a host for disease organisms. Disease can spread rapidly if animals drink from the same water source, so sick animals should be isolated and waterers should be cleaned frequently.

Waterers can be disinfected using a dilute bleach solution following cleaning. A dilute bleach solution of 2 to 3 ounces for each 50 gallons of tank capacity of bleach containing 5.25 percent sodium hypochlorite applied weekly also will suppress algae growth.

Proper installation of the waterer or tank base will prevent fecal contamination of water. The base should be wide enough so animals easily can place their front legs on it while drinking, but not their hind legs. This will keep animals from defecating in the water.

Summary

Water is an important, but often overlooked, nutrient. Livestock water requirements are affected by many factors including, size, productivity, diet and environmental conditions. Good water quality and cleanliness can increase water intake and improve livestock production. Limited access or reduced water consumption can result in dehydration, which can be fatal to livestock.

Cover photo by Gerald Stokka

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