Water—the Nutrient We Often Take for Granted

Cooperative Extension Service

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Behind oxygen, water is the most important component for life. Water is consumed in the largest quantity of all the essential nutrients and comprises 55 to 70% of the total body weight of a milking dairy cow. Water is necessary for not only milk production (milk is 87% water), but also many other functions within the body. These include body temperature regulation, transportation of nutrients in the blood, metabolic processes within cells, elimination of waste through the feces and urine, lubrication of joints and many organs, and as a cushion for the brain. Small changes in water within the animal's body can have large impacts on health and performance. Thus, providing adequate water intake is extremely important throughout the life of a dairy animal.

Thirst, and thus drinking behavior, is controlled by the hypothalamus, a region of the brain. Cattle drink by using the muscles in their cheeks to create suction that draws water upward into their mouths. As one aliquot of water is sucked up, it is swallowed. Approximately 40% of water intake is consumed within 2 hours of feeding and milking. Late lactation cows may consume their water needs within 5 water-consuming episodes whereas earlier lactation cows may consume water over 8 or more episodes daily. Dairy cows are able to consume their water needs in less than 20 minutes. Thus, adequate and easily consumed aliquots of water are needed. Water must be easily accessible throughout the day to allow lactating dairy cows to consume 25 to 36 gallons of water daily.

Water intake is influenced by many factors. Milk production drives water intake where approximately 4 to 5 pounds of water is consumed per pound of milk produced. Dry matter intake influences water intake and vice versa. Dietary potassium content also influences water intake. In addition, ambient temperature, relative humidity, wind speed, and solar radiation influence water intake. Additional sweating in cattle allows for heat loss from the body surface helping to cool the cow, resulting in additional water loss. Jerseys (189 g/m^2-h) sweat less than Holsteins and mostly-white Holsteins (281 g/m^2-h) sweat less than mostly-black Holsteins (414 g/m^2-h). Panting also is used to dissipate heat. Both additional sweating for temperature regulation and panting increase water needs of dairy animals. Cattle under heat stress (temperatures above 68ºF- higher humidity could lower this temperature) require 1.2 to 2 times more water than cattle housed under thermoneutral temperatures and humidity. When given a choice, cattle prefer water at 68 to 77º F. Under heat stress conditions, chilled water has been shown to increase water consumption.

Besides the milking herd, providing free-choice water in addition to their milk allowance is important for baby calves. Restricted water intake has been shown to decrease starter intake by 31% and weight gain by 38%. Remember that weight gain early in life has been positively related to milk production 2 years later. Early in life, calves may only drink 25 to 34 ounces of water, an amount that may not be noticed in a bucket of free-choice water, but an amount that is very important for their hydration and overall health and growth.

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As starter intake increases, the amount of water they drink increases. Calves that have diarrhea may increase their free water intake by 25 to 50%.

Limitations in availability of clean, fresh, and high-quality water can limit milk production or growth quicker than a deficiency in any other nutrient. Water intake also regulates feed intake. Thus, understanding the importance of water and how to effectively manage your dairy feeding system to provide adequate water intake is very important. Important management concepts to achieve this objective include the following:

Milking Cows

- Waterers should be sized to accommodate multiple animals. Midwest Plan Service recommends one waterer or 3 ft. of water trough perimeter space per 15 to 20 cows in a barn.
- Milking cows consume water alternately with feed and shortly after being milked. Thus, waterers should be located within 50 ft. of the feedbunk and in return alleys or areas where cows are housed directly after milking. Waterers should be located close to cows housed in freestalls, compost bedded pack barns, loose housing or on pasture.
- Waterers should be located in areas immediately accessible upon return from the milking facilities. Waterers should be sized to accommodate the number of cows released from the milking parlor at one time. A recommendation is that cows have access to 1 to 2 ft. of linear trough space per cow in return alleys from the milking facility.
- Cattle spend approximately 6 hours per day eating, but only about 20 minutes daily drinking water. Thus, the flow rate of water into the waterer is very important in providing adequate water intake. Cattle should be able to drink water without gulping air. The potential problem of stray voltage should be investigated if cattle lap water from the waterer.
- The depth of water within the trough should be such that cows can submerge their muzzles 1 to 2 inches into the water and drink without gulping air. Thus, the recommendation that water depth be a minimum of 3 inches with shallow water depths of 3 to 8 inches being preferred.
- The water surface in water troughs should be 2 to 4 inches below the top edge with the height of the trough being 24 to 32 inches for Holstein cows (2-3 inches lower for Jerseys).
- Waterers should be emptied and cleaned (scrubbed) with a weak chlorine solution (1 cup of household bleach per 5 gallons of water) at least weekly to improve water quality and animal acceptance. This solution should be removed from the waterer and replaced with clean water.
- Water troughs should be fitted with non-back siphoning valves and an outlet (which is not accessible by cattle) for easy removal of water and sediment in the tank.

Baby Calves

- Don't forget the baby calves! Fresh, free-choice water should be provided at all times from 3 days of age. Very young calves will drink a small amount of water (less than a quart per day), but this amount in addition to their milk is important for their health and growth.
- As starter intake increases, the amount of water calves drink also increases.
- Water should be replaced daily. Waterbuckets should be located in a separate area from buckets with starter to prevent the starter from getting wet.
- Water provided through automatic waterers should be dumped and the water trough cleaned and scrubbed at least weekly using a weak chlorinated solution.
- During colder weather, providing warm water helps increase water consumption.

Heifers and Dry Cows

- Don't forget to monitor water troughs for dry cows and older heifers.
- During the summer (or warmer temperatures) waterers should be shaded to decrease water ambient temperature.
- Waterers should also be cleaned on a regular basis.