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Dairy Lines

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KANSAS DAIRY EXTENSION NEWS

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Upcoming Events

■ **October 25**
KSU Dairy Day
Manhattan, Kansas

Water Intake and Water Quality Requirements for Dairy Cattle

by John F. Smith

Water Intake

Providing clean and high quality water is essential to maintaining high milk production in lactating dairy cattle. Even a small decrease in water intake can result in a decrease of dry matter intake of 1 to 2 pounds per day or a reduction of peak milk production of 2 to 5 pounds per day. In general, a lactating dairy cow will require .5 gallons of water per pound of milk produced. The water intake for different classes of dairy cattle is presented in Table 1.

Table 1. Water Intake Requirements for Dairy Cattle[3]

Livestock class	Age or production	Gallons/day[2]
Holstein calves	1 month	1.3 to 2.0
	2 months	1.5 to 2.4
	3 months	2.1 to 2.8
	4 months	3.0 to 3.5
Holstein heifers	5 months	3.8 to 4.6
	15 to 18 months	5.9 to 7.1
	18 to 24 months	7.3 to 9.6
Jersey cows	30 pounds milk/day	13.0 to 15.5
Guernsey cows	30 pounds milk/day	13.8 to 16.0
Ayrshire,	30 pounds milk/day	14.5 to 17.0
Brown Swiss,	50 pounds milk/day	24.0 to 27.0
& Holstein cows	80 pounds milk/day	38.0 to 42.0
	100 pounds milk/day	48.0 to 52.0
Dry cows	Pregnant, 6 to 9 months	9 to 13

[1]Adapted from: Adams, R.S. 1986. Water Quality for Dairy Cattle. Pennsylvania State University.
[2]Higher levels of water intake apply for an all-hay ration (greater than or equal to 80% dry matter).
[3]Source: Rick Grant, University of Nebraska.

Encouraging Water Intake

Providing easy access to clean and high quality water is the key to maximizing water intake. Making water available to cows as they leave the milking parlor is beneficial in increasing water intake during heat stress. Typically access to an 8-foot trough when cows are leaving the parlor is adequate for milking parlors with 25 stalls or less per side. In drylot housing, it is recommended to have watering stations in two locations and 30 feet of trough perimeter per 100 cow groups or 80 feet of perimeter for 200 cow groups. In freestall housing, one waterer or 2 feet of tank perimeter should be provided for 15 to 20 cows. An ideal situation would be to have water available at every cross-over between feeding and resting areas. The water system on a dairy should be designed to meet peak demand and daily demands. The advantage in having water at multiple locations will be compromised if cows have to wait for water tanks to refill.

Water Quality

Maintaining a source of high quality water is essential to maximizing milk production. It is a good idea to check drinking water annually for coliforms, PH, nitrate, Nitrites, and total bacteria. Expected levels of water quality test are presented in Table 2. High producing cows may consume 200 to 300 pounds of water per day making them extremely sensitive to poor water quality. Nitrate levels over 100 to 150 parts per

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Heart of America Dairy Herd Improvement Summary (August)

	Quartiles				Your Herd
	1	2	3	4	
Guernsey					
Rolling Herd Average	17,466	14,279	13,312	11,342	
Summit Milk Yield 1st	63.2	53.4	50.7	44.8	
Summit Milk Yield 2nd	74.7	65.9	61.2	55.6	
Summit Milk Yield 3rd	82.4	71.9	67.2	59.8	
Summit Milk Yield Avg.	73.7	64.4	59.4	54.7	
Income/Feed Cost	1,200	994	925	731	
SCC 1st LACT	190	141	232	286	
SCC 2nd LACT	256	203	314	228	
SCC 3rd+ LACT	398	291	489	365	
SCC Average	294	230	358	320	
Days to 1st Service	92	84	93	80	
Days Open	123	137	132	141	
Projected Calving Interval	405	419	414	423	
Milking Shorthorn					
Rolling Herd Average	19,145	15,991	14,346	12,066	
Summit Milk Yield 1st	61.2	52.0	49.1	44.7	
Summit Milk Yield 2nd	78.9	68.7	62.4	54.9	
Summit Milk Yield 3rd	83.1	74.6	70.0	58.0	
Summit Milk Yield Avg.	74.2	66.0	61.8	53.0	
Income/Feed Cost	1,487	1,244	1,109	878	
SCC 1st LACT	264	185	186	204	
SCC 2nd LACT	324	248	231	171	
SCC 3rd+ LACT	435	571	428	450	
SCC Average	352	382	315	322	
Days to 1st Service	89	84	87	99	
Days Open	144	140	152	153	
Projected Calving Interval	431	427	439	442	
Holstein					
Rolling Herd Average	21,688	18,824	16,922	13,988	
Summit Milk Yield 1st	71.0	63.8	58.7	50.8	
Summit Milk Yield 2nd	90.6	80.8	73.4	62.3	
Summit Milk Yield 3rd	95.6	85.2	78.6	66.6	
Summit Milk Yield Avg.	84.4	75.8	70.2	60.5	
Income/Feed Cost	1,690	1,406	1,401	960	
SCC 1st LACT	272	302	300	349	
SCC 2nd LACT	298	329	351	418	
SCC 3rd+ LACT	494	527	527	643	
SCC Average	359	395	408	502	
Days to 1st Service	92	93	98	100	
Days Open	142	141	143	144	
Projected Calving Interval	422	421	423	424	
Jersey					
Rolling Herd Average	15,757	13,383	11,964	9,980	
Summit Milk Yield 1st	52.3	47.0	40.2	36.9	
Summit Milk Yield 2nd	63.4	56.4	50.4	43.8	
Summit Milk Yield 3rd	67.7	60.0	53.5	44.1	
Summit Milk Yield Avg.	61.4	55.1	48.7	42.0	
Income/Feed Cost	1,515	1,074	924	760	
SCC 1st LACT	230	322	229	373	
SCC 2nd LACT	306	311	286	433	
SCC 3rd+ LACT	481	534	435	637	
SCC Average	361	416	342	514	
Days to 1st Service	83	87	92	90	
Days Open	116	121	126	130	
Projected Calving Interval	395	399	405	409	

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million (ppm) may cause reproductive problems in adult cattle. Nitrite levels over 4 ppm can be toxic to cattle. Water with a PH less than 5.5 may create problems similar to mild acidosis. Magnesium levels over 125 ppm or sulfate levels over 250 ppm may have a laxative effect. The coliform count should be under 10 per 100 milliliters for adult cattle. The benefit of many other feeding and management techniques may not be realized if lactating dairy cattle are not provided with quality water. Water is an essential nutrient for lactating dairy cows.

Table 2. Expected Water Quality Analysis[1,3]

Item	Average	Expected[2]	Possible Cattle Problems
pH	7.0	6.8 - 7.5	Under 5.5; Over 8.5
	(ppm)	(ppm)	
Dissolved solids	368	500 or less	Over 3,000
Total alkalinity	141	0 - 400	Over 5,000
Sulfate	35.5	0 - 250	Over 2,000
Fluoride	0.23	0 - 1.2	Over 2.4 (Mottling of teeth)
Calcium	60.4	0 - 43	Over 500
Magnesium	13.9	0 - 29	Over 125
Iron	0.8	0 - 0.3	Over .3 (taste)
Manganese	0.3	0 - 0.05	Over .05 (taste)
Copper	0.1	0 - .6	Over .6 to 1.0
Arsenic	--	0.05	Over .20
Cadmium	--	0 - .01	Over .05
Mercury	--	0 - .005	Over .01
Lead	--	0 - .05	Over .10
Nitrate as NO3	33.8	0 - 10	Over 100
Nitrite as NO2	.28	0 - 0.1	Over 4.0 - 10.0
Hydrogen sulfide	--	0 - 2	Over .1 (taste)
Barium	--	0 - 1	Over 10 (health)
Zinc	--	0 - 5	Over 25
Total bacteria /100 ml	336,300	under 200	Over 1 million
Total coliform /100 ml	933	less than 1	Over 1 for calves Over 15 to 50 for cows
Fecal coliform /100 ml	--	less than 1	Over 1 for calves Over 10 for cows
Fecal/100 ml	--	less than 1	Over 3 for calves Over 30 for cows

[1]From: Adams, R.S. 1986. Water Quality for Dairy Cattle. Pennsylvania State University.
[2]Based primarily on criteria for good water for human use.
[3]Source: Rick Grant, University of Nebraska.

Starting Fresh Cows on Feed

by J.R. Dunham

The most critical feeding period of the production cycle is the first few weeks after calving. It is during this time that fresh cows are going on feed and summit milk yield (SMY) is being set. (Note the relationship between summit milk yield (SMY) and rolling herd average in the quartile comparisons). It also is the time when cows have a tremendous will to milk but not a great appetite. This means that early fresh cows are loosing body weight and have the potential for metabolic problems. Most metabolic problems can be avoided if we can get fresh cows to eat well.

The prepartum feeding program which was discussed in the last issue of Dairy Lines will affect the success of early lactation feeding programs. The goal should be to maximize dry matter intake (DMI) during early lactation.

With the change to TMR feeding programs, many dairy farmers have created a problem for feeding the recently fresh cow. Most TMRs do not provide enough long-stem hay for the recently fresh cow. Fresh cows seem to benefit from some long-stem hay in order to help maintain body fill and prevent displaced abomasum. If possible, provisions should be made for fresh cows to consume 5 to 10 pounds of long-stemmed hay for the first week following calving. In many herds this may require separating recently fresh cows for a few hours each day for feeding hay.

Maximizing DMI is important in the early lactation cow to minimize body weight loss and stimulate high SMYs. In addition, cows will maintain or begin gaining weight earlier in the lactation after they have maximized DMI.

Hay quality has the most effect on DMI. Consumption of low quality hay will be reduced, and the rate digestion of low quality hay will limit DMI. Therefore, try to select the best quality hay for the early lactation cows.

The amount of grain in the ration has an effect on DMI. Since the rate of grain digestion is rapid compared to forage, DMI will be increased when the total ration is composed of up to 55 percent grain. However, there is no advantage in feeding a ration that contains more than 78 to 80 Mcal / 100 pounds.

Buffer is extremely important in high energy rations for preventing acidosis. It is even more important for starting recently fresh cows on feed to maintain nearly normal rumen pH. The total dry matter of high energy rations should contain about 0.75 percent buffer.

Feeding adequate amounts of protein is important for stimulating DMI and for increasing SMY. Inadequate protein intake will limit DMI by restricting rumen microbial growth. Adequate amounts of protein are also needed to make milk from the energy source from body weight loss. Usually, early lactation cows will produce better when the ration dry matter is 18 to 18.5 percent protein. The undegradable intake protein (UIP) should be 35 to 40 percent of the intake protein.

You have only one chance each lactation to set the SMY for each cow. Make sure the early lactation ration will maximize DMI and will give each cow the opportunity to produce to her potential.

Hay Prices*

	Location	Quality	Price ($/ton)
Alfalfa	Southwestern Kansas	Premium	N / A
Alfalfa	Southwestern Kansas	Good	100–110
Alfalfa	South Central Kansas	Premium	100–110
Alfalfa	South Central Kansas	Good	90–100
Alfalfa	Southeastern Kansas	Premium	100–115
Alfalfa	Southeastern Kansas	Good	90–100
Alfalfa	Northwestern Kansas	Premium	N / A
Alfalfa	Northwestern Kansas	Good	80–90
Alfalfa	North Central Kansas	Premium	90–100
Alfalfa	North Central Kansas	Good	80–90

Source: USDA Weekly Hay Report, *Week ending September 10, 1996*

*Premium Hay RFV = 170–200
Good Hay RFV = 150–170

Feed Stuffs Prices

	Location	Price ($/ton)
SBM 48%	Kansas City	272.30–274.30
Cotton Seed Meal	Kansas City	214
Whole Cottonseed	Memphis	160–165
Meat and Bone Meal	Central United States	262–270
Blood Meal	Central United States	490
Corn Hominy	Kansas City	160
Corn Gluten Feed	Kansas City	114–117
Corn Gluten Meal 60%	Kansas City	320
Distillers Dried Grain	Central Illinois	150–155
Brewers Dried Grain	St. Louis	145
Wheat Middlings	Kansas City	120–124

Source: USDA Weekly Feed Stuffs Report, *Week ending September 4, 1996*

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