

respiratory diseases common to the area. Vaccines were boosted as recommended by the manufacturer. After weaning, the six calves in each group were placed in a common pen and remained together as a group until sold at 160 to 170 days of age. During this post-weaning period, calves were offered a choice of alfalfa hay (18.0% crude protein, 60% total digestible nutrients) and a concentrate mix (14% crude protein, 78% total digestible nutrients) composed mainly of dry-rolled barley, corn silage, soybean meal and vitamin-mineral premix. Calves

were weighed as they were placed in the hutches, at weaning and when they were sold.

Results and Discussion

The effect of drinking water bucket management on the performance of Holstein bull calves reared in hutches from birth to weaning (60 days) is summarized in Table 1.

Table 1. Average daily gain and body weight of Holstein bull calves from birth to weaning (60 days) as affected by frequency of cleaning and rinsing of drinking water buckets.

Season	cleaning/rinsing interval			Average	Weaning weight, lbs.
	Daily	7-days	14-days		
	----- Daily gain, lbs. -----				
Summer	1.43	1.41	1.34	1.39	171
Fall	1.65	1.54	1.43	1.54	180
Winter	1.50	1.43	1.41	1.45	175
Spring	1.65	1.54	1.41	1.54	180
Average	1.54	1.47	1.41		
Weaning Weight, lbs.	181	176	172		

The magnitude of differences in daily gain and 60-day weaning weights are not great. Calves whose water buckets were cleaned and rinsed daily weighed only 5 and 9 pounds more at weaning than those whose water buckets were cleaned and rinsed at 7 and 14-day intervals, respectively. However, it must be remembered that 9 lbs. accounts for just over 5% of the total body weight of these young, light calves. Also notice that season had an effect on the performance of the calves. Those reared

during summer and winter months gained about 7 pounds less than those reared during spring and fall months, which is about 4% of total body weight.

A summary of effects of drinking water bucket management during 60 days of hutch rearing on the performance of the Holstein bull calves from birth to sale weight (160-170 days) is presented in Table 2.

Table 2. Performance of Holstein bull calves from birth to sale weight (160-170 days) as affected by drinking water bucket management during the hutch-rearing phase (first 60 days).

Season	cleaning/rinsing interval			Average	Sale Weight, lbs.
	Daily	7-days	14-days		
	----- daily gain, lbs. -----				
Summer	2.35	2.24	2.13	2.24	458
Fall	2.68	2.57	2.49	2.57	512
Winter	2.40	2.42	2.40	2.40	484
Spring	2.64	2.53	2.38	2.53	505
Average	2.53	2.44	2.35		
Weaning Weight, lbs.	506	491	476		

These calves were 160 to 170 days of age when marketed and even though management of the calves was identical for approximately the last 100 days, differences in drinking water bucket management during the first 60 days while calves were in hutches resulted in differences in daily gain and sale weight at sale. Only minor differences in the daily gain and sale weight of calves whose drinking water buckets were cleaned and rinsed daily or each 7 days could be detected. Differences were not significant. However, when the cleaning/rinsing interval was increased to 14 days, daily gain and sale weight were significantly reduced. Compared to calves whose drinking water buckets were cleaned/rinsed daily or at 7-day intervals, those whose bucket were cleaned/rinsed each 14 days weighed 30 and 15 pounds less when sold, respectively. These differences were not simply a carryover of weight differences observed during the 60-day hutch-rearing period. Calves whose drinking water buckets were changed daily weighed 9 pounds more than those whose water buckets were changed at 14-day intervals by the end of the hutch-rearing period (Table 1). However, there was a 30-pound difference in the sale weight of these calves approximately 100 days later. Thus, factors associated with drinking water bucket

management during the hutch-rearing phase affected the performance of calves during the next 100 days during the post-weaning growth period. Reductions in water intake resulting from stagnant, contaminated water in the buckets that were cleaned/rinsed at 14-day intervals may have resulted in lower concentrate intake, impeded gastro-intestinal tract development, or health/behavioral issues that reduced daily gain during the next 100 days. Calves whose water was only cleaned at 14-day intervals also had more health problems. Also notice the seasonal effect. Calves started in the summer or winter gained less and weighed less at sale than those started in spring or fall.

Implications

Frequent cleaning/rinsing of drinking water buckets of hutch-raised calves will increase daily bodyweight gain by over 7 percent during the hutch-rearing period and through the next 100-day growth period. Although daily cleaning/rinsing of water buckets is preferred, intervals between cleaning should not exceed 7 days.

Utah State University is committed to providing an environment free from harassment and other forms of illegal discrimination based on race, color, religion, sex, national origin, age (40 and older), disability, and veteran's status. USU's policy also prohibits discrimination on the basis of sexual orientation in employment and academic related practices and decisions.

Utah State University employees and students cannot, because of race, color, religion, sex, national origin, age, disability, or veteran's status, refuse to hire; discharge; promote; demote; terminate; discriminate in compensation; or discriminate regarding terms, privileges, or conditions of employment, against any person otherwise qualified. Employees and students also cannot discriminate in the classroom, residence halls, or in on/off campus, USU-sponsored events and activities.

This publication is issued in furtherance of Cooperative Extension work. Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Noelle Cockett, Vice President for Extension and Agriculture, Utah State University.