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Supplementing Young Grazing Dairy Heifers with Lick Tubs: A Case Study

Post-weaned dairy heifers are young, growing animals with greater nutrient requirements than older heifers. Heifers at this stage still have developing rumens and are transitioning to diets containing larger amounts of forage. Pasture can be used as a main forage source for young dairy heifers, but additional supplementation is necessary to promote growth and achieve desired rates of gain. Although grazing heifers is a common practice, little research has been done to evaluate different supplementation strategies for post-weaned, prepubertal dairy heifers.

Lick tubs offer producers an additional option for nutrient supplementation. Lick tubs are dense, molasses-based supplements that may be able to be utilized in pasture-raised dairy heifer development. Both the dense physical form of the tubs, and the feed ingredients used in formulation, help regulate intake and minimize overconsumption. The form of lick tubs also makes them

less susceptible to weather elements, allowing them to be placed outside for free-choice consumption.

Having lick tubs available as an additional source of nutrients for pasture-raised dairy heifers provides an extra level of supplementation beyond the grain supplement, offers a continuous source of supplemental nutrients throughout the day, and may provide a valuable source of nutrients for less aggressive heifers that may not compete well at the bunk when grain supplements are fed. Because lick tubs are an extra expense, there is a need to understand how the tubs affect animal performance and whether the investment costs result in profitability.

Numerous types of lick tubs are available on the market, and each will have different nutrient formulations. Some lick tubs are designed to be protein supplements, some are intended to provide a combination of protein and energy, and others are meant to be

a source of additional minerals. Because the various lick tubs serve different purposes, determining the type of lick tub that best fits a particular production system is the first decision a producer should make.

To learn more about the role of lick tubs in grazing dairy heifer systems, a pasture trial was conducted during the summer of 2011 to evaluate the efficacy of providing a lick tub as a source of additional nutrients for pasture heifers. The dairy heifers used in the trial were approximately six months of age at the start of the trial, weighed an average of 391 pounds, had a heart girth circumference of 54 inches, and were 43.8 and 41.2 inches tall at the hip and withers, respectively. The three-month trial started in mid-June and ended mid-September. The pasture was divided into two separate paddocks with 14 heifers in each paddock.

Prior to initiating the study, heifers were adapted to pasture for two weeks. Heifers were randomly assigned by weight to one of two treatments: 1) control — pasture without lick tub, or 2) pasture with free access to a lick tub. Heifers were rotationally grazed, allowed free access to pasture, and were weighed and measured monthly during the trial. All heifers were supplemented with a grain mix containing 34 percent corn, 18 percent soyhulls and a 48 percent grower pellet (20 percent crude protein) all on a dry matter (DM) basis. The grain mix was supplemented at 1.25 percent of body weight (on a DM basis) to allow for gains of at least 1.8 pounds per day (lbs/d), regardless of treatment. A switch-back design was used, where heifers were assigned to one treatment for the first month, switched to the alternate treatment for the second month, and returned to their original treatment for the final month of the trial. The nutrient composition of the lick tub used in this trial is shown in Table 1.



Table 1. Guaranteed analyses of the lick tub used in the heifer grazing trial.

Item	
Crude protein, not less than	7.0%
Crude fat, not less than	3.0%
Crude fiber, not more than	2.0%
Calcium (Ca), not less than	5.0%
Calcium (Ca), not more than	6.0%
Phosphorus (P), not less than	4.0%
Magnesium (Mg), not less than	1.5%
Potassium (K), not less than	4.0%
Copper (Cu), not less than	730 ppm
Manganese (Mn), not less than	1,165 ppm
Iodine (I), not less than	68 ppm
Cobalt (Co), not less than	75 ppm
Zinc (Zn), not less than	2,100 ppm
Selenium (Se), not less than	13 ppm
Vitamin A, not less than	80,000 IU/lb
Vitamin D3, not less than	20,000 IU/lb
Vitamin E, not less than	100 IU/lb

When heifers had access to the lick tub, they consumed an average of 0.67 lb/d (as-fed basis) of the lick tub. The average growth of heifers on the trial is shown in Table 2. During the first month of the summer, heifers with the lick tub gained an average of 0.4 lb/d more than heifers without the lick tub. However, as the summer progressed the gains of the heifers were similar, and access to the lick tub did not improve daily weight gain.

At the end of the trial, the heifers averaged 562 pounds. Over the entire trial, heifers that had access to the lick tub gained approximately 0.2 lb/d more than heifers that did not have access to the lick tubs. Even though there was a difference in average daily gain over the trial, skeletal growth was similar for heifers that either had access or did not have access to the lick tub. Heifers had greater plasma urea nitrogen (PUN) concentrations in the first 28 days of the study when provided lick tubs, but this difference disappeared during the second and third months of the trial.

A greater PUN concentration suggests that more protein was available in the rumen during the first month, which may account for the increased average daily gain of heifers during this period. One may speculate that these young heifers might benefit from short-term lick tub supplementation (28 days) when placed on pasture. Although the lick tub used in this trial mainly was formulated to provide additional mineral supplementation, lick tub consumption might have increased overall protein intake of the heifers.

The cost of providing lick tubs is an important consideration. The daily cost of the lick tub in this trial was 35 cents per day per heifer, which was determined using the average intake of the heifers throughout the feeding period. Over the entire trial, the total cost of the lick tub was \$29.05 per heifer, resulting in a cost of \$1.84 per additional pound of gain. However, the cost of the additional gain from feeding the lick tub was only \$1.17 per pound over the first 28 days of the trial, indicating that the use

of the lick tubs was more economical when heifers were transitioning to pasture.

In summary, offering a mineral-based lick tub during this trial improved overall average daily gain of young grazing dairy heifers. Interestingly, the greatest advantage of the lick tubs occurred early in the summer when the dairy heifers were still adjusting to the pasture environment. Even though this trial did show an increase in gain for dairy heifers when they were offered a lick tub, the lick tub substantially increased daily feed costs and costs of gain.

Livestock producers have access to a variety of lick tubs with varying nutrient values and costs. Although this trial indicated that providing lick tubs might be advantageous for helping young dairy heifers transition to pasture, additional research is needed to determine effects of lick tubs with different nutrient profiles on animal growth and overall profitability.

Table 2. Average growth performance of dairy heifers grazing pasture either without (Pasture) or with (Pasture + Lick Tub) access to the lick tub. Heifers were switched to the alternate treatment at the end of each month.

Item	Pasture	Pasture + Lick Tub	Standard Error	P Value*
Average daily gain, lb/d				
Month 1 (d 0-28)	1.40	1.81	0.09	<0.01
Month 2 (d 29-55)	2.07	2.28	0.09	0.13
Month 3 (d 56-83)	2.41	2.35	0.09	0.67
Overall (d 0-83)	1.96	2.15	0.06	<0.01
Heart girth change, in	1.7	1.5	0.15	0.34
Hip height change, in	1.3	1.2	0.09	0.78
Withers height change, in	1.3	1.5	0.11	0.13
Plasma urea N, mg/dL¹				
Start of study (d 0)	14.6	14.5	0.77	0.94
End of month 1 (d 28)	10.0	12.1	0.79	<0.01
End of month 2 (d 55)	9.3	8.3	0.77	0.20
End of month 3 (d 83)	14.2	15.0	0.77	0.32

*P values less than or equal to 0.05 indicate a significant difference between treatments.

¹Milligrams per deciliter.

Apr 2013

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