Cost of Feed per Pound of Gain in Cal Poly's Dairy Calves

Kayle A. Phelan
California Polytechnic State University, San Luis Obispo
1 Grand Avenue
San Luis Obispo, CA 93407
kphelan@calpoly.edu

Robert A. Flores
California Polytechnic State University, San Luis Obispo
1 Grand Avenue
San Luis Obispo, CA 93407

Abstract

California is ranked one of the top five states in the United States for dairy production. It produces approximately 40 billion pounds of milk per year for US production. California's dairy industry is not only the largest milk producer in the nation, but it is also the most financially prominent in the agricultural industry. This industry lead is purely because of its careful management practices. The way calves are raised depend on the resources used, the natural environment present, and the operation of the dairy farm. Essentially, there are numerous ways to care for a cow and calf. However, the aim of raising calves is to ensure productive cows are raised. Calves are the future of the heard. With good management techniques, a newborn heifer calf will eventually develop into a high milk-producing cow. As the heifer grows, it is important to watch her weight and rate of gain. Since feed is the number one cost on a dairy, it is important to achieve optimum growth with low costs.

Introduction

California Polytechnic State University, located in San Luis Obispo, is known for its agriculture program and the "Learn by Doing" motto. The University has a dairy located on its campus, that provides students with the opportunity to work on the operation. The dairy has both the creamery and the milk parlor giving its students access to livestock and production side of the dairy industry.

Operations continue to grow and expand, so it is important to keep track of the rate of gain for heifers for the 365 days-a-year operations. Cal Poly's operation is small, with only one to three calves born per week, making the rate of production for the dairy minimal. One of the largest costs for any livestock operation is the cost of feed and with each calf born, there is one

more animal to feed. Therefore, the rate of gain per animal is essential to allow the operation to succeed.

Review of Literature

The California dairy industry is one of the largest in the nation. According to the California Milk Advisory Board (CMAB), California produces 20 percent of the United States' milk, 40 percent of the United States' dairy exports and 42.3 billion pounds of milk each year. In order to keep up with the rapid production, replacement heifer breeding programs are the most important part of the industry. Raising replacement heifers is expensive and complex; consequently, management practices must be followed appropriately, to ensure heifers meet industry demands and appropriate breeding arrangements need to be put in place. Discussing feed, it is important to start with the calf. It is essential to take adequate care of dairy calves, as they play an important role in the dairy business.

Feed is one of the largest costs in running a livestock operation. Meeting the needs of the farm and the nutritional requirements of the animals can add up quickly for any dairy due to expensive costs. Allocation of a budget is necessary for proper livestock care and profitability. Knowing how fast the replacement heifers can reach sexual maturity is also key. The more cows produce calves, the more milk can be produced, and in turn, generating more money back to the operation. Knowing the cost of feed per pound of calf weight gained can give the dairy a proper estimate of how much money it takes to raise a single replacement heifer up until the time she can join the herd. "A newborn calf must be fed highly digestible feedstuffs containing adequate levels of high-quality protein, energy, vitamins, and minerals" (PennState, 13). This could be a potential problem for the farmer. Feed can be extremely expensive per head, especially when incorporating high quality nutrients within the rations. When running an operation, it is

important to remain cost effective – knowing how much of each nutrient the calf retains for optimum growth versus giving the calf too much of the added nutrients makes it expensive for the farmer's budget. Understanding nutritional requirements and how to adjust to changing environments without over conditioning is important (Schroeder, 2016).

According to J.W. Schroeder from North Dakota State University, the average cost of raising one heifer from birth to first calving age was $1,360, with feed accounting for 40 percent of that cost. "Being too focused on low costs is hurting the industry by producing low quality animals that are not suited to meet the demands of the growing consumer needs," (Hoard's Dairyman, 2016).

The first nutrient source a calf receives is colostrum. After colostrum and milk/milk replacer has been fed, calves should be consuming one and one-half to two pounds of calf starter feed per day (BAMN, 4). "For the first 70 days of age, a reasonable ADG should be about 1.7 to 2 pounds per day. By six months of age, heifers should be gaining at least two pounds per day" (Dairy Herd Management, 2016). In order to reach these averages, calf starter should contain 16-22 percent crude protein and .52-.56 Mcal net energy for gain per pound (BAMN, 6). A calf gains weight with the amount of feed it actually consumes, which is why feed intake is key in all animals.

Creating an efficient farm is vital to the industry. Proper feed nutrition and feed intake monitoring can help make this happen. Although feed costs continue to rise, it is important for the farmer to adapt to the changes of the dairy farm. Knowing what is "palatable and contains sufficient energy" (BAMN, 6) can help create a feeding program that benefits each operation. Another factor besides feed palatability that can affect feed intake is weather conditions (Hoard's

Dairyman, 2016). A smart farmer will know how to counteract these factors and increase or decrease nutrients depending on the forecast.

It is important to keep records of average daily gains of the animals on the farm. These records can help set growth targets that will help farm performance and keep up with the growing demand of the dairy industry. The cost of feed is increasing so farmers need to understand which types of feed work best with the environment they live and which is most cost effective for their operation.

Methodology

To perform the research needed for the dairy replacement heifer cost per pound of feed per gain, the first step was to consult with the herd manager/operations manager to create a master plan for the project.

Once the plan was created, the calves were weighed weekly – week within their birthdate to about 8 weeks of age. To take the weight recordings, a standard weight tape should be used. The tape should be placed around the animal at the heart girth just behind the front legs, and should be pulled to take up the slack (not tightened excessively), the weight should be read according to the appropriate breed.

Weights should be well recorded. Using an excel document to record the weights was found easiest for this project.

Speaking with the calf feeders is the best way to determine the amount of feed being fed to each calf and the cost per 50 pound bag of feed.

After the data has been collected, the ADG of each heifer must be taken, this is done by averaging each weight for the duration of the experiment and dividing by 56 days (8 weeks).

Then once each ADG has been calculated per calf, there must be an average of those ADG's found. This will provide the researcher with an average of the ADG's for the calf herd.

Determining the feed price per calf, will take the amount of feed per day multiplied by the average ADG. This will give you the pounds of feed per pound of gain. Then multiply that number by the cost per pound of feed in the 50 pound bag to achieve the cost per pound of gain for one calf on the operation.

Results and Discussion

The outcome of this project is very important information to the Cal Poly Dairy Operation. Knowing how much it cost to raise the heifers while they are in the hutches can help make improvements in calf care to become a more efficient dairy. Though this research proved to be successful, there is always room for improvement.

Suggestions for future research on the ADG of the calves include obtaining an accurate scale to weigh each calf with. The weight tape gave an approximate weight depending on size of the calf, yet without the proper training it could have a large variable impact. Additional suggestions for recording and documenting weights is to weigh every seven days, therefore there are no discrepancies of ADG per week. Lastly, the more accurate the project is made, the more accurate numbers the researcher will have to work with, giving the operation a more detailed look into their calf management practices to help determine important decisions.

The calf records are closed to the public - only the Cal Poly Dairy management team and some dairy sciences course will be able to view them. This information pertains to the Cal Poly Dairy and will be used to make decisions involving the calf feeding practices when considering new feeds compared to the feed used now.

Sources

Bovine Alliance on Management and Nutrition (BAMN). *A Guide to Dairy Calf Feeding And Management Optimizing Rumen Development and Effective Weaning* 2003. 1-6.

California Milk Advisory Board. Real California Milk Website. 2016.

Chester-Jones, Hugh, Dr., Broadwater, Neil. *Colostrum.* Minnesota Dairy Team. 2009. 1-30.

Dairy Calf Heifer Association (DCHA). "Monitor Heifer Average Daily Gain." Dairy Herd Management. 6 Jun, 2012. Web.

"Feeding the Newborn Dairy Calf." PennState, College of Agricultural Sciences Agricultural Research and Cooperative Extension. Pg.13-19

Hoard's Dairyman Staff. "Feed to Meet their Potential." Hoard's Dairyman – Calf & Heifer. 2016.

Schroeder, J.W. "Dairy Focus: Know the Cost of Raising Replacement Heifers." North Dakota State University. 2016

US Jersey. "A Quality Heifer." www.infojersey.com