



## **Northern NY Agricultural Development Program 2004 Project Report**

### **The Effect of Initial Weight and Winter Diet on the Performance, Meat Quality and Profitability of Holstein Beef for the Grass-Finished Market**

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#### **Background:**

The NNY region produces an abundant quantity of high quality forage. There is also an abundance of land left idled by an increasingly efficient dairy industry. The region has 130,900 dairy cows annually producing nearly 60,000 bull calves that are mostly exported from this region. Research at Cornell University has demonstrated that Holstein steers can be used to produce beef of equal or superior quality to that from beef breeds. There is a growing demand for beef finished on an all forage diet and raised without growth promotants and antibiotics. While there are research results guiding producers in the production of Holstein beef on a high grain diet, the ability of Holstein steers to produce beef on an all forage diet has heretofore been unknown. High quality pasture from an intensive grazing management program will support high levels of animal gain. The effect of an all forage diet on animal performance, meat quality and profitability using stored feeds during the winter feeding period is less well documented. The purpose of this project is to examine the effects of initial weight when placed on pasture and three diets during the winter feeding period on the performance, meat quality and profitability of Holstein steers destined for the grass finished market.

If Holstein steers can be used in a grazing program to produce grass-finished beef, this could add value to the Holstein bull calf, which will benefit the local dairy industry. It could also lead to the development of a grazing industry that would keep land open and productive by demonstrating a model for the profitable use of locally available land, animal and labor resources.

**Methods:**

In late winter, 2004, Holstein calves (n=30) were purchased from local dairies and transported to two custom calf raisers. One goal was to evaluate the effect of initial weight at pasture turnout. As such, the custom calf raisers were to provide calves in two weight classes: 200 lbs (n=15) and 300 lbs (n=15). In mid April the calves were delivered to the CCE St. Lawrence Learning Farm, where they were fed a diet of hay and grain until the start of the grazing season on May 21. The calves were grazed using the principles of management intensive grazing.

On October 28, an informational meeting was held at the CCE St. Lawrence Learning Farm. Participants viewed the animals, followed by a presentation on the potential for finishing cattle on all forage diets. Data collected on the Holstein steers were also presented.

On November 5, the grazing season was terminated and baleage supplementation was provided with partial pasture for one month. On December 6 the calves from each weight category were randomly assigned to one of three all forage diets for the winter feeding period: 1) high quality baleage (18%+ crude protein), 2) high quality (12%+ crude protein) dry hay and 3) medium quality (10-12% crude protein) dry hay.

**Results:**

The performance of the calves during the grazing season is shown in Table 1. The weight gain of both groups was lower than expected. Fox (1989) reported ADG of 2.25 lbs. and 2.44 lb for Holstein heifers initially weighing 414 lb and 530 lbs. respectively. However the relative gain (ADG divided by average body weight) was similar to this study. The heavy weight group gained 25% faster than the light group. This is higher than that reported by Fox (1989), who showed a 10% increase in ADG in heavy weight vs. light weight calves. While the ADG of the lightweight group was lower than the heavy group, the relative gain of the light group was higher than that of the heavy group.

**Table 1. Performance of Holstein steers during 168 day grazing season.**

	Weight group	
	Light	Heavy
Initial weight, lb.	170 <sup>a</sup>	293 <sup>b</sup>
End weight, lb.	369 <sup>a</sup>	539 <sup>b</sup>
ADG, lb.	1.2 <sup>a</sup>	1.5 <sup>b</sup>
ADG per 100 lb	0.4378 <sup>a</sup>	0.3529 <sup>b</sup>

<sup>a,b</sup>Values in rows with different superscripts differ significantly at P < 0.01.

**Conclusions/Impacts:**

The calves came to the CCE St. Lawrence Learning Farm lighter than anticipated with more variation in weight than desired. The treatment rate for bovine respiratory disease was also high. Care of the newborn calf is of utmost importance to assure good health and performance further down the production chain.

The projected finish weight of the Holstein steers is 1150 lb. To assure tenderness, these cattle should be harvested between 18 and 24 months of age, which means that on average these cattle must have a weight per day of age [WDA = (weight-birth weight) ÷ days of age] of 1.4-1.9 lb. Individual birthdates of the calves were not available, however most of the heavy group was born in December 2003 and the light group was born in Feb 2004. At the end of the grazing season the heavy and light groups were approximately 11 and 9 months old, which computes to a WDA of 1.3 lb and 1.0 lb for the heavy and light group, respectively. To reach the desired market readiness by 18-24 months of age, either performance of the cattle will have to increase, and/or the finish weight will be lower than originally projected.

**Next steps if results suggest continued work is needed.**

As of February 2005, the calves are in their respective winter feeding treatment. Following this period the cattle will go back to pasture and graze until they reach the high Select quality grade as determined by ultrasound. A full evaluation of animal performance and carcass quality will help to determine if initial weight on pasture and winter diet are important.

**Acknowledgments/Cooperating Farmers:**

Charlie Hitchman, Farm Technician, Cornell Cooperative Extension of St. Lawrence County provides daily care for the animals. Allen and Mary Kelly, Doug Thompson, Dan Chambers, David Fisher, and Gary Tiernan kindly donated livestock for this trial.

**Literature Cited:**

Fox, D. G. (1989). "Producing beef from Holstein steers: A summary of 10 years of research." Invited paper at Nutritional Services Associates Annual Meeting, Lancaster, PA, August 4, 1989.

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**Northern New York Agricultural Development Program:**

The Northern New York Agricultural Development Program provided funding for this grass-based agriculture research project. The Northern New York Agricultural Development Program is a farmer-driven research and education program specific to New York state's six northernmost counties: Jefferson, Lewis, St. Lawrence, Franklin, Clinton and Essex. Thirty-three farmers serve on the Program board led by Co-Chairs Jon Greenwood of Canton (315-386-3231) and Joe Giroux of Plattsburgh (518) 563-7523. For more information, contact Jon, Joe or R. David Smith at 607-255-7286 or visit [www.nnyagdev.org](http://www.nnyagdev.org) # # #