Northern New York Agricultural Development Program
2019 Project Report

"Where's the Beef" in Value-Added Dairy Beef Crosses?

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Background:

The dairy sector has been struggling for 3 years with decreased milk prices and in some cases loss of a milk market. This has been especially true for smaller dairy farms. Jason Karszes of the Cornell University PRO-DAIRY Program has documented a nearly $2,000/head cost to raise a heifer to her first lactation. Additionally, some farms have added Jersey genetics to their dairy herds in an attempt to increase income from improved milk components. While this may be beneficial, the Jersey bull calf has virtually no sale value. As such, several genetic companies have programs that guide the selection of cows to produce dairy replacements and recommend breeding the remaining cows to beef sires. Not only is there a cost savings to the dairy farm but it has been shown to substantially increase the rate of genetic improvement.

According to the USDA Market News, in New York, Holstein x beef breed bull calves are bringing a $50-$100/head premium when sold as newborns compared to purebred Holstein bull calves. The vast majority of these calves are leaving the state to be raised. Given the abundant supply of high quality forage in Northern NY, there is potential to raise the calves to feeder weight (300 lb–800 lb) or even finish them using feed refusals from the dairy enterprise. This could provide an additional income stream for dairy farms as well as a supply of calves for the burgeoning beef stocker industry. However, if these dairy-beef crossbred calves are to have

optimal value, they must have the correct genetics to overcome the built-in prejudice to "dairy type" and meet the needs of consumers. This means using beef bulls that complement the traits of the Holstein cow. To accomplish this, farmers and genetic companies need information on how to select beef bulls.

No research has been conducted to document the value of the dairy x beef calf. The objective of this research is to provide the information that dairy farmers need to make a decision on the viability of adding this crossbreeding enterprise to their farm. Additionally, the information gathered may spur development of a new calf growing business in NNY.

Methods:

Farms that were currently breeding their dairy cows to beef bulls were recruited through personal invitation, newsletter, and email. Seven farms were visited to discuss the project; two selected to participate. A newborn calf-through-weaning data collection sheet was developed (see Appendix). Information of primary interest was calving ease and calf vigor. Ear tags were provided as the farms did not routinely tag calves going to market. One of the farms marketed a large percentage of its calves through one livestock auction barn. Funding from New York State Department of Agriculture and Markets allowed for USDA grading of the newborn calves that came through the auction market.

Results:

Data was collected on 125 calves out of Holstein dams bred to an Angus bull (Table 1). The majority of the cows were termed as "aged." At birth, calves were weighed and ear tagged. They were managed similar to the heifer calves, assuring consumption of colostrum, milk replacer, or waste milk. For a subset of calves, we collected birth and sale dates. This allowed us to calculate the amount of time the calves remained on the farm before being shipped. This subset of calves (n = 47) was born over a 26-day period from mid-June to mid-July 2019 and marketed over a similar time period. Calves were kept on the farm before marketing 6.4 and 5.9 days for heifers and steers, respectively.

Table 1. Description of newborn calves from Holstein dams bred to an Angus bull, 2019.

Sex	n	Birthweight, lb	USDA Grade[1]	Price, $/cwt
H	35	87	1.5	135
B	90	93	1.5	155

[1]USDA newborn calf grades. 1 = dry navel, healthy, vigorous, adequately muscled; 2 = moderately vigorous, lighter muscled than #1; 3 = less vigorous, light muscled, slightly unhealthy; 4 = wet navel, appears to be recently born, sick, injured, poorly muscled. H = heifer, B = bull calf.

Table 2 shows factors collected on 100 calves for one farm from which we also had USDA grade data. From the table you can see that regardless of gender, calves that graded higher brought a higher price. Based on the r-square of .34, birthweight explained more of the variation in price in heifers compared to bulls (Rsq=.05). A

similar scenario played out with the effect of grade on price of heifers compared to bulls. While overall gender was a large determinant in how calves were priced, being a heifer explained more of the variation (Rsq = .82) compared to bulls (Rsq = .73).

Table 2. Factors that affected the price of calves out of Holstein dams bred to Angus bull, 2019.

		USDA Grade[1]				
	Sex (n)	**1**	**2**	**3**	**4**	
	B	49	15	6	2	
	H	18	7	2	1	
Factors						**Rsq with Price**
Price, $/cwt	B	176	127	67	10	1.0
	H	168	105	35	10	1.0
Birth weight, lb	B	95	88	86	75	.05
	H	91	80	79	71	.34
Birth date	B	5/28	5/23	5/20	-	.05
	H	6/2	5/24	-	-	.16
Farm days[2]	B	5.8	7.0	6.0	-	.06
	H	6.1	7.3	-	-	.09
Grade[1]	B	49	15	6	2	.73
	H	18	7	2	1	.82
Vigor[3]	B	1.5	1.0	2.0	-	-
	H	1.2	1.0	-	-	.04
Dystocia[4]	B	1.0	1.0	1.0	-	-
	H	1.0	1.0	-	-	-
Dam age	B	1.6	1.5	2	-	-
	H	1.5	1.5	-	-	-

[1]USDA newborn calf grades. 1 = dry navel, healthy, vigorous, adequately muscled; 2 = moderately vigorous, lighter muscled than #1; 3 = less vigorous, light muscled, slightly unhealthy; 4 = wet navel, appears to be recently born, sick, injured, poorly muscled.
[2]Farm days = time calf remained on farm prior to marketing.
[3]Calf nursing vigor scored at birth. 1 = aggressive, 2 = slow, 3 = required tubing.
[4]Dystocia. Calving difficulty. 1 = none, 2 = minor, 3 = major.

Selection of the appropriate beef sire for dairy crossbreeding

A Cornell study: "Growth, feed efficiency, carcass composition and carcass characteristics of Holstein vs beef breed steers" (Perry and Fox, 1992) compared growth and carcass traits of Holstein and beef breed steers. While that study did not evaluate dairy cross-bred steers, the results of the research provide guidance on the deficiency of steers with Holstein influence. It is interesting to note that some of the commonly held assumptions do not hold. For example, in Table 3, final weight, marbling and hot carcass weight were not different between the two breeds. However, Holstein steers grew slow, were less efficient in converting feed to gain, and had small

ribeye areas. Fortunately, producers can select genetic tools to put positive pressure on those traits.

Table 3. Comparison of Holstein steers vs beef breed steers*

Trait	P-value
Final weight	NS
DOF	.01
ADG	.01*
DM/gain	.01*
Marbling	NS
Conformation	.01
DP	NS
HCW	NS
BF	.01*
REA	.01*
Sensory	.01

**Cornell, Perry and Fox, 1992.*

One of the most effective genetic tools is the Expected Progeny Difference (EPD) which evaluates an animal's value as a genetic parent. The Angus breed currently has 21 EPDs and 6 indices which combine several EPDs with economic values to predict the dollar value associated with that index. All of these EPDs and Indices are presented as values, however, the easiest way to understand them is the percentile, which shows where a particular EPD is relative to the breed average. If you want to move an EPD you select those animals above breed average (lower percentile).

Figure 1 is show the traits of interest of a beef sire used in one of the study herds. Selection priority of sires for use on Holstein cows was the sire's fertility and the calving ease of his progeny. There is anecdotal evidence that hybrid vigor exists in sperm from different breeds and, therefore, crossbreeding seems to help get a cow bred. Many semen companies are rating their bulls on fertility.

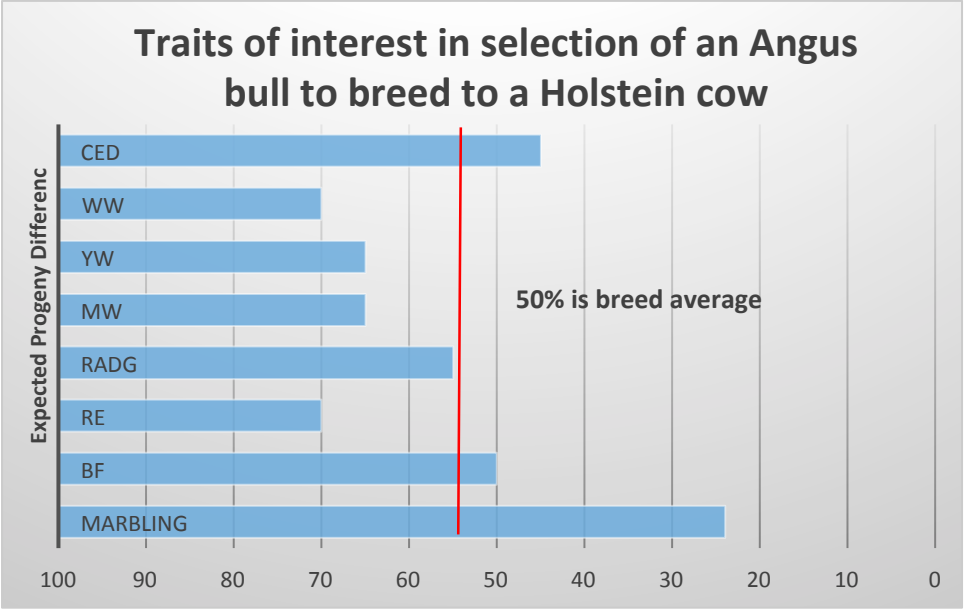

Figure 1. Traits of interest in selection of an Angus bull to breed to a Holstein cow, NNYADP project, 2019.
EPDs: CED=calving ease direct, WW=weaning weight, YW=yearling weight, MW=maternal weight, RADG=residual average daily gain, RE=ribeye area, BF=backfat.

It's not in the scope of this report to discuss the EPDs in depth, however, Figure 1 offers a simple example for consideration. The important message is that Holstein cows should be bred to beef sires that complement the cows' genetic makeup, are economically competitive to feed, and meet consumer demands for beef quality.

For calving ease, look for the EPD Calving Ease Direct (CED). The sire in Figure 1 is in the 45th percentile, which means he is better than the average Angus bull.

For economic efficiency: Going back to the Perry and Fox data in Table 3, Holstein steers had a slower rate of gain, lower feed efficiency, and smaller ribeye area. The first two factors affect profitability in the feedyard; the smaller ribeye area affects consumer acceptance of the product. To put selection pressure on these traits, you would use WW: weaning weight, YW: yearling weight, RADG: residual average daily gain, and RE: ribeye EPDs to influence bull selection. The bull in Figure 1 is significantly below breed average for these traits and therefore no genetic progress would be made and, in fact, there is real risk of losing ground.

The only EPD that the bull in Figure 1 exceeds in is Marbling and a Holstein cow would already be likely to produce higher marbling progeny (Perry and Fox).

There are other EPDs in the Figure 1 bull's pedigree that could add value, however, if we are looking for a sire to add value to his progeny, he should not be the first choice to use on Holstein cows.

Finally, there has been some concern expressed that eventually the volume of the dairy-beef crossbred (DxB) calves coming to market will eventually erode the $80-$100 premium. As of early 2020, the premium is still being paid but the type of calves coming to the market are being segregated. Commodity-type calves, i.e., those with no sire selection, are bringing the smallest premium. What are being called "program calves," those with a vetted sire selection and raised with birth, health and nutrition protocols, are bringing the highest premiums (source: *personal communication, Semen supplier and Livestock Auction owner*). You can see this in our data. The number 1 DxB calf fetched a $111/hd premium compared to the number 3 DxB.

Conclusions

1. Higher grading calves received a higher price. Producers should follow best management practices with all calves to achieve optimal health and grading.
2. Due to higher discount on heifers, it may be advantageous to keep them on the farm longer before shipping to increase weight. This is especially true if vigor is low and/or health is questionable.
3. Once bulls are sorted on fertility and calving ease, selection pressure should be applied to add value through average daily gain, feed efficiency, and ribeye area.

For More Information:

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"Where's the Beef" in Value-Added Dairy Beef Crosses?

Farm and Newborn Calf-through-Weaning Data Collection Sheets

FARM INFORMATION (one per farm)			
Name			
Farm name			
Address			
email			
Phone			
Newborn protocol			
Colostrum type and quantity.			
What determines when to tube?			
Ear tag	**Y/N**	**Dip navel**	**Y/N**
Castrate	**Y/N**	**Dehorn**	**Y/N**
Diseases vaccinated for:			
Other:			

Individual newborn calf data (one per newborn)										
Calf birthing data										
Birthdate		**ID**		**Sex**	**M/F**	**Weight**				
Frame score			**Muscle score**							
Dystocia										
	1 = No difficulty; 2 = Minor difficulty; 3 = Major difficulty;									
Vigor	**Nursing**		Aggressive		Slow	Required tubing				
Died	Y/N		Age		Cause					
Parent data										
Dam breed			**Dam age**							
Sire breed										
Sire registration number										
Market destination:										
Comments:										

Individual calf data (Production and expense through weaning)										
Wean date			Wean weight							
Feed	Milk		Grain			Forage			Other	
Quantity										
Cost/value										
Labor hours			Labor rate			Bedding cost				
Vet & med										
Other										
1.										
2.										
3.										
Health										
Died	Y/N		Age			Cause				
Treated for:										
Respiratory			Scours				Digestive			
Other:										

References:

Perry, T. C., and D. G. Fox. 1992. Growth, feed efficiency, carcass composition and carcass characteristics of Holstein vs beef breed steers. In: Cornell Nutrition Conference, Rochester, NY. p 110-119.