Benchmarking calf growth and performance on northern New York dairy herds

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The pre-weaning period is a vulnerable time for dairy calves and as a result, optimizing growth and health can be a challenge for dairy producers. Ensuring calves successfully transition through weaning, albeit important, can only tell us so much about a calf-raising program. It is equally important to quantify how calves are growing and performing to get the full picture of how successful a calf-raising program is. With that objective in mind, Cornell Cooperative Extension North Country Regional Ag Team (CCE NCRAT) recruited eight farms across the northern New York region to participate in a peer-to-peer discussion group focused on calf management. The discussion group was funded through the Dairy Advancement Program, which required us to meet on three separate occasions and to meet three specific milestone goals. Early on it was emphasized that the goal of the discussion group was not a competition, nor designed to rank the eight participating farms, but rather to encourage discussion, and for participants to learn from one another. The more specific objectives of the group were to: 1) measure transfer of passive immunity (TPI) among newborn calves, 2) calculate average daily gain (ADG) across the pre-weaning period, and 3) to determine the costs associated with each farm's heifer-raising program. The

group discussion consisted of eight calf managers/ farm owners across northern New York, along with the two CCE NCRAT dairy specialists. Results from the first two objectives are described below. To ensure anonymity, participating herds were assigned a herd identification number ranging from one through eight; however, due to inconsistencies in data collection, Farm Eight is omitted from this report.

MEASURE TRANSFER OF IMMUNITY OF NEWBORN DAIRY CALVES

The first objective of the project was to measure TPI among newborn calves and to benchmark individual farms against industry standards. For the past several decades, the industry standard to evaluate TPI was to categorize calves as having

FIGURE 1
Serum Total Protein levels for a subset of calves on NNY dairy herds
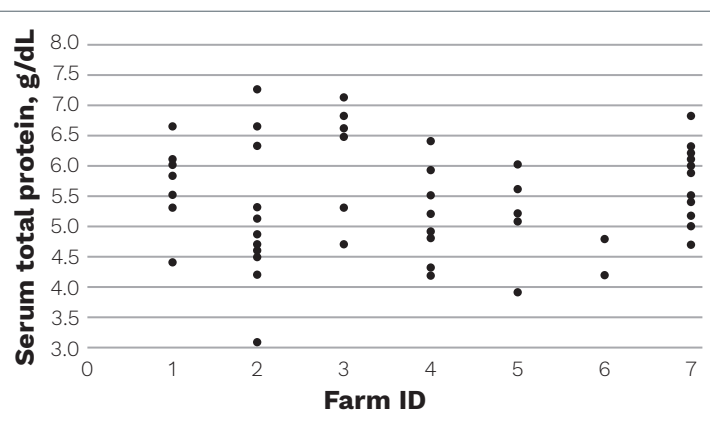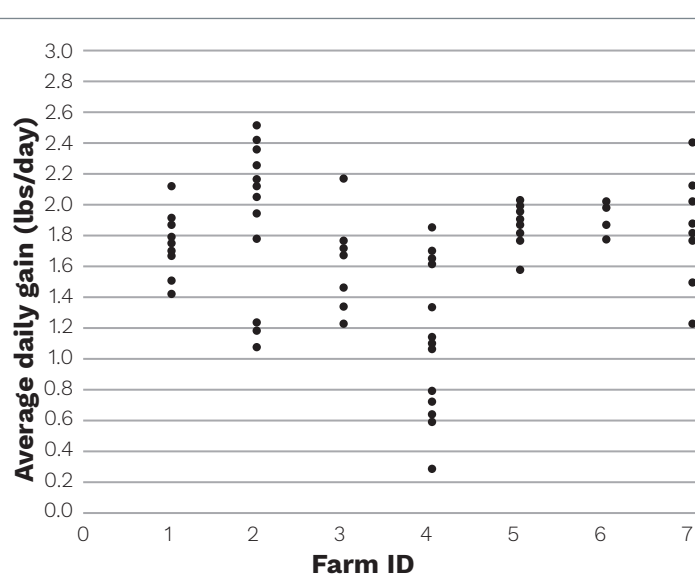

FIGURE 2
Average daily gain for a subset of calves on seven participating herds in northern NY

success or failure of TPI. Recently, new industry standards have been defined and documented by categorizing calves

TABLE 1

Transfer of passive immunity (TPI) levels for participating farms categorized using Lombard et al. (2020) revised industry standards

Farm ID	Excellent (> 6.2)	Good (5.8-6.1)	Fair (5.1-5.7)	Poor (< 5.1)
1	14%	43%	29%	14%
2	23%	15%	0%	62%
3	67%	0%	17%	17%
4	20%	40%	0%	40%
5	0%	17%	67%	17%
6	0%	0%	0%	100%
7	23%	23%	31%	23%
Industry standard	>40%	~30%	~20%	<10%

(Lombard et al., 2020)

TABLE 2

Revised industry standard recommendations

TPI category	Serum IGG (g/L)	Equivalent total protein (g/dL)	Equivalent brix (%)
Excellent	≥25.0	≥6.2	≥9.4
Good	18.0-24.9	5.8-6.1	8.9-9.3
Fair	10.0-17.9	5.1-5.7	8.1-8.8
Poor	<10	<5.1	<8.1

Adapted from Lombard et al. (2020)

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into one of four categories (Lombard et al., 2020). According to Dr. Lombard's research, more than 40 percent of calves within a herd should achieve excellent TPI, about 30 percent should achieve good TPI, about 20 percent should achieve fair TPI and less than 10 percent should achieve poor TPI (**Table 2**).

For this discussion group, we collected blood samples from a subset of calves on each farm between 24 hours and seven days of age. Based on the data in **Figure 1** and **Table 1**, there

was variation within and between the participating herds. As a result of sharing this information, individual participating farms have continued to work with the CCE NCRAT dairy specialists to improve colostrum management protocols. For example, following the dissemination of these results, Farm Six made changes to their colostrum management protocols and asked that TPI levels continue to be monitored for new calves entering the herd under the new management strategies. Following these changes,

Farm Six is now achieving 100 percent of sampled calves in the "Excellent" category (≥ 6.2 g/dL).

MEASURING AVERAGE DAILY GAIN (ADG)

Quantifying ADG was a topic that surfaced multiple times on a recent CCE Agricultural Needs Assessment Survey that was distributed to farms across the northern NY region in 2019.

CCE NCRAT dairy specialist Casey Havekes weighs a calf on a northern NY dairy.
Photo credit: L. Ferlito

MEET THE CHALLENGES OF TODAY'S MARKETPLACE

The Dairy Advancement Program through the New York State Department of Agriculture and Markets and the New York State Department of Environmental Conservation is designed to enhance long-term viability of New York dairy farms while maintaining a commitment to environmental stewardship. The program is coordinated through Cornell PRO-DAIRY and delivered to farms in partnership with Cornell Cooperative Extension and agriservice professionals. Eligible projects assist New York dairy farmers to position their farms for long-term economic and environmental sustainability. Funds are used to engage professionals for financial analysis and to create business plans, to design new or remodeled facilities, to develop farmstead environmental plans, including design of practices identified in the farm comprehensive nutrient management plan. Additionally, funds provide for the formation of peer groups of dairy farmers focused on shared learning on specific management topics and analysis for improvement. Since its inception in 2013 nearly 650 dairy projects have been awarded funding, focused on small- and mid-size farms across NY. An estimated $21 million has been reinvested as a result of these projects. Contact Caroline Potter (cjh42@cornell.edu), PRO-DAIRY Extension specialist, for more information.

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It became apparent through follow-up conversations that calf managers and producers 'think' that their calves are growing well and meeting targets, but they do not have a method to track ADG to know for sure. This led the CCE NCRAT dairy specialists to develop a second objective to track ADG throughout the pre-weaning period for a subset of calves on each participating farm. We aimed to collect birth weights within three days of birth and weaning weights within seven days of being fully weaned off milk. The average amount of time between weights for each farm is reported in **Table 3**.

The ADG results shown in **Figure 2,** display variation within and between farms. The widely accepted industry benchmark for calf growth is to double birthweight by 60 days of age. Rather than focusing our attention on weighing calves at 60 days of age, we aimed to weigh calves once they were fully weaned off milk (**Table 3**). Interestingly, Farm Four made changes halfway through the discussion group after learning their calves were not growing adequately. The four highest ADGs reported for Farm Four (**Figure 2**) were taken from calves following our recommendation to extend the weaning age and the weaning period length. Farm Four has continued to work with CCE NCRAT dairy specialists to promote the growth and success of their calves. Additionally, despite having good results, Farm Three has asked to keep tracking calf growth as they transition from feeding milk replacer to whole milk.

OVERALL IMPACT

Overall, this project was successful in helping northen NY farms track TPI rates and ADG on their herds. While benchmarking is a very valuable tool, and one that we relied on heavily for this discussion group, it is important to understand the data provided in this report are the results of an exploratory project. There are many outside factors that were not considered that could drive the results presented in this report. For your reference, **Table 4** outlines the housing and feeding strategy for each of the seven participating farms.

The results from this exploratory project sparked great discussion among the participants. One calf manager said: "The info is really rich, and we can use it to make improvements on our farm. I'm interested in what the other farmers are doing, and this feedback from them is helpful." Further, this project also motivated some farms to implement changes to their feeding and management strategies to achieve better calf growth and performance. As noted earlier, a third objective is to quantify the cost of raising heifers for each farm up to 13 weeks of age. The CCE NCRAT dairy specialists are still working through this objective, and participating farms are eager to better understand their costs associated with this period to make economically favorable improvements to their systems. ∎

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TABLE 3
Benchmarking seven participating northern NY dairies with industry standards for average daily gain (ADG)

Farm ID	Double birth weight?	Weeks between data collection	Double birth weight by 60 days of age? (Approximate calculation)
1	Yes (2.88×)	~13	1.90×
2	Yes (2.12×)	~8	2.27×
3	Yes (2.17×)	~9	2.06×
4	No (1.70×)	~7	2.08×
5	Yes (2.60×)	~10	2.22×
6	Yes (3.32×)	~16	1.78×
7	Yes (1.97×)	~14	1.20×

TABLE 4
Descriptive summary of the housing and feeding program for each participating farm

Farm ID	Housing system	Feeding program
1	Individual pens	Whole milk + probiotic, 2×/d
2	Hutches	Whole milk + balancer, 2×/d
3	Hutches	Whole milk / milk replacer, 2×/d
4	Individual pens	Milk replacer, 2×/d
5	Hutches	Pasteurized whole milk + balancer, 2×/d
6	Hutches	Whole milk, 2×/d
7	Group pens	Acidified milk replacer, ad lib