



COLOSTRUM MAY PROVIDE more than immunity. Its impact, when coupled with milk replacer, appears to be additive and carries over into your herd's future productivity.

Better gains bolster the bulk tank

Successful calf rearing involves a complete package approach from the first colostrum feeding to air quality.

by A. F. Kertz

LAST year, Gary Sipiorski kicked off the 15th annual Dairy Calf and Heifer Conference with an analysis of key economic factors all dairies should consider. Net return on a cow-per-acre basis was similar to corn but yielded more than soybeans.



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Exports have aided the U.S. dairy industry in terms of both products and heifer sales which have primarily gone to Turkey, Mexico and Russia. He also noted that the cost to raise a replacement heifer into lactation can range from \$1,500 to \$2,500. This figure could cause you to question whether or not you should raise all heifer calves, particularly if they can be better pegged for potential milk yield by genomics at an early age.

Go beyond a 20/20 replacer

Recently, a shift toward the use of alternative proteins has been spurred by higher milk protein costs. This is driven by not only milk price but the burgeoning human food market for whey proteins.

Not all nonmilk proteins can be assumed to be the same. Spray-dried bovine plasma protein can function as a nonmilk protein source, while the immunoglobulins can provide beneficial effects in the intestinal tract. Bovine plasma protein, at a 5 percent inclusion rate, is typically used to supply about 20 percent of total protein in a milk replacer. This protein source may also be paired with another nonmilk protein at a similar level, such as hydrolyzed wheat protein.

As whey proteins are rapidly used in human food applications, supply and price often make them too costly for use in calf milk replacers.

Feeding more than twice daily is an option when going beyond the proverbial 1 pound per day of a 20 percent protein, 20 percent fat (20/20) milk replacer. In a calf trial done at a larger dairy in Wisconsin, two groups of calves were fed 1.8 pounds of a 28/20 milk replacer twice daily at 8 a.m. and 9 p.m. from Days 1 to 7. Following this was 2.5 pounds fed either twice daily or three times daily (third feeding was at 2:30 p.m.) on Days 8 to 42. Only 1.25 pounds were fed once daily on Days 43 to 49 before full weaning at Day 50 when calves were moved into group pens.

Statistically significant improvements in body weight gain, hip height and feed efficiency were noted for calves fed three versus two times daily.

While more attention has been paid over the last several years to the effects of cold stress in calves ("Cold weather impedes calf growth," *Hoard's Dairyman*, November 2011, page 717), calves are also subject to heat stress ("Heat stress shortchanges heifers," *Hoard's Dairyman*, May 10, 2013, page 326). Both of these topics were addressed, but the scarcity of data on heat stress in calves is obvious.

Heat stress can spike energy demands for coping as related to panting, excessive fluid loss, sweating, inadequate water intake, lack of shade and scours. There is a clear need for research in the area of how to best feed and manage calves undergoing heat stress. The simplest and least costly remedy for all animals on a dairy is to provide shade. That alone reduces solar radiation along with air and body temperatures.

Air quality varies

A show-and-tell demonstration on air quality issues in calf pens followed, using an instrument for measuring air quality, as is

used on cruise ships. Simply taking readings within our meeting room illustrated variance in an area where there was apparently no air quality problem. Several calf/heifer growers had brought materials from their operation to assay. A rubber nipple received the worst grade and reflected that worn and cracked nipples are a problem for calves just as old inflations are a problem in milking parlors.

Based on 7,236 plate readings that had been done, 75 percent of calf barns had air quality issues. The degree to which this is an issue was reported in the *Journal of Dairy Science* in 2006 from a study by the University of Wisconsin Veterinary School. This Wisconsin work has centered on ventilation. The poorer the ventilation, the greater the bacteria counts.

They found that the more solid pen sides present around a calf, the poorer ventilation was and the greater bacteria counts were. For example, having a solid floor and solid sides was three sides. Adding a solid back and front equals five sides — and some want to cover the top, too!

It is best to target four air exchanges per hour without a draft. This entails a strategic and tailored tube ventilation system that fits your scenario. This is not the same as the older tube ventilation approach which generally just recirculated internal air with an exhaust fan. The current Wisconsin approach is to push in outside air only (a positive ventilation system).

Colostrum is more than IgGs

In 2005, a study was published in which Brown Swiss calves were provided either 2 or 4 quarts of colostrum at the first postcalving feeding over the course of a year. That was the only difference between these two sets of calves which then went through two lactations in that herd. Those that had received 4 quarts of colostrum had lower treatment costs, greater daily gain, produced 11 percent more milk in the first lactation and 17 percent more milk in the second lactation.

That opened eyes as to whether this could have been due simply to additional early life nutrition, or was it due to higher levels of bioactive factors in that colostrum? Last year, a large dataset of calves raised through two or more lactations provided evidence that doubling calf birth weight by 2 months of age could translate to an additional 2,000 pounds of milk production over multiple lactations.

Could this be additive with the colostrum effect noted previously? Colostrum's value may be more than just passive immunity alone — the benefit we most associate with colostrum. This fit with the overall goal to provide strategies that allow for optimum growth, health and milk yield in the first and subsequent lactations in the most profitable manner. A study was reviewed in which two levels of colostrum were fed with two different levels of milk replacer for each of those colostrum treatments. The effects of colostrum levels and milk replacer were additive.

Twelve calf studies were combined in a meta-analysis and revealed that a pound difference in daily gain during the first 2 months of a calf's life resulted in about 1,500 pounds more milk in their first lactation. And there appears to be no compensatory mechanism for a lack of colostrum and low nutrition during the first several months of a calf's life. 🐄