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DAIRY PIPELINE

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Colostrum Pasteurization and Calf Health Outcomes

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"Calves that receive an adequate volume of high quality colostrum compared to those that receive poorer quality colostrum will experience increased weaning weight, rate of gain, and improved feed efficiency."

Studies from as early as the 1950's have shown long-term benefits of colostrum consumption on calf survival, health, and performance. Calves that receive an adequate volume of high quality colostrum compared to those that receive poorer quality colostrum will experience increased weaning weight, rate of gain, and improved feed efficiency. Poor quality colostrum often results from poor udder hygiene of the dam at calving or from improper storage or thawing of the colostrum. Benefits from proper colostrum management appear to extend into adulthood as calves provided with high quality colostrum have a reduced age at first calving, improved milk production in first and second lactation, and reduced tendency for culling during first lactation.

Colostrum provides antibodies and many necessary nutrients to promote performance and growth; however, colostrum can also contain microbial pathogens. When colostrum is contaminated with pathogenic bacteria, this becomes problematic and can negate any positive effects that normal colostrum components may have on development of the calf's immune system. In the dairy cow, the predominant antibody present in colostrum is immunoglobulin G (IgG). Fast delivery of colostrum with an adequate amount of intact IgG and a low pathogen load should be priorities on all dairies. Colostrum management practices are vital to help reduce calf mortality and morbidity rates due to microbial pathogens.

One way to improve the quality of colostrum is through the heat-treatment process of pasteurization. By heating colostrum at 60°C (140°F) for 60 minutes, microbial pathogens can be diminished without completely denaturing IgG. This colostrum pasteurization process takes longer and is performed at a lower-temperature than is recommended for waste milk/bulk tank milk (65.5°C [149.9°F] for 30 minutes). This is to preserve the structure of the IgG while simultaneously destroying many bacteria. As a reminder, pasteurization is not the same as sterilization. Many bacteria can and do survive the pasteurization process. However, it has been shown that calves receiving pasteurized colostrum (60°C [140°F] for 60 minutes), had a lower proportion of *E. coli* present in the intestines when compared to calves fed fresh colostrum or no colostrum in the first 12 hours of life (Malmuthuge et al. 2015).

Additional studies have shown that pasteurized colostrum reduces mortality and morbidity rates in calves. The average U.S. dairy calf mortality rate before weaning is 7.8%. In a study by Armengol and Fraile (2016) with 587, those fed pasteurized colostrum experienced a mortality rate of 2.8%, while calves that received fresh colostrum had a death rate of 6.5% over the first 21 days of life. The same trend was also observed when investigating morbidity; only 5.2% of calves fed pasteurized colostrum developed an illness, whereas 15% of calves fed fresh colostrum developed an illness calves. To further support the claim that pasteurized colostrum reduces the pathogenic bacterial load to decrease mortality and morbidity, a study by Malmuthuge et al. (2015) with 32 calves investigated pathogenic bacterial loads in calves fed pasteurized, fresh, or no colostrum. Calves fed pasteurized colostrum not only had lower pathogenic bacterial loads but also had higher beneficial bacterial counts, leading to im-

Upcoming Events

See VTDairy for details.

September 16, 2017
Premier National Jr. Dairy Showmanship contest, Harrisonburg, PA

September 17, 2017
Premier National Dairy Showmanship contest, Harrisonburg, PA

September 29, 2017
State Fair Jr. Dairyman's Contest

September 30, 2017
VA State Fair Dairy Show

Sept. 22 & Oct. 19, 2017
Augusta/Rockingham/Rockbridge Hay/Forage Quality Superbowl Samples & Forms deadline: 9/22; Results Program & Dinner 10/19

October 3-8, 2017
Bus trip to Fair Oaks Farm and World Dairy Expo

October 3-7, 2017
World Dairy Expo

February 14-15, 2018
Virginia State Feed Association Convention & Virginia Tech Nutritional Management "Cow College"

If you are a person with a disability and require any auxiliary aids, services or other accommodations for any Extension event, please discuss your accommodation needs with the Extension staff at your local Extension office at least 1 week prior to the event.

proved immunity for the calf to better handle diseases.

Overall, microbial pathogens contained in colostrum can lead to increased incidence of disease and death in calves, which can impair future performance of the dairy cow. One way to reduce this pathogen load in colostrum while maintaining the IgG concentrations is by heat-treating colostrum. Purchase of a pasteurization system for colostrum and milk will cost between $7,000 and $15,000. So, for the average sized dairy in Virginia that milks 140 cows, it is estimated that that purchase and maintenance of a pasteurizer would increase rearing costs $14 per new calf over 5 years.

Genomics – Another Tool in the Toolbox

—Jeremy Daubert, Extension Agent, Rockingham County; jdaubert@vt.edu

Genomic predictions have been widely available since 2009. Their accuracy continues to increase as more animals are tested. So what does this mean for you, the producer? Are these predictions of value to you? Is it cost effective to genomic test your animals? The answer to all of these things is: It depends!

> "At a cost of around $45 per animal, the investment is not insignificant. To invest in using this technology, a producer would need to examine the farm at an individual level."

The accuracy of genomic predictions is a little over 70% for most traits, which is double what parent average would give you, and confirming or correcting parentage of animals also adds value. Genomic tests also identify recessive traits that affect the animal's health and fertility. At a cost of around $45 per animal, the investment is not insignificant. To invest in using this technology, a producer would need to examine the farm at an individual level. Which animals will you test? How will you use the data?

All AI stud bulls are already genomic tested, so most herds are reaping the benefits of genomics on the paternal side. For farms that are expanding and need to keep all of their replacement for growth, genomic testing females will probably not pay off. Where this technology has the potential to benefit you the producer are herds where there are too many heifers in the heifer pens. Testing all animals at an early age and making culling and mating decisions based on this can be profitable. For example, if you only need 50 heifers to calve this year, but you have 65, you can cull the bottom 15. This can save on feed costs and increase the genetic value of your herd.

There is a caveat to genomic testing. These tests predict the animal's genetic potential only. Management, feed and weather all have a significant influence on an animal's actual production and are not included in genomic tests. Therefore, a producer would be better off fixing problems that affect an animal's health, before investing in genomic testing.

For producers that have excess animals and a plan to manage them, genomic testing may be a viable option. It is another tool in the toolbox. As with any tool, using it properly makes all of the difference. With genomics, there are many ways to manage the data, but it is important that it gets managed to be profitable.

For more information on Dairy Extension or to learn about current programs, visit us at VT Dairy—Home of the Dairy Extension Program on the web at: www.vtdairy.dasc.vt.edu.

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