Research Tidbits

I like to read research papers, or at least the ones that pertain to what I do. A lot of times I just race to the conclusions, at the end, to see if I need to go back and read the whole paper, but sometimes I just plow through the whole thing from front to back. Below are some conclusions from a couple of recent research papers that I think have practical applications in the dairy business.

“Effect of colostrum heat treatment and bacterial population on Immunoglobulin G absorption and health of neonatal calves” by Gelsinger, published in the July 2015 issue of the Journal of Dairy Science, looked at the effects of both heat treatment (often referred to as pasteurization) of colostrum and of bacterial population levels in colostrum. There have been conflicting studies in the past regarding the effect of high levels of bacteria in colostrum on absorption of IgG in neonatal calves. Current thinking suggests that high levels of bacteria reduce IgG absorption. There have been studies that suggest that there are positive effects on IgG absorption that may be independent of bacteria levels, on IgG absorption as well. This trial was unique in that researchers fed calves colostrum with low and high levels of bacteria using both untreated and heat treated colostrum. To make heat treated colostrum have high levels of bacteria, they added back a small amount non-treated colostrum and allowed to incubate for 72 hours. The results were consistent between heat treated and non-heat treated groups. Calves fed high bacteria colostrum had much lower IgG levels in blood than those fed the low bacteria colostrum, heat treated or not. In fact, the high bacteria group’s blood IgG levels averaged only 47% of the levels found in calves fed the clean colostrum. This is a very large difference, enough to explain why many calves fed adequate amounts of high quality colostrum on some farms do not achieve adequate IgG levels in blood. It was also interesting that the average blood total protein for the high bacteria group was 88% of the average for the low bacteria group. This is because total protein includes other proteins, not just IgG. This shows that even a small change in blood total protein can represent a very large change in actual IgG. Another conclusion was that heat treatment did not have an effect on IgG levels independent of reduction of bacterial numbers. Thus, heat treatment of very clean colostrum would not be expected to increase IgG levels in calves. The most important conclusion of the study was that for adequate IgG transfer, colostrum must be clean.

“Evaluation of a handheld device for measurement of B-hydroxybutyrate concentration to identify prepartum dairy cattle at risk of developing postpartum hyperketonemia,” by Tatone, was published in the May 15 edition of the Journal of the American Veterinary Medical Association. Handheld meters have been used for quite some time for testing BHBA (ketone) and glucose levels in postpartum cows. Results can be used to determine individual cow treatments and to evaluate the herd-level risk for ketosis. Until now, however no one has been able to demonstrate practical, on-farm utilization of BHBA testing prepartum. Traditionally nonesterified fatty acid (NEFA) levels have been measured between about 14 and 4 days before calving to determine if cows are mobilizing too much body fat and thus are a greater risk for a variety of metabolic and infectious conditions post calving. There are some problems with this test, though. First, cows do not tell us when they are going to calve, so we do not know which cows actually will calve in 4-14 days, and we have to wait until after calving to run the test. Second, cows need to be sampled right before feeding, on cool days, and with little stimulation to prevent falsely high results. Third, blood needs to be frozen and send to an outside lab for testing. In this study cows were sampled from 3 to 9 days before the expected calving date. However, even blood from cows that
did not calve in the expected window was used in the analysis, and results were valid for these cows as well as for others. The authors concluded that a prepartum BHBA concentration of greater or equal to 0.7 mmol/L as determined by the handheld device be used as a cutoff of the identification of cows are risk of developing postpartum ketosis. Cows above the cutoff were about 2.2 times more likely to develop ketosis than cows below the cutoff. These results now give us an easy way to monitor prefresh cows, and groups of prefresh cows for excessive fat mobilization that may lead to a variety of serious health problems after calving. We can sample any cows within the expected 3-9 day window, run the test immediately and make conclusions or recommendations right on the spot.

Hopefully these two studies can provide useful information for you on your farm.