



UT PARLOR

A publication for Tennessee's dairy producers and supporting industries

WINTER 2018

A Look Back at 2018

As we celebrate turning the calendar to 2019, it's also a good time to reflect on the memories we made in 2018. Wow, what a year! Low milk prices, letters from processors and international dairy uncertainty. Even with all the uncertainty and difficulty, dairy families are pulling together and promoting dairy products, dairy farmers and the dairy way of life. Looking back at my first year at UTIA has reinforced one thing – dairy farmers are incredible people. We know times are tough, and the belt can't always be tightened much more. Even with that adversity, I hear so many farmers tell me, "We've survived before, and we'll keep going." I have been privileged to visit with many of our Tennessee dairy farmers at Master Dairy Producer meetings, industry meetings and visits on their farms. Thank you to all the farmers who have opened up their farms to me over the last year.

The question I hear most often is, "Can you improve the milk price?" That question is asked in mostly a joking manner, but it hits home. There are some things we can't control, but we may be able to lower overhead costs by evaluating management, herd health and reproduction. Efficiency can be as simple as going back to basics. Often, the biggest improvements in efficiency can be from assessing what "normal" is on your farm. Another pair of eyes, ears and boots on the ground can help identify things that aren't necessarily wrong or bad, but that could be done a little bit better and give you more bang for your buck.

Take water for instance. Water can be a huge limitation on a farm, even though we don't always think of it as a necessary ration ingredient. Limiting water intake decreases feed intake, milk production, reproduction and immune status. Keys to remember:

- Provide at least 4 inches of linear water space per cow.
- Provide at least two water sources per **group** of cows.
- Provide **clean** drinking water to cows **and** calves.

On a recent farm call, we were talking about ways to increase production. The producer provided everything they needed to: at least 4 inches per cow and two sources per group. But the water troughs weren't being cleaned

routinely. Because of this, we watched cows hover their muzzles above the water trough for the hour we were out there. The cows wanted to drink, had plenty of space and water troughs, but the resource was still limited. Increasing cleaning frequency, thoroughly scrubbing out troughs, and routinely checking can make this a more efficient part of your farm, increasing farm production and profit.

Another thing to consider is colostrum management. Further in this newsletter we'll talk about it more, but I want to stress the importance of prioritizing small things. The goal of colostrum is to provide passive transfer of immunity to the calf from the dam. It is estimated that between 20 to 40 percent of all calves do not gain passive transfer of immunity. One of the reasons is colostrum intake. All colostrum is not created equal, and the only way to truly distinguish "good" from "adequate" or "poor" is through testing. It is another step, but it can take as little as one minute total and as little an investment as \$30. Make sure your calf consumes:

- At least 4 quarts of good quality colostrum (greater than 50mg/mL) or greater than 100g of immunoglobulins total from colostrum replacer.
- At least 2 quarts of colostrum within six hours of life (first feeding).

Meeting these recommendations will help ensure your calves are protected with innate immunity, from dam to calf. In a 2016 study, failure of passive transfer was linked to increased death, incidence of diarrhea and bovine respiratory disease and decreased average daily gain. Other studies have linked failure of passive transfer to more breedings per animal and decreased production. Going back to the basics of testing colostrum and feeding adequate amounts of high-quality colostrum will improve calf performance, increasing that animal's production and efficiency.

If you would like me to come out, or back out, to your farm, please contact me at 337-718-9764 or eeckelka@utk.edu, or through your county agent (extension.tennessee.edu/pages/office-locations.aspx).

I hope you and your families are enjoying the new year. I'm looking forward to 2019 with all of you!

- Liz Eckelkamp, UTIA Assistant Professor and Dairy Extension Specialist

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For more information, check out these resources:

UTDairy Resources with the key word "colostrum" (ag.tennessee.edu/AnimalScience/UTDairy/Pages/Resources.aspx)

Raboisson, D., P. Trillat, and C. Cahuzac. 2016. Failure of passive immune transfer in calves: a meta-analysis on the consequences and assessment of the economic impact. *PLoS One* 11(3): e0150452. doi:10.1371/journal.pone.0150452. <https://journals.plos.org/plosone/article/file?id=10.1371%2Fjournal.pone.0150452&type=printable>

Looking Forward: Milk Prices and Outlook



Photo courtesy Sam Morris

2018 blend prices, in the three Southeast federal orders, will average about \$1.50/cwt. lower than 2017. Margins are at the lowest level in several years. Needless to say, 2018 is a challenging year for dairy farmers. What can we expect in 2019? Will there be any improvement in farm milk prices? As we write this article (middle of October), we project 2019 Southeast federal order blend prices to average \$0.50-\$1.00/cwt. higher than 2018. Granted, this increase is not as much as dairy farmers need, but it is a step in the right direction.

Four dairy commodities — butter, cheese, dry whey and nonfat dry milk powder (NFD) — establish the basis for all federal order milk prices, including the Southeast orders. Historical high dry whey and NFD prices were the driver behind record farm milk prices in 2014. Whey peaked at over \$0.60/lb. and powder over \$2.00/lb. in 2014. However, since those record highs, prices of those two commodities declined significantly. During the first quarter of 2018 NFD was below \$0.70/lb. and dry whey around \$0.25/lb. A big

difference compared to prices in 2014 and a major reason for low farm milk prices.

Thanks to increased demand for whey and NFD, and declining inventories, prices are improving. In September, powder reached \$0.85/lb. and dry whey over \$0.40/lb. Increasing prices for these two products is the primary reason behind our \$0.50 to \$1.00/cwt. higher blend price forecast for 2019. Let me interject every penny change in the price of dry whey changes the Class III or advanced Class III (basis for Class I Mover) skim price \$0.06/cwt. Every penny change in NFD changes the Class IV or advanced Class IV skim (basis for Class I Mover) price \$0.09/cwt.

Now let's turn to the other two products, butter and cheese. Farm prices would have been much lower over the past couple of years without strong butter prices. However, it appears butter has reached a steady trading level, and inventories are adequate. As a result, we do not anticipate any significant increase in the 2019 butter price. Due to the wide price spreads between block and barrel cheese on the past few months, the cheese price is difficult to predict. Federal orders average block and barrel cheese in the pricing formula. However, with cheese consumption continuing to increase almost every year, the 2019 cheese price is projected a few cents higher than 2018.

Two factors can easily change our projections up or down. They are milk production, mainly influenced by the number of dairy cows, and dairy product consumption. The total number of dairy cows in the US has increased almost 200,000 head since 2013. We have to go back to 1995 to find a larger national dairy herd than today. More cows means more milk; more milk without consumption keeping pace with production means lower dairy commodity prices; and lower dairy commodity prices results in lower farm milk prices.

Since February, cow numbers have declined slightly. Low milk prices and margins are increasing the number of dairy farm exits. Plus, dairy cattle slaughter numbers are over 5 percent higher than a year ago. If cow numbers decline at a stronger rate than currently, our 2019 projections may be low.

Turning to dairy consumption, the news is mixed. For the first time in several years per capita consumption of all dairy products was down in 2017 (most recent year available) compared to the previous year. Through the first eight months of 2018, domestic consumption is only up about a quarter of 1 percent. Better news is dairy exports are at a record level, and are over 18 percent higher than last year. Exports now account for about 16 percent of total dairy consumption.

We are hopeful an improving economy, increasing wages and low unemployment will help boost domestic consumption. And developing countries' economies keep growing,



thus increasing their demand for animal protein, especially dairy, and trade issues are reconciled, thus expanding exports. If this occurs, look for 2019 blend prices higher than our projections.

In summary, based on today's market information, we project 2019 blend prices in the three Southeast federal orders to average \$0.50 to \$1.00/cwt. higher than 2018.

The two key factors impacting prices are cow numbers and consumption. Significant changes in these two factors will move our projection higher or lower.

- Calvin Covington

Calvin Covington is a retired dairy cooperative CEO and now does some farming, consulting, writing and public speaking.

Student Spotlight — Amanda Lee

As a graduate student in the Department of Animal Science at the University of Tennessee, under Peter Krawczel, associate professor, I have been given many opportunities to conduct research at the East Tennessee AgResearch and Education Center Little River Unit, present research around the world, and study with an esteemed faculty and staff. But when granted the chance to team up with Aarhus University in Denmark for a semester-long study abroad, Krawczel and I jumped at the chance.

Our research at the University of Tennessee focuses on exploring the relationship between stocking density and dairy cattle behavior, production and health, given a secondary challenge: heat stress. Similarly, our research in Denmark focuses on exploring how stocking density on automatic milking systems (AMS) effects dairy cattle production and behavior. In a freestall system we define stocking density as the number of cows per spots to lie down and eat from. Traditionally, we ideally want a 1-1 ratio of cows to spots for eating and lying so that cows do not compete for either resource. However, in an AMS, multiple cows may want to milk at the same time. This increases the competition at the AMS, although cows are still able to lie down and eat without competition. Our goal is to determine the stocking density of a single AMS that will maximize total milk production per AMS and individual cow milk production. Our secondary goal is to determine how cows use an AMS throughout the day to establish better recommendations for when cleaning or maintenance should be performed.



Photos courtesy Amanda Lee

From August to December 2018, I have been granted the incredible opportunity to study under Lene Munksgaard, a professor and leading behavioral researcher in the Department of Animal Science at Aarhus University. Aarhus is one of the leading agricultural universities in Denmark, with faculty studying a variety of animal species, agriculture, soil science and forestry. Researchers here work with a wide range of production animals including dairy cows, pigs, chickens, equine and minks.

Because Aarhus University has collected continuous data on three AMS from 2004 to present, their facilities provide an ideal opportunity to observe how multiple stocking densities has changed both milk production and daily visits. Currently, stocking density recommendations for AMS are limited to individual company recommendations. However, we believe we will be able to provide clear, scientifically based recommendations to dairy producers looking to install AMS within Tennessee and throughout the world. Despite differences in dairy production systems, producers in the US and Denmark face similar challenges. We hope that our research will help producers to embrace new technology to maximize milk production.

- Amanda Lee, UTIA PhD student in Dairy Cattle Welfare



Silage Corn Responses to Nitrogen Application Rates

Yield results have been analyzed for the second year of the University of Tennessee Extension (UT Extension) corn silage nitrogen response study. This applied research is being conducted with support from the Tennessee Department of Agriculture and examines several aspects of corn silage production in Tennessee: yield and quality over a

broad range of nitrogen application rates, early detection of nitrogen deficiency, and quantifying harvest removal rates of phosphorus and potassium. Here, we discuss part of the second year results, namely the yield results. These data, replicated across four to five years of study, will be used by UT Extension to update corn silage nitrogen recommendations, which currently differ from the corn grain recommendations (Table 1).

Table 1. A comparison of UT Extension corn grain and corn silage nitrogen fertilizer recommendations. Corn silage nitrogen use is estimated per bushel equivalent using conversion factors: 7.3, 7.5, 7.5 and 7.2 bushels/ton at yield breakpoints of 15, 18, 19 and 25 tons/acre, respectively (Lauer, 2006).

Corn for Grain			Corn Silage			
Yield	Nitrogen		Yield		Nitrogen	
bu/ac	lbs/acre	N/bushel	tons/acre	≈ bu/ac	lbs/ac	N/bushel
100-125	120	1.20-0.96	15-18	110-135	120	1.09-0.89
126-150	160	1.27-1.07	19-25	143-180	150	1.05-0.83
151-175	180	1.19-1.03				
176-200	210	1.19-1.05	> 25	>180	180	< 1.00
201-225	240	1.19-1.07				

The yield data presented below were measured using replicated small plots (10 x 30 feet) planted with a commonly used corn silage variety (Pioneer 2088) at 30,000 plants per acre on 30-inch rows. Seven different nitrogen application rates were repeated in four blocks at four different AgResearch and Education Centers: 0, 120, 150, 180, 210, 240 and 300 lbs-N/acre. Nitrogen application rates were split to replicate dairy producer practice: 80 lbs-N/acre at planting, followed by varying amounts at the V6-V8 growth state, around 16 to 24 inches tall (40, 70, 100, 120, and 180 lbs-N/acre). All of the nitrogen was applied as urea treated with Agrotain. A follow-up study with manure is currently being analyzed.

Small plot yield results varied significantly across the different nitrogen application rates (Table 2). The site effect was significant, so yields at the different centers varied at the same nitrogen application rate. Table 2 presents yield differences for each center using letters that denote significantly different yield categories. The “A” category denotes the highest yield category and is shaded in Table 2.

Table 2. Small plot corn silage yield normalized to 65 percent moisture (average +/- standard deviation) at four different UT AgResearch and Education Centers across seven different nitrogen application rates. For each center, nitrogen application rates that do not share a common letter are significantly different.

AgResearch and Education Center	Nitrogen Application Rate (lbs-N/acre)						
	0	120	150	180	210	240	300
Highland Rim	10 ± 2 C	17 ± 5 BC	17 ± 2 BC	20 ± 2 AB	23 ± 3 AB	22 ± 5 AB	26 ± 2 A
Middle Tennessee	13 ± 2 B	20 ± 1 AB	20 ± 3 A	19 ± 3 AB	21 ± 2 A	21 ± 3 A	24 ± 5 A
Plateau	15 ± 3 C	23 ± 1 B	23 ± 1 B	28 ± 1 A	22 ± 2 A	31 ± 1 A	31 ± 1 A
East Tennessee (Little River Unit)	17 ± 8 B	25 ± 1 AB	26 ± 4 AB	26 ± 4 A	26 ± 3 A	28 ± 4 A	25 ± 1 AB



Overall, this year's results reinforce two facts. First, low nitrogen application rates will, in some site years, jeopardize yield and producer profits. Second, over-applying nitrogen will increase cost without a profitable yield return. In 2018, the yield results with 180 lbs-N/acre were not significantly different from those obtained with 210, 240, and 300 lbs-N/acre at all the site locations tested. Further, the yield for the 180 lb-N/ac application rate was significantly higher than for the 150 lb-N/ac application rate only at one site.

Pending further analysis of silage quality, the current maximum UT Extension nitrogen application rate (180 lb-N/ac) appears to be a good compromise between fully realizing yield and profit potential while minimizing nitrogen fertilizer cost and the unnecessary environmental damage nitrogen over-application can cause.

Further analysis of the Year 2 results will be available in future editions of UT Parlor. Additional analyses will focus on **silage quality, estimated milk production per acre,** and quantifying the **return on investment** of the different nitrogen fertilizer application rates. An assessment of early indicators of nitrogen deficiency (ear leaf analysis, measures of leaf greenness) will be presented. Finally, harvest removal rates of phosphorus and potassium will be examined to determine whether the higher rates than expected in Year 1 were replicated in Year 2. This is an important consideration because predictions of crop phosphorus removal rates are frequently used to set agronomic manure application rates.

- Shawn Hawkins, UTIA Associate Professor, Biosystems Engineering and Soil Science
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When it comes to calves, the first meal is key!

The importance of timely feeding, properly collecting, and properly storing colostrum cannot be stressed enough. The decisions regarding how to manage and handle that calf in the first few hours of its life can have lasting impacts, and even dictate the likelihood of its survival. To this end, we have recently compiled a series of fact sheets addressing the key components of a successful colostrum management program. To help you identify which of those fact sheets might be most relevant to you, a short summary of each is provided below:

1. The Importance of Colostrum (extension.tennessee.edu/publications/Documents/W660-A.pdf)

Topics covered within this fact sheet:

- The importance of feeding high-quality colostrum (more than 50 mg/ml) within six hours of birth.
- Details of why it is better to harvest and feed high-quality maternal colostrum rather than using a colostrum replacer.



Photo courtesy Sam Morris

- Support of why proper feeding of colostrum results in a win-win situation.
- Details of the negative outcomes of not feeding colostrum.

2. Key Concepts for Colostrum Collection, Storage, and Preparation (extension.tennessee.edu/publications/Documents/W660-B.pdf)

Topics covered within this fact sheet:

- Keys for managing dry cows to maximize colostrum quality.
- Factors related to harvesting high-quality colostrum correctly.
- Summary of several methods for evaluating colostrum quality.
- Techniques for correctly storing colostrum after its harvested.
- Proper method of preparing frozen colostrum for feeding.



Photo courtesy Sam Morris





Photo courtesy Sam Morris

3. Know the Colostrum Equation (extension.tennessee.edu/publications/Documents/W660-C.pdf)

Topics covered within this fact sheet:

- A summary of the three Qs of colostrum feeding: Quality, Quantity and Quickness.
- Data supporting why it is critical to feed colostrum within the first six hours of life.
- Details of what quantity of colostrum should be feed and when it should be offered.
- Highlights of why feeding colostrum from a bottle is preferred.
- Methods for using a tube feeder (when it is unavoidable).

4. Test Your Colostrum Management (extension.tennessee.edu/publications/Documents/W660-D.pdf)

Topics covered within this fact sheet:

- A critical component of colostrum management is testing how successful you are in achieving your desired outcomes.
- Methods that you can use to test if you are successfully transferring passive immunity from the cow to the calf (via correct colostrum feeding).
- Key benchmarks for evaluating your success.
- Potential causes for failures for transfer of passive immunity.

Tools, approach and costs of evaluating passive transfer of immunity.

For these and other resources on calves, visit the UT Dairy website at ag.tennessee.edu/AnimalScience/UTDairy/Pages/Resources.aspx.

- Peter Krawczel, UTIA Associate Professor and Dairy Extension Specialist
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Vet Check

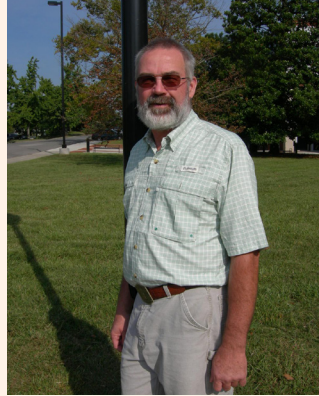


Photo courtesy Lew Strickland

Biosecurity for Your Farm

Farm biosecurity best management practices are an integral part of controlling any disease that can enter your farm through foreign sources. Biosecurity is the cheapest and most effective method of disease control since vaccinations cannot eliminate disease and treatment can only re-

duce losses. Most cattle diseases are spread by cattle blood, saliva, manure, urine or exhaled air and special attention needs to be paid to reducing contact from animal to animal or animal to object to animal. This is best done by a combination of animal isolation, control of movement onto and around the farm, proper insect control, as well as cleaning and disinfection.

Animal Isolation

Cattle disease is most frequently spread by contact between cattle, and limiting this contact is the most important part of biosecurity. Newly arriving cattle should be isolated from other cattle for a minimum of 30 days. The isolation area should be separated from any other cattle housing areas and is best located where drainage and prevailing wind direction is away from the rest of the farm. Request health records for all incoming animals and watch them closely each day for early signs of disease. Test for common diseases (BVD, anaplasmosis and Johne's disease) early in the isolation period so the results will be available before comingling any animal with other cattle on the farm. Deworming and vaccinating these animals are also worthwhile. Isolate sick animals until all signs of disease are gone for at least one week. Weaned, younger cattle are best kept separated from older animals since they are still building immunity and are generally more susceptible to disease. Animals in isolation should be handled only after all other animals are handled for the day. Dead animals should be disposed of by rendering, burning, deep burial or composting so that they do not serve as a source of disease to live animals. If there is any question as to why the animal died, a necropsy (an animal autopsy) should be performed to determine the cause of death.



Traffic onto the farm must be controlled for biosecurity to be effective. People, vehicles, other domestic animals, rodents (rats or mice), birds (pigeons) and insects (flies and ticks) can spread disease. The farm should have signs posted and gates should be locked when no one is around. A single entrance into the farm is easier to monitor and control than several entrances. Visitors to the farm should wear clean clothes and footwear that is free of manure. Provide plastic disposable boots for visitors coming onto your farm. Anyone handling animals should wash their hands before handling each animal and between animals, or wear disposable gloves. Avoid allowing vehicles that have been on other farms into barn lots or pastures unless properly washed upon leaving the previous farm. Pets from outside should be kept away from animals and feed sources. Finally, an effective program of pest control should be in place. This may include fences, screens traps or baits.

Cleaning and Disinfection

Disinfection means to render an object free of germs. Some common examples of objects that can spread disease are handling facilities (chutes, etc.), balling guns, stomach tubes, dehorners, castration equipment and any other object that is used on more than one animal without proper disinfecting. It is a best management practice to dispose of disposable syringes and **needles** after they are used **once**. Reusing needles greatly increases the probability of spreading disease animal to animal. For instance, a study by Reinbold in 2010 found that there is a 60 percent probability of spreading anaplasmosis from an infected cow to a clean cow by reusing needles. So, make it a habit to change needles every shot! Boil non-disposable syringes in water, rinse, dry and store in plastic bags until their next use. Do **not** use disinfectant on needles and syringes, as this will render medication useless. For disinfection to be effective, the object to be disinfected must be clean. A thorough scrubbing with soap and water followed by rinsing will remove most germs. The presence of manure or other body fluids such as saliva will make disinfectants ineffective. Several good disinfectants are available from animal health product suppliers and are very effective if used as directed. A good disinfectant that is commonly available is chlorohexidine, available as a 2 percent solution.

Disinfectants will work well if:

- The object to be disinfected is clean. Remove any manure, blood or saliva on the object prior to disinfection.
- The disinfectant is designed to be effective against the germs to be killed. Always buy a disinfectant that is effective against a wide variety of common germs.
- The disinfectant is mixed properly. Too little or too much disinfectant in a solution will cause the disinfectant to be less effective. Always follow label directions for mixing.
- The disinfectant is in contact with the object for at least 5 to 10 minutes.

Hypochloric acid (bleach) is a commonly used, inexpensive and effective disinfectant for which directions for use are not available on the label. Some points to remember about the use of bleach as a disinfectant include:

- Bleach can produce annoying or even toxic fumes and should always be used outside. **Never** mix bleach with ammonia or vinegar as a very toxic gas is produced.
- Bleach is often used in too concentrated a form and one-eighth to one-half cup per gallon of water is all that is needed.
- Bleach solution for disinfection cannot be stored and must be made fresh daily.
- Bleach is corrosive to metals, deteriorates fabrics, irritates skin, and some individuals are very sensitive to bleach fumes.

An effective program of biosecurity, including isolation, control of movement into and around the farm and disinfection of items used on more than one animal is the cheapest and most effective form of disease control for the beef herd. Even small management changes directed towards disease control can yield a healthier herd. If you have any questions, please contact your veterinarian, local Extension agent, or myself at, lstrick5@utk.edu, or 865-974-3538.

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