

# UT PARLOR

A publication for Tennessee's dairy producers and supporting industries

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## Efficient Dairying through Technology and Lean Farming

Reducing waste of time and resources and creating a more productive and profitable farm is the purpose of the lean dairy business. Farmers can make dairy farming more efficient by using precision technology, utilizing data, and understanding the costs and revenues of their operation. UT Extension, in conjunction with Alltech, AgCentral Farmers Co-Ops, and the Tennessee Farm Bureau Federation organized meetings on May 28-29, 2019, in Columbia and Athens, Tennessee. Dairy farmers were invited to participate in these meetings to gain insight into farm efficiency opportunities.

### Precision Dairy Technologies

Precision dairy technologies help to improve animal health and well-being, production, and efficiency in daily operations. Assistant professor and dairy Extension specialist Liz Eckelkamp discussed precision dairy technology economics in her talk. She explained how technologies could improve farm operation and some things to consider before purchasing them. Precision dairy technologies could act as “the eyes and ears of the farmers” by replacing labor and supplementing data for decision-making. Precision technologies can provide reports, like a cow's steps or lying time, and predict events, like heat or disease detection. On-farm technology success relies on a farmer's willingness to act on the alert or data generated by the technology. Farmers must be realistic in what to expect from technology and make good use of it by keeping track of precision technology-generated alerts.

Precision technologies serve several purposes including detection of estrus, mastitis, fresh cow diseases, and lameness. However, producers should consider economic feasibility and return before investing. Purchasing a precision technology should be based on the requirements of a farm, flexibility of farm infrastructure, cost, and ability of precision technology to translate to meaningful action. Eckelkamp emphasized a farmer's willingness to use and incorporate a precision technology are key to long-term success.

**Take-home message:** Precision technologies are tools to make farm operations effective and efficient. However, technology investment does not necessarily improve farm operations or profitability. Success is a combination of a good manager, good service team, and willingness to use technology and follow up on technology alerts.

### Being Competitive as a Small Farm

Jeffrey Bewley from Alltech presented several topics including lean dairy farming, new ideas for using dairy data, understanding costs and revenues toward financial success, and how to be a small giant. He explained incorporating lean business management principles into dairy farming. Lean farming is the efficient utilization of investment and employees by reducing nonutilization of talents, unclear routines, overproduction, waiting time, etc. Bewley highlighted the following keys for lean farming:

1. Identify and eliminate waste in the farming process.
2. Organize the farm effectively.
3. Standardize processes to do things right the first time.
4. Develop an active team to increase farm productivity and efficiency.

Sorting and setting things in order will help with effective use of time and labor. “It is better to do things smartly and efficiently,” Bewley said. He also discussed the true potential of small dairies in his “Small Giants” talk. He acknowledged that there are some competitive disadvantages to being small, like economies of scale, but small dairies can still be giants in the dairy industry by possessing some key traits:

1. A leader with a vision.
2. A well-maintained relationship with the local community.
3. An engaged and valued service team.
4. Personal ties with customers.
5. A passion for being in the dairy business.

A farm could be great in several ways, such as producing more milk per cow, marketing organic milk or another

niche product, engaging in agritourism, being strategic, or marketing genetics. To achieve any of these, a farmer should invest more on cow comfort and nutrition, rather than overinvest in infrastructure, like a large parlor. Bewley suggested several controllable factors for farm operations, including milk yield, replacement heifer quality, reproduction, and feed cost. Financial records are as important as production records. To understand the profitability and cost of farm operations, farmers need to understand and keep track of farm financial records.

**Take-home message:** Maintaining personal ties with consumers, managing an interactive service team, prioritizing consumers' interest, and planning financial feasibility help small dairies be successful. Effective and smart utilization of resources and time is crucial to improve dairy farm efficiency.

—Arup Sen, UTIA, PhD student in Dairy Systems Management

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## Dairy Cattle Longevity Revisited

The American Dairy Science Association is an international organization composed of educators, scientists, and industry professionals who are committed to advancing the dairy industry. The American Dairy Science Association annual meeting was held in Cincinnati, Ohio, from June 23-26, 2019. The meeting brings together more than 1,800 professionals, educators, and students from around the world to discuss interests in the future of dairy science. More than 540 oral presentations and 580 poster presentations were discussed. Highlights from a few of the presentations are below.

### Barriers to Longevity

Although improvements in genetics and cow comfort have taken place over the past several years, dairy cattle longevity persists for about three years after first calving. Naturally, a cow's life span can average about twenty years. According to Albert De Vries, associate professor in dairy management and economics from the University of Florida, we need to re-evaluate how many dairy heifers are required, which animals should be dams, and what to do with unneeded replacement animals. The goal of De Vries's work is to reduce cull rates and extend the cow's time within the herd by exploring economic and environmental incentives for longevity within a herd.

Economics is the largest driver of culling decisions. When determining the goals and outcomes of animals on farm, the end goal should not be to secure a lifetime profit but to optimize profit per unit of the most limiting factor. The optimal longevity goal is for the cow to reach her fifth or sixth lactation. If she reaches that lactation, her net return will outweigh her cost. Short longevity may be driven by

the abundance of dairy heifers now available through sexed semen. According to David Kendall from ST Genetics, many herds keep excess replacement heifers. The reason for this may be because we commonly breed everything and keep everything. Strategically using sexed semen, beef semen, in vitro fertilization, and genomic testing can ensure the most profitable herd.

Future herd turnover is the driver of replacement needs. To calculate herd turnover, divide the total number of cows that leave the herd over twelve months by the average population at risk for that same time. Cows removed from the herd because of mortality, disease, infertility, low milk production, or sold for dairy purposes should be replaced immediately with your best heifers to keep facilities full and reduce fixed costs. Herd replacement makes up about 10 percent of a farmer's operational cost. Kendall stated that culling earlier is better because of the input cost of raising an unproductive heifer. Maintaining a closed production system to ensure the farm has the opportunity to improve the herd may also reduce input costs. Appropriate culling and replacement decisions can decrease future economic loss and increase the net value of heifers entering the herd.

**Take-home message:** Genetic selection and strategic culling are important assets to use in evaluating the longevity of all the animals in a herd. The optimal longevity of a cow is to reach her fifth or sixth lactation to ensure her net return outweighs her costs. Selective heifer replacement strategies can assist with cow longevity and decrease future economic loss.

### Housing Impacts on Longevity

Management and facility design may also play a role in longevity by improving health care and cow comfort. According to research by Nigel Cook at the University of Wisconsin, cow comfort is key to ensure the well-being of the animal. On average, a cow should lie down for approximately twelve hours per day. Studies have shown that when a cow is restricted from lying for an extended period of time and then given the option to lie down, she will prioritize lying over feeding. It is recommended to size stalls relative to the size of cow using them, and loose, deep bedding should be utilized in order to maximize comfort. Heat stress management can also improve lying time. It is recommended to provide fast-moving air over all lying areas, sufficient exhaust to remove heat and moisture from the barn, and strategically placed water lines to mist the cows at appropriate times to assist in cooling. Alley dimensions and flooring surfaces also become critical in barn design to ensure cows can move easily among feeding, drinking, milking, and resting areas.



**Take-home message:** Management and facility design can play a large role in how long cows are able to stay in the herd. Providing a clean and comfortable place for the cows to lie down can increase lying time and improve overall herd health. Managing heat stress by providing proper ventilation and misters to keep the cows cool can also greatly improve overall longevity within your herd.

—Emily Luc, UTIA, MS student in Mastitis and Immunology

For more information or to read the full abstracts, follow this link: [adsa.org/Portals/0/SiteContent/Docs/Meetings/2019ADSA/2019ADSA\\_Abstract\\_Book.pdf?v20190715](https://adsa.org/Portals/0/SiteContent/Docs/Meetings/2019ADSA/2019ADSA_Abstract_Book.pdf?v20190715)

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## Extension Education for the Future

Researchers, farmers, and consumers are interconnected through Extension education. The Extension Education-1 session of the 2019 American Dairy Science Association annual meeting included studies on the perceptions of farmers, nutritionists, and consumers across different aspects of dairy operations.

### Milk Demand—From the Eyes of the Consumers

Assistant professor and dairy Extension specialist Liz Eckelkamp from the University of Tennessee explored the factors that drive milk purchases. Tennessee consumers purchased single gallons (61 percent) of whole (42 percent) and 2 percent (39 percent) milk from retail grocery stores (89 percent). Tennessee consumers also considered milk to be a safe household staple. Price (35 percent), taste (31 percent), and expiration date (26 percent) were the top three considerations when purchasing milk. Store-branded milk was perceived to be cheaper (44 percent), followed by locally processed (10 percent) and locally owned (8 percent), with money going back to the farmers (8 percent). USDA organic milk was considered to be expensive (21 percent) and healthier (19 percent) with no artificial additives (19 percent). Local milk was considered to be locally owned (17 percent) and locally processed (15 percent), with money going back to the farmers (15 percent). The majority of the respondents considered milk as “local” when it was produced either within the county or within the state. Consumers were willing to pay \$4.16/gal for organic branded milk, compared to \$3.24/gal for store-branded and \$3.96/gal for local branded milk. Sixty-five percent of study respondents knew very little about cows’ milk and reached out to health professionals (36 percent) or online articles (21 percent) to learn more. However, health professionals (37 percent) and friends and family (37 percent) were the most trusted sources to learn about milk. Working with physicians and pediatricians could be a way to share information about milk with consumers.

**Take-home message:** Consumers make purchase decisions based on price, taste, and expiration date. Partnering with doctors could be a way to share information about milk with consumers.

### Efficient Feeding Management for Profitable Farming

Balancing dietary protein to meet dairy cow amino acid requirements is crucial to feed formulation. Over and underfeeding of crude protein (CP) to dairy cows could result in economic loss and environmental pollution through nitrogen excretion. A survey was conducted by researchers at Virginia Polytechnic Institute and State University focused on nutritionists’ perceptions of dietary protein balancing in ration of the dairy cow. Most participating nutritionists were willing to reduce CP in diet and considered only methionine and lysin during ration formulation. Reducing CP was driven by decreasing ration costs, not by environmental concerns. The benefits of reduced CP ration and balancing essential amino acids should be shared with everyone involved in the production cycle.

In another talk, researchers from Pennsylvania State University discussed feeding and cropping management effects on farm financial performance. Balancing feed resources to increase milk yield or milk components could help to increase income over feed cost. They showed that farms with high net return usually had the highest average milk production. However, these farms had average milk components. On the other hand, farms with medium net return had the lowest average milk production. However, they had the highest milk components, which improved their overall milk price. The cost for hired labor or loan payments could challenge the profitability of the farm.

**Take-home message:** Most nutritionists in the US consider amino acid balancing during ration formulating as a means of lowering feed cost. Benefits of low CP ration in reducing nitrogen waste should be shared. Utilization of the available feed to improve milk yield or components could result in increased income over feed cost.

### Microlearning Courses for an Efficient Farm Operation

A study conducted by the researchers at Freie Universität Berlin and Cornell University discussed the effect of microlearning courses on employee efficiency. They developed three microlearning courses on colostrum management with objectives, standard operating procedures, background information, and a quiz for each course. Those courses were made accessible through a PC or smartphone. Participants’ experiences (i.e., access, page visits, time spent, and completion) were recorded. Most of the participants accessed the standard operating procedure section of each course. Most employees reported having more confidence in completing tasks after training. Almost



all participants were more interested in the background of the task to understand why they should do it. The participants suggested that even repeating a simple and well-known step helps them perform that particular task more efficiently. Providing employees with microlearning courses with a standard operating procedure and background information can improve employee efficiency.

**Take-home message:** Microlearning courses can build employee confidence and improve efficiency. Employees wanted to understand the “why” behind the “how” of tasks.

### Research Priorities in California’s North Bay Dairies

Researchers from the University of California conducted a survey to determine research and educational needs in California’s North Bay region. The participants ranked pasture management, disease prevention, state and federal funding opportunities, labor management, and water as top areas for research and education. Veterinarians and Extension agents provided valued information to the dairy producers there. Most participants indicated on-farm demonstrations and educational meetings quarterly or twice a year were preferred Extension education methods.

**Take-home message:** Pasture management and disease prevention were the top two research and education priorities for California’s North Bay dairies. Dairy producers preferred on-farm demonstrations for future Extension education.

—Arup Sen, UTIA, PhD student in Dairy Systems Management

For more information or to read the full abstracts, follow this link: [adsa.org/Portals/0/SiteContent/Docs/Meetings/2019ADSA/2019ADSA\\_Abstract\\_Book.pdf?v20190715](https://adsa.org/Portals/0/SiteContent/Docs/Meetings/2019ADSA/2019ADSA_Abstract_Book.pdf?v20190715)

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## Milk Quality and Mastitis Control in a Changing Dairy Industry

The American Dairy Science Association is an international organization composed of educators, scientists, and industry professionals who are committed to advancing the dairy industry. The American Dairy Science Association annual meeting was held in Cincinnati, Ohio, from June 23-26, 2019. The meeting brings together more than 1,800 professionals, educators, and students from around the world to discuss interests in the future of dairy science. More than 540 oral presentations and 580 poster presentations were discussed. Highlights from a few of the presentations are below.

### Role of Employees and Procedures in Milk Quality

The dairy industry is continually changing and herd sizes continue to grow, creating an increased need for hired

labor or alternative labor sources. A survey by veterinarian Ronald Erskine from Michigan State University found that employees want to learn more about the importance of their job and how they contribute to the success of the farm. When employees feel wanted and contribute to the farm, they tend to pay more attention to the job at hand. Because many do not come from a farm background, they lack understanding of the critical processes of milking, such as milk letdown. Allowing sixty to ninety seconds for oxytocin to assist in milk letdown will ensure available milk will be removed in a timely fashion. Milk yield decreases the longer it takes the cow to start milking while the cluster is attached. When a precise premilking routine is followed, 90 percent of cows should have immediate milk letdown after the cluster is attached, and milk should flow 95 percent of the time during milking. Erskine also found that for every one-minute delay past the required sixty to ninety seconds for oxytocin stimulation, 7 lbs. of milk is lost and the risk of damaging teat tissue increases. When dairy farms ensure strict compliance with their protocols, their bulk tank somatic cell count was found to remain low. With the increase in immigrant labor, it is important to decrease the language barrier as much as possible. Companies and land-grant universities have developed education and training tools to assist with the translation of protocols and ensure the employees feel heard.

**Take-home message:** When employees feel wanted and contribute to the farm, they tend to pay more attention to the job at hand, which is critical in controlling milk quality on the farm. Efficiency in the parlor includes using precise premilking routines to ensure consistent milk letdown.

### Robotic Milking and Milk Quality

In contrast to milking in a parlor, robotic milking systems have been on the rise. A study by Charlotte Winder, assistant professor in the Ontario Veterinary College at the University of Guelph, Canada, used information from the robots to develop accurate mastitis detection models. The robots detect clinical mastitis by measuring milk yield, visit frequency, duration of milking, and temperature and conductivity of the milk. The model Winder was able to develop showed 93 percent accuracy in detecting sickness up to fifteen days after the first diagnosis of mastitis. While the robots may have more consistency in milking and accuracy in detecting mastitis, they are also less effective at teat cleaning and identifying defective teats. Cows with abnormal teats, such as teats that cross in the rear, will not be correctly identified by the robot, leading to insufficient cleaning and milking.

**Take-home message:** Robots have the accuracy to detect mastitis, but are lacking in other areas of efficiency, such as teat cleaning.



## Farm Attitudes and Milk Quality

In order to understand producers' perceptions of mastitis and mastitis management, the Southeast Quality Milk Initiative set out to gather information. The decline of US dairy herds within the last decade can be attributed to the challenges of consistently producing high-quality milk. Farms had lower bulk tank somatic cell counts when provided with information sources on how to prevent and treat mastitis, had a positive perception of controlling mastitis, planned to remain in business in the next five years, and were present in the parlor at milking. Managers of closed dairies reported that the lowest bulk tank somatic cell count that caused them concern was 418,000 cells/ml, whereas managers still in business reported concern at 338,000 cells/ml. Overall, the Southeast Quality Milk

Initiative was able to show that all types and sizes of dairies can succeed by producing high-quality milk and controlling mastitis on their farms. Being proactive about mastitis yields positive outcomes.

**Take-home message:** Farmers who have a positive outlook on controlling mastitis on their herds are able to control their bulk tank somatic cell count more efficiently.

—Emily Luc, *UTIA, MS student in Mastitis and Immunology*

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# Vet Check

## Prevent Winter Pneumonia in Your Calves

With changes in weather, protecting your preweaned calves from the elements requires walking a fine line between providing comfortable shelter and impeding air quality. Structures added to a barn to block calves from wind and cold can be counterproductive if they alter ventilation. Just as soon as air quality becomes poor, cases of pneumonia will increase.

Regardless of the type of housing, it is important to pay attention to the microenvironment of the calves, not just your personal impression. While the air quality at your height might seem to be excellent, that may not be the case 2 feet off the ground where the calf lives and breathes. The following measures are ways to promote winter air quality and prevent pneumonia in various calf-housing systems:

- **Indoor barns with individual pens**—Prevent nose-to-nose contact with solid-panel pens that are open in the front and back for air movement. Even in extremely cold conditions, leave sidewall curtains at least partially open and protect calves with deep, organic bedding. The University of Wisconsin’s nesting score system recommends that calves in cold conditions should be bedded to a nesting score of “3,” meaning the bedding is deep enough so you can’t see the calf’s legs when the calf is lying down.
- **Individual hutches**—Hutches provide natural ventilation and protection from winter elements, but you can run into trouble if they are crowded too closely together. Even if done with the best of intentions of sheltering hutches from the wind, stacking them too tightly together can promote disease transmission among calves. An easy rule of thumb is to position hutches so there is at least one hutch-width between units.
- **Group pens**—Group-housed calves will automatically have nose-to-nose contact, so their respiratory health needs to be protected through other measures. Deep organic bedding and ventilation with fresh (not recycled) air are important. Stocking density should be twenty calves per pen or less, with resting space of 4 square meters per calf or more.

Regardless of the housing, written protocols for disease detection and treatment should be prepared and in place with consultation from the herd veterinarian. Calves will respond much better to treatment if they are diagnosed early. For the tech savvy producer there are two helpful calf health-monitoring systems: the University of Wisconsin’s Calf Health Scorer app and the California BRD Scoring System app from the University of California-Davis.

Paying close attention to a management program is very important. As much as we would like to have that one “silver bullet” to keep calves healthy, it does not exist. Colostrum quality management, housing, and early detection of disease are more important than drug therapy. Re-evaluate your protocol if you are treating 20 percent or more of your preweaned calves for respiratory disease.

Consistent attention to monitoring and veterinary-prescribed treatment will ensure calves are properly cared for, regardless of who works the day the calf is detected ill. Monitoring equipment and records as to how the calf responded to treatment will also assist in knowing if a specific medication is effective or not.

Your veterinarian and local Extension agents can be valuable resources in developing protocols for monitoring and caring for your calves. If you have questions concerning calf care, please contact them or myself at [lstrick5@utk.edu](mailto:lstrick5@utk.edu), 865-974-3538.

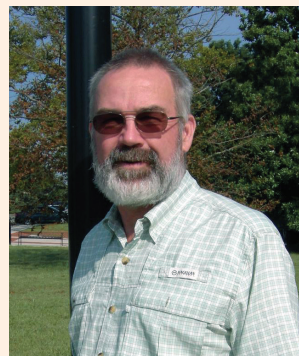


Photo credit: Lew Strickland

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Adapted from Maureen Hanson: Dairy Herd Management



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