Dairy Summit 2016
Santa Fe, New Mexico
August 4 - 7, 2016

9th Annual DNMC Dairy Summit is hosted by
When you are checking your feed, does it appear to be warm to the touch? If so, you might have a bigger problem than you think....

As mold consumes nutrients in your feed, it produces CO$_2$, water and heat. This is the reason why you sometimes have heating in your feed bunk. It is known that mold growth degrades the nutrient value of feedstuffs which negatively impacts performance and may cause palatability issues.

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To Our Sponsors
DNMC would like to express our appreciation to the industry partners for their generous contributions to the Dairy Summit. The success of the event would not be possible without their support. We value the long-term support from several sponsors and are pleased to have new companies involved for the first time. We hope you all enjoy the Summit!

from the DNMC Family
www.dnmcmilk.com

Event Agenda

Speakers

Saturday Activities

Saturday Night Entertainment

DNMC - Who We Are

DNMC - Essay Contest Winner

DNMC - In the media
Thank you for attending...

We are glad you have taken the time to be with us in Santa Fe. We decided on a “pre-harvest” event this time and hope you will enjoy some time away in the mountain air. At an elevation just over 7,000 feet, we hope to enjoy cool, late-summer weather.

We are excited about the Summit location, La Posada De Santa Fe. This historic site had its beginnings around 1880. The hotel has grown into one of the finest and most historic in the Southwest. At the La Posada, you will enjoy the comforts of a luxury hotel while being reminded of the rich history of Santa Fe.

The Dairy Summit has set the standard in the industry for relevant and timely topics important to dairy producers. Year after year, the Summit podium is filled with leaders in the industry offering ideas and solutions to improve dairy profitability. This year in Santa Fe that tradition will continue.

We trust that you will find these sessions educational and filled with information you can take home with you. We will also get the opportunity to meet and hear from the winner of the 2nd Annual “Dairy Summit Student Essay Contest”. Details about all of the student contestants, their contact information as well as their essay will be made available to all Summit attendees.

About Santa Fe, New Mexico

The city of Santa Fe, founded by Spanish colonists in 1610, is known as the oldest state capital city in the United States and the oldest city in New Mexico. Located in the southern Rocky Mountains, Santa Fe served as a regional hub for much of the early exploration of the American West. The blend of cultures including Native American, Spanish and the American West is evident as you look around town. There is great historical architecture, amazing food and unique culture to be found in Santa Fe. Take some time to enjoy the sounds, views and tastes while learning a bit of history about the American Southwest.

During the event, share the great moments and memories with us! Tweet or share photos, new ideas, etc. through Facebook or Twitter - #dnmcdairysummit or #dnmcnlk

Also, Like us on Facebook : Dairy Nutrition and Management Consulting, LLC
Follow us on Twitter @dnmcnlk
Thursday, August 4th
1:00pm - 5:00pm - Valley Ag Dairy Comp 305 Training
3:00pm - 4:00pm - Registration / Sponsored by: Novus & Purina Animal Nutrition
4:30pm - 6:30pm - Open Reception / Sponsored by: Provimi North America

Friday, August 5th
7:00am – 8:00am / Breakfast / Sponsored by: ABS

DNMC DAIRY SUMMIT 2016
Morning Session - Sponsored by: Trouw Nutrition USA
8:00am - 8:15am - Welcome & Introduction to Dairy Summit
8:15am - 9:15am - Speaker / Mark Marsalis, PhD

Are We Choosing the Best Types of Forage in the High Plains Region, and Are We Managing These Crops Correctly?
9:15am - 10:15am - Speaker / Luiz Ferraretto, PhD

Advancements in Corn Silage Processing
10:15am - 10:45am - Break / Sponsored by: Diamond V
10:45am - 11:30am - Speaker / Julie Sauls
DNMC Dairy Summit Student Essay Contest Winner
11:30am - 1:00pm - Lunch / Sponsored by: BJM Sales & Service & Kemin

Afternoon Session - Sponsored by: Chr. Hansen, Inc.
1:00pm - 2:00pm - Speaker / Alan Vaage, PhD

The Science of Feeding Mixing Technology on a Modern Dairy Farm
2:00pm - 3:00pm - Speaker / Luis Mendonca, DVM, MS

The Effects of Environmental Stress on Cow Health and Reproduction
3:00pm - 3:30pm - Break / Sponsored by: Arm & Hammer
3:30pm - 4:30pm - Speaker / Sue Hart
What Does the Future Hold for the Power of Dairy Farm Data?
4:30pm - 4:45pm - Closing Remarks

Saturday, August 6th 2016
7:00am - 9:00am / Breakfast / Sponsored by: Micro Technologies
Activities throughout the day / Sponsored by: MSBiotec & Zinpro
- Spa
- Golfing
- Fly Fishing
- Historical Tour of Santa Fe with a “Taste & Spirits of Old Santa Fe”
6:00pm - 8:00pm / The Santa Fe School of Cooking & Market: R&D LifeSciences
Meet in the lobby at 5:45pm

Sunday, August 7th
Depart at your leisure
Mark Marsalis, PhD
New Mexico State University

Mark is an expert in forage production in the High Plains. As a forage extension specialist and researcher, Mark has been helpful to the dairy industry in the area of specie and variety selection as well as agronomic techniques for successful forage production. This session will make sure we are thinking correctly about how to best turn forage production efforts into good heifers and high milk flow.

About the Speaker

Mark Marsalis currently serves as Extension Forage Specialist for New Mexico State University. His responsibilities include extension, research, and administration. He is a native of Mississippi. Mark received a B.S. in Biology from Mississippi State University in 1997 and an M.S. in Plant and Soil Sciences (emphasis: Forage Ecology) from the University of Tennessee in 2000, where he conducted research on endophyte infected tall fescue pastures. Mark received the Ph.D. in Agronomy (Forages) from Texas Tech University in 2004. His doctoral research focused on adaptation of forage Bermuda Grass to the harsh environmental conditions of the Texas High Plains.

Mark began his professional career with New Mexico State University in September 2004 as Extension Agronomist at the Agricultural Science Center at Clovis, where his regional extension and research efforts focused on sustainable cropping strategies and the pressing water-related challenges to both grain and forage crop production in eastern New Mexico. At Clovis, Mark’s program had a special emphasis on forage sorghum as an alternative to corn for silage operations. Small grain crops were also a significant part of his research. Upon appointment as statewide Extension Forage Specialist in 2013, Mark relocated to Los Lunas, NM, where he also serves as Superintendent of the Agricultural Science Center. His research interests have broadened to include alfalfa, New Mexico’s #1 cash crop, as well as perennial pastures and alternative water-conserving hay crops. His efforts focus on maximizing products of reduced input forage systems in limited water situations.

Contact information: marsalis@ad.nmsu.edu
Luiz Ferraretto, PhD  
*University of Florida*

Luiz serves on the faculty at the University of Florida in Gainesville as a Dairy Nutrition Specialist. He had the opportunity to work with early Shredlage research while at the University of Wisconsin. This session will focus not only on the details of Shredlage technology but also on the overall keys in harvesting, processing, storing and utilizing good quality silage.

**About the Speaker**

Dr. Luiz Ferraretto is originally from Brazil where he earned his B.S. in Animal Science from São Paulo State University in 2008. Immediately after the completion of his B.S. Degree, Luiz joined University of Wisconsin-Madison for an internship (2009) followed by an M.S. (2011) and Ph.D. (2015) in dairy science with focus on applied dairy nutrition.

After the completion of his Ph.D., Luiz joined The William H. Miner Agricultural Research Institute as a post-doctoral research associate. Currently, Luiz is an Assistant Professor of Livestock Nutrition in the Department of Animal Sciences at University of Florida and his research interests are applied dairy cattle nutrition and management with emphasis on starch and fiber utilization by dairy cows, corn silage and high-moisture corn quality and digestibility, the use of alternative by-products as feed ingredients, and supplementation of amino acids and feed additives.

Contact information: lferraretto@ufl.edu
Are we as dairy producers and dairy nutritionists truly convinced of the crucial nature of successful feed processing, blending and delivery? Jaylor has taken the position as a dairy TMR mixer manufacturer that in addition to working with steel and fabrication, they also need to be basic in truly understanding nutrition. This topic presentation will help us better understand our feed mixing and help us to think critically about opportunities and changes to improve production and cow health.

About the Speaker

Dr. Alan S. Vaage has worked extensively with both beef and dairy producers for over 30 years. He holds a Ph.D. in Ruminant Nutrition from the University of Guelph, Ontario specializing in digestive physiology, rumen function, and forage utilization. He is recognized as an expert in both dairy and beef nutrition, especially in regards to rumen function.

Dr. Vaage conducted beef cow-calf nutrition and grazing systems research with Agriculture and Agri-Food Canada in Melfort Saskatchewan, and then spent 15 years as Senior Ruminant Nutritionist for two North American commercial feed companies, for whom he managed ruminant product and feeding program development and consulted for key dairy and beef customers. Dr. Vaage joined Jaylor as Ruminant Nutritionist in 2010 to provide nutritional and technical support for their vertical TMR mixer business.

Dr. Vaage presents and consults internationally on TMR mixer use, is the columnist for TMR Corner for American Cattlemen magazine, as well as writes occasionally for other publications. Throughout his career, Dr. Vaage has contributed to a number of scientific and industry based committees and organizational groups devoted to enhancing the transfer of technical and scientific information and services to the agri-food industry.

Contact information: avaage@jaylor.com
A project to better understand the impacts of environmental stress in commercial dairies in the Southwest U.S. is underway and based at KSU. Using his veterinary background and practical dairy skills, Luis is digging deeper into ways that heat stress, cold stress, mud, etc. impact the potential for success in transitioning cows and helping them become pregnant. This presentation will report on some early findings of this effort and offer potential solutions for improved results with cow health and reproduction.

**About the Speaker**

Dr. Luís Mendonça received a DVM degree in 2006 at Universidade Estadual de Maringá, Brazil. In 2007 he worked in a private practice that specialized in reproductive management and technologies (i.e., embryo transfer and in vitro embryo production), providing services to clients across various states of Brazil and in Bolivia. In 2008, he was hired as a postgraduate researcher at the Veterinary Medicine Teaching and Research Center in Tulare, CA, where he worked in large dairy operations and was involved in different aspects of dairy production research. He obtained his M.S. degree and completed his residency in Dairy Production Medicine (2012) at the College of Veterinary Medicine, University of Minnesota.

Dr. Mendonça joined the Department of Animal Sciences and Industry at Kansas State University in 2013 as a State Dairy Extension Specialist where he now has a 30% research and 70% extension appointment. His current roles and responsibilities include development of an extension and research program addressing issues facing the Kansas and U.S. dairy industry. His goal is to develop and carry out research related to immune function, health, heat abatement and reproductive management of dairy cattle.

Contact information: mendonca@ksu.edu
Sue Hart  
*Valley Agriculture Software, Tulare, CA*

Sue will present on ways that our industry’s ability to compile massive amounts of cow data will help take dairy production to the next level. Are most dairy producers and heifer raisers taking full advantage of the information they routinely collect? Topics including cow health, reproduction, food safety, source verification and genomics will be presented in this discussion.

**About the Speaker**

Sue has worked in the dairy industry for over 30 years. Before joining VAS three and a half years ago, Sue worked for AgSource as a Regional Sales Manager covering Northwestern Wisconsin and Minnesota. Sue is known for her working knowledge of DC305 and her ability to work with producers, helping them analyze data and find profit opportunities on their dairies. She has offered instruction at several universities including University of Wisconsin-Madison, University of Wisconsin-River Falls and several technical colleges. Sue began her career with VAS as a Support Specialist for DC305 and currently holds the position of Field Specialist for all VAS products including DC305, Pocket CowCard and FeedWatch. Sue is also a member of the marketing team for VAS.

Contact information: Sue.Hart@vas.com
Option #1 – Spa

Spa Sage at La Posada de Santa Fe Resort is an intimate sanctuary, combining luxury, elegance, serenity and comfort.

Locally inspired therapies, expertly applied treatments, and indigenous products set Spa Sage at La Posada de Santa Fe Resort apart from other spas in Santa Fe. Housed in a soothing setting, including classic adobe architecture and enchanting decor, this luxury spa provides holistic health and wellness services, including a full-service salon, fitness center, saline pool and hot tub and yoga classes.

Contact the Santa Fe spa to book your massage and for more information by calling 505-954-9630.

Option #2 - Golfing

Known as the City of Santa Fe’s finest municipal golf course since 1998, Marty Sanchez Links de Santa Fe offers a spectacular golf experience with inspirational 360 degree panoramic views that surround the Sangre de Cristos, Jemez, Ortiz and Sandia mountains.

Located eight miles west of the historical downtown district, their year-round, four season weather-permitting course offers golf sport enthusiasts of all ages a spectacular golf experience showcasing exceptional customer service. Partake in the championship 18-hole course, 35-station all-grass driving range, practice greens, putting area and par three course ranked “top three big little course in the United States” by Travel + Leisure Magazine.
Option #3 - Fly Fishing

Santa Fe Adventures experienced fly fishing guides can take you trout fishing on all types of waters - from large rivers to high mountain spring creeks and lakes, they have them all here in Northern New Mexico. The landscape is breathtaking and extremely diverse, with everything from deserts, canyons and mountains with alpine forests of pines and aspen to mesas of cactus and juniper. There is excellent fishing all year-round, with lots of fish to be caught. New Mexico is truly western fly fishing’s “Land of Enchantment.”

Meet in the lobby at 7:45am

Option #4 - Historic Tour of Santa Fe with a “Taste & Spirits of Old Santa Fe”

With so many things to do in Santa Fe, Historic Walks ensures that you experience the very best of the city’s attractions. Led by professional guides/art historians, museum docents and seasoned actors recreating the past, their unique tours showcase Santa Fe’s rich history and exciting contemporary scene. Their staff will plan and design exclusive tours into Northern New Mexico.

This activity will also tie in a unique historic & culinary Santa Fe Experience. The customized private Taste & Spirits of Old Santa Fe Event is a customized two hour event that combines history with an exclusive “Old Santa Fe Culinary Experience”! Their professional “museum docent” guides from the New Mexico History Museum share historic commentary & background on the exceptional cuisine presented by these outstanding restaurants considered Historic Santa Fe’s “local favorites”... This customized “Santa Fe Culinary Experience” starts at historic La Casa Sena with old world charm and Contemporary Southwestern Cuisine and continues to La Boca or La Taberna (for larger groups) specializing in Tapas & Other Savory Spanish Cuisine created by Chef/Owner, James Caruso concluding for a “perfect finale” at the celebrated Coyote Cafe’ known as the forerunner of Contemporary Southwestern Cuisine! Each restaurant provides a “Signature Cocktail & Tasting” for your special guests created with Southwestern Flair by their notable Santa Fe Chefs!!

Meet in the lobby at 9:45am

Saturday Night Entertainment: The Santa Fe School of Cooking & Market

Located in beautiful Santa Fe, New Mexico, in the heart of historic downtown Santa Fe, The Santa Fe School of Cooking is an internationally acclaimed, recreational culinary school and market specializing in foods of the southwest. While in Santa Fe, we will experience the Traditional New Mexican demonstration class & dinner.

MEAL TO INCLUDE:
Warm, spicy tastes and enticing aromas evoke Santa Fe’s rich cultural traditions. This class will allow you to experience this delicious cuisine, including local cooking techniques and the lore of the region. This class includes corn tortillas, cheese enchiladas with red chile sauce, chicken enchiladas with green chile sauce, pinto beans, posole, and capirotada (bread pudding). Demonstration Class, 3-hours.
It’s about **PUSHING** all the right buttons before **MAKING ALL THE RIGHT MOVES**.

If this, then what? It’s a question that gets asked over and over when putting together a ration. AAMPS answers like nothing else can, turning a nutritionist’s own observations into accurate, performance-improving predictions. Built on a constantly updated database, AAMPS technology is backed by a team of dairy nutrition experts. Why not start pushing all the right buttons today?

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Dairy Nutrition and Management Consulting, LLC is a group of dairy industry professionals that has the opportunity to work with producers in several western states. Founded in 2006 in the Texas Panhandle, DNMC has grown to include four nutrition professionals and two support staff. The growth and leadership of the group has been noticed by the western dairy market. Not only does DNMC strive to offer sound council for its clients, there is also the goal to lead the industry in the areas of milk and feed economics. Though advice in many areas around the dairy is common, being basic in nutrition and feed/milk economics is the focus. The goal is for every piece of information offered by DNMC to a client to be the correct balance of biology and economics.

In the role of being a leader in the dairy industry, DNMC is active in authoring articles in various publications and speaking at academic and industry events. The team at DNMC feels that it is a privilege to be part of the U.S. food production system. As well, the unique aspects of the dairy industry and the people involved in producing milk have made for a labor of love. It’s a blessing to partner with clients to improve each operation’s financial success while working to keep the industry strong.

This business model revolves around feed, forage and milk, but the heart of the efforts relate to serving the people who own and manage dairy cows. The truth is that the cow is the real boss for all who call the dairy industry home. It is the respect for this amazing animal and her ability to work and provide a living for our clients that motivates the efforts of DNMC. This is a people business, and this is a cow business. DNMC is committed to both.
Who We Are

Steve Martin, MS,
received a BS in Animal and Dairy Science from Auburn University in 1987 and a Masters in Animal Nutrition from Texas A&M in 1989 with a focus on forage production and feeding. Steve served on the research and marketing staff for the National Cottonseed Products Association after graduate school. In 1991, he joined Purina Mills as a field dairy nutrition consultant. Working in this role for 14 years, Steve had the opportunity to work for many large commercial dairies in the southwestern US. The experience with Purina led to a new opportunity to work on the production side of the industry as a member of a dairy management team in the Texas panhandle. In 2006, Steve re-entered the consulting world, but this time as the founder of Dairy Nutrition and Management Consulting, LLC. Steve excels in areas of diet formulation and modeling, feed/milk economics and heifer feeding strategies. After 25 years in the industry, the broad goal of Steve’s effort is to maximize the convergence of biology and economics for DNMC. Steve and his family now make their home in Northern Colorado where he leads the team’s efforts across the western US.

Jay Thurman, MS, PAS
earned his BS in Animal Science from Texas A&M University in 1995 and MS in Animal Nutrition from West Texas A&M in 2000. Jay spent the first part of his career working in the manufacturing, research, sales and technical service of various feed ingredients. Jay’s experience on the supplier side of the industry helps DNMC maintain focus on the feed/milk economics on the dairy. This experience also allows DNMC to ensure the best value delivery of micronutrients in the diets of DNMC client herds. As a result of 18 years of industry experience, Jay brings a high level of professionalism to DNMC. In addition, his nutrition education keeps with the philosophy of DNMC of building a highly qualified team of nutrition professionals. With this background and experience, Jay has excelled as a proven field nutritionist for DNMC. He also manages the implementation of the various services offered by DNMC. Chief among these is the production of each client’s weekly Green Sheet. It is in this role that Jay has gained a valuable perspective of how overall dairy profitability is impacted by milk solids production, ration formulation, ingredient markets and milk pricing. Jay and his family live in the small Texas Panhandle town of Happy.
Erika Vorster

was born and raised in a cattle ranching family in South Africa. She attended the University of the Free State, where she graduated with a degree in Agriculture. After graduation, Erika was employed by the Department of Animal Health, before joining her father on the family ranch. Erika’s first experience with the dairy industry was at her grandfather’s dairy. Though the dairy was small, milking only 20 cows, this experience initiated her interest in the dairy industry. After arriving in the USA, Erika quickly became involved in today’s modern dairy industry. She began on a 2600 cow dairy, where she was exposed to all aspects of the operation. This herd expanded during her employment to milk 4,000 cows. The next step for Erika was the chance to be the overall herd manager of a 1,000 dairy. In both of these roles, Erika became proficient in the use of several types of dairy herd management and feeding software programs. She offers support to DNMC clients in the areas of feed program management, dairy management software and numerous dairy spreadsheet applications. Her dairy management experience is a great “real world” asset for the group. Erika manages the Feed and Milk Model application for DNMC’s clients. Now located back at home in South Africa, Erika is also pursuing a master’s degree from The University of Glasgow in Scotland.

Rob Mensonides

grew up on a dairy in Western Washington and is the eldest of four brothers and the son of a Dutch immigrant. He studied at Washington State University and earned a Bachelor of Science in Agricultural Economics with an Animal Science focus. While attending WSU, he played football and baseball and served as president of FarmHouse Fraternity. Rob also enjoyed being part of CUDS (Cooperative University Dairy Students) were he helped manage the university dairy herd. Growing up on a dairy prepared him well to enter the industry after graduation as a feed consultant for Cargill and then on to Land O’Lakes Purina. In 2006 he joined Agri-King and soon after entered management where he helped grow the brand in the new PNW area. As part of Agri-King, he gained valuable experience in cutting edge forage research and value added product growth. Rob and his wife currently manage a successful farming business. As a hay producer, Rob has a passion for the forage industry and has been successful in managing and marketing organically produced forages and grains from his farm. Rob works with a number of hay farmers and dairymen in the PNW to provide high quality forages. Now as a part of DNMC, Rob’s entrepreneurial character and out of the box attitude have blessed him when helping dairymen look at their businesses with a different and unique perspective. The philosophy of using a team approach and looking at the big picture in business has served Rob and DNMC clients well in staying profitable and sustainable. Rob and his wife live with their two children in eastern Washington.
Kraig Peel
received his B.S. from Angelo State University in 1988, a Master’s of Science from Texas A&M University in 1997 and a PhD from A&M in 2000. Kraig is currently a tenured faculty member at Colorado State University, Department of Animal Science. Kraig began his career as an extension agent in Del Rio, Texas. He then transitioned to ranch management in South Texas before returning to graduate school in College Station. Graduate studies involved general animal performance, reproduction, and meat and muscle biology. Kraig has offered consulting services to the DNMC team during the past year. In this role, he has added value through expertise and experience in livestock production systems and animal evaluation. In addition to completing these important tasks himself, Dr. Peel has been helpful in the process of developing and standardizing the farm visit evaluation task completed by DNMC for its client farms. Kraig and his family make their home in Northern Colorado.

Linda Brittingham
has served on the DNMC team for four years. In addition to various administrative tasks, she is involved in efforts related to mining and summarizing data for various DNMC reports. Linda joined DNMC after more than 10 years of practical day-to-day experience in a dairy office environment. It was in this role that she became proficient at DairyComp, on-farm feeding software management programs, tracking of milk logistics and relating to milk co-ops. This experience allows Linda to manage large amounts of data, summarize these into meaningful bits and actually have an understanding of what the data means. It was the years of managing input at the farm level whether from a clipboard, pocket notebook or Bluetooth scanner that allowed Linda to contribute to DNMC’s value so quickly. Linda and her husband Les make their home in Fort Collins, CO.

Diane Thurman
grew up around livestock and earned a BS in Animal Science from Texas A&M University in 1996. Diane has been a part of the DNMC team for five years. In this role, she is critical in the process of summarizing dairy performance data and communicating these reports to the DNMC team and clients. Diane works in the development and implementation of the DNMC Weekly Green Sheets and the new yearly trend analysis. As well, Diane assists the team with various special projects and is involved in the planning an implementation of the annual DNMC Dairy Summit. Additionally, Ag Advocacy is near and dear to Diane’s heart. Through various outlets, she promotes youth livestock programs, the dairy industry and agriculture in general.

www.dnmcmilk.com
Julie Sauls
Kansas State University

Julie Sauls was raised on a small beef and row crop operation in southeast Illinois and was heavily involved in agriculture from a young age.

Julie received her bachelor’s degree in animal science at the University of Missouri in May 2014. While at Mizzou, Julie was very active in the Dairy Club as well as CAFNR (College of Agriculture Food and Natural Resources) Student Council. During her undergraduate studies, Julie worked in Dr. Randy Prather’s research laboratory investigating genetically altered swine. She also assisted with dairy nutrition and reproductive trials in Dr. Mathew Waldron and Dr. Mathew Lucy’s laboratories.

After undergraduate graduation, Julie began attending Kansas State University to fulfill the requirements for a master’s degree in animal sciences under the advisement of Dr. Jeffrey Stevenson. The subject of her thesis research relates to increasing the expression of estrus of lactating dairy cows exposed to varying concentrations of steroid hormones. Julie will begin a PhD program this fall under the advisement of Dr. Barry Bradford and Dr. Jeffrey Stevenson investigating nutrition and reproduction interactions in lactating dairy cattle.
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Feeding for the Bottom Line

Finding the sweet spot

by Steve Martin

I HAVE lived in four different land-grant college towns in my life, and have always felt at home in the atmosphere that surrounds them. In addition to the culture of college sports, land-grant institutions also have an abundance of ag folk and a vet school to attract a type of people make for good neighbors.

Not only do you have an agriculture student... farmer employees and the like in most land-grant college towns, you also have a bunch of engineers. They are the reason for the M in A&M. Well, “mechanical” to be precise, but I suppose engineering is the more modern word. As these folks I like to discuss the different worlds of the engineer and the agriculturalist. This difference is best described when attempting to explain the various uncertainties that exist in nature, and thus in agriculture.

Unlike physics and engineering where 45 degrees plus 45 degrees always equals 90 degrees, and where one pound plus one pound always equals two pounds, agriculture scientists work in a world where things are a little less certain.

To be sure, there are laws that exist and govern the biological realities that we try to predict, but it’s safe to say we have a long way from really understanding it all.

Is it all just random?

I made a comment to a client recently that I am not sure was very well received. When reviewing rations and then studying records that would partially judge the success of those rations, I made the following comment: “At times I feel like if at the end of my lifetime someone said to me, ‘all of the work you did on rations really had no substantive impact on the cows. It was all just random. All the work you did was just to manage inventories and keep you busy.”

A shocking thought. But really, don’t we all wish we knew the variables and unexpected changes that are having a big influence on the success of our diet formulations.

I often describe the way we manipulate cows nutritionally would look like a cow with an abundance of knobs under her hide. As a nutritionist, we slip our hands inside to tweak and adjust some of the knobs with great accuracy; often just one click at a time. We spend a tremendous amount of time keeping maybe 20 or so knobs in perfect balance.

But since we really can’t see under her hide, there are numerous other knobs that we don’t even know exist.

When attempting to explain the various uncertainties that exist in nature, and thus in agriculture.

Unlike physics and engineering where 45 degrees plus 45 degrees always equals 90 degrees, and where one pound plus one pound always equals two pounds, agriculture scientists work in a world where things are a little less certain.

To be sure, there are laws that exist and govern the biological realities that we try to predict, but it’s safe to say we have a long way from really understanding it all.

Finding the sweet spot

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But since we really can’t see under her hide, there are numerous other knobs that we don’t even know exist. Much less how to adjust them for maximum performance. This should be humbling even to the most confident among us.

This is all a bit hyperbolic and I don’t want to disregard the volume of dairy nutrition research that has been done over the last 100 years or so. The significant gains in production per cow that have greatly reduced the number that are needed to supply milk are a testament to this. Even so, I still can’t put a 79 net energy of lactation (NEL) ration in front of my client and promise that it will gain them the two extra pounds of milk needed to cover the cost and offer a decent return on investment compared to the 77 NEL diet that is in the bunk today.

It’s just not that simple.

That’s the bad news, but as always there is an upside. The good news is the cow’s biological momentum is to make milk – exactly what we want her to do. What we have to do as nutritionists is to come alongside and support this effort. We don’t need to know every detail, but we must work hard to, above all, do no harm.

Since we are not blessed with the exact math and laws of physics enjoyed by our engineering friends, we are in constant search for what you might call the sweet spot.

It is often said that feeding cows is both an art and a science. The science side leans on and is governed by the nutritional principles, and is applied to the cow through the series of knobs I mentioned earlier. The art side is what experience has taught us about the situation with the other knobs that we don’t know exactly how to dial or even know what or where they are.

In dairy nutrition, and in ruminant nutrition in general, the sweet spot usually has to do with fine tuning the feeding process that is ongoing in the rumen. The great thing about looking for this in a dairy cow is that she can give us feedback as quickly as tomorrow.

Rules perpetually change

In a modern dairy where we measure nearly everything every day, we can really learn about the little tweaks we make in some ingredients. The perfect diet. But unlike the unchanging realities, laws and principles that sometimes can be a little less certain.

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In dairy nutrition, and in ruminant nutrition in general, the sweet spot usually has to do with fine tuning the guide the engineering world, the rules in feeding dairy cows are in a state of perpetual change.

You may have finally found the sweet spot and what you think is the perfect ratio, just in time for a village pot change, or all of your hard work is being overwhelmed by the onset of heat stress. There is a sound nutritional principle that may be the inter working of the coveted sweet spot. It is called associative effects.

As we build diets in a dynamic environment, we always keep in mind what impact one ingredient has in the ration. These relationships between ingredients are mostly related to how they work together to maximize rumen fermentation and kinetics.

Most dairy producers understand the fermentation part. The kinetics part is a bit more elusive. In short, rumen kinetics describe the amount of time feed ingredients stay in the rumen and how they move around before being fully fermented and washed out. The best example of these positive associative effects is to have to do with rumen fermentation and kinetics.

Could they give a bit more?

Let’s say you have a reasonably successful ration situation with 55 pounds of intake of a 79 NEL diet and 80 pounds of energy-corrected milk in a pen of early to mid-lactation cows. This isn’t a bad situation, but you have the feeling the cows could give a little more from such a high energy ration.

Upon further inspection after spending some time in the cows, you decide the manure is okay, but it is a little loose. In general, this team suggests adding one pound of straw and replacing three pounds of the candy alfalfa with three pounds of medium quality alfalfa that has a little stem to it. After putting these ideas into the computer model you find that NEL has dropped from 79 to 77.5.

Hmm, is this okay?

The decision is made to make the change and let the cows give their opinion. A week later the result is slightly lower intake, two pounds more milk, and nicer, more consistent manure. But how can this be with a lower NEL? Wasn’t there a reduction in energy intake?

Yes, if you measure it simply from a gross energy standpoint. But the cows told you the truth about the net energy that is available for them to make milk.

In short, the addition of straw and “cooling down” the alfalfa made the rumen a happier place. The positive associative effect of the roughage change improved the rumen environment and allowed for more complete fermentation of all the other ingredients in the ration. The next time you do a manure screening you should not be surprised to see less undigested corn and whole cottonseed.

As we look for the sweet spot when building dairy diets, much of the wisdom comes from previous experience that could be described as art not science. But when looking a little deeper, maybe there is more science in that art than you first thought.

Understanding how different combinations of ration ingredients impact each other is not as much art as it is leaning on the science of positive associative effects. Respecting both the science and art of building rations will insure that you are truly feeding for the bottom line. WEST

The author is the founder of Dairy Nutrition and Management Consultants, LLC, which works with dairies and heifer growers in Texas, New Mexico, Kansas, Colorado, Washington, and California.
Are we feeding what we formulate? (part 2)

When I hear the word “compliance” and the phrase “procedural drift” in a dairy production environment, I can nearly guarantee the subject is either reproduction or milking. As technology on dairies has become more complex, the need to build systems and protocols to be sure of success has become paramount.

When dealing with getting cows pregnant, it is a must that the human effort and technology used are well co-ordinated. The biological and reproductive system of a cow. Though we can’t “restart” her monthly clock, the uterus and ovaries are still in charge. The intended result is a confirmed pregnancy.

Similarly, in the milking parlor there is a confluence of people, machines, pulsation, vacuum, and a clock that are all coordinated to harvest milk the way the cow’s udder is designed to work. Success is measured by milk flow, somatic cell count and the health of the udder.

In both instances, while considering the cow’s reproductive organs and hormones along with more hormones and the mammary system, we build very specific protocols to work along with biological systems to achieve the intended results: a pregnancy and high quality milk. So compliance in these areas is necessary to obtain the desired goals and it involves training and re-training. The reality of procedural drift and employee turnover result in a nearly constant state of perpetual schooling.

I don’t think we’ve taken this same level of effort and attention to detail into the feeding center. Sure, we talk about loading errors and mixing time and we have feeder schools, but have we really respected the mixer wagon as an instrument of dairy production on the same level as we have the uterus and the udder?

Instead of details related to calves, CLA, milk let-down, etc., the mixing effort relates to knives, augers, kickers, RPMs and capacity. There is no less effort involved in making a near-perfect TMR load than there is to get a cow pregnant or to milk her out correctly. Food-mixing details and protocols need just as much attention and training. Loading order and knife size of the desired mix may top the list of details. At what volume was the mixer designed to mix well? It is likely not the level at which food starts falling over the edge. Exceeding the desired amount reduces the chance of a well-blended TMR. This must be checked just as regularly as pen counts. Intakes and ration density changes. Just because it was right when you set up the load in your software doesn’t mean it will be right a month from now.

There are two goals at work here and the issue of mix filler relates to both. We first need the mixer to completely blend the added ingredients so each bite is uniform. Usually, but not always, some particle size reduction is required. If we have the correct amount of space filled inside the mixer, no matter the pounds, then these two things can happen successfully.

One challenge is that some ingredients need more particle size reduction than others. So, intuitively, we put the longer ingredients in earlier to give them more time for cutting. But this is where the mixer differs from the uterus or udder. Whereas every cow has the same rules related to breeding and milking, every TMR mixer is different. And every mixer is even different from itself over time. Metal years and must be taken into account. So mixing time, loading order, and total load size are all moving targets!

My early years of formulating dairy diets were spent in and around Stephenville, Texas. In the early 1990s this was a growing dairy market where the local cow count had far outpaced local forage growth and was missing a lot of alfalfa hay. So, lots of it. Whereas most of my current diet formulations contain 0 to 10 pounds of hay, those early-90s Stephenville rations contained as much as 20 pounds.

Understanding newer technology now about things like snDF and sSNDF, I now see how both diet types work. But the mixing approach then compared to the mixing approach now couldn’t be more different. Likewise, the desired shaker box results are quite different.

We used horizontal mixer boxes to nicely blend high quality alfalfa hay to build a nice, but hairy, TMR that kept cows healthy and supported good milk production. Now, some 25 years later, I don’t run into many horizontal mixers. The ability of vertical mixers and their more aggressive cutting ability has allowed for a variety of low roughages to be easily processed and nicely blended for better consumption. But at what cost?

Is there a downside to those aggressive, high-RPM cutting blenders?

I recently added a new client and at my first visit to the farm I was surprised to see a horizontal mixer wagon. I must admit I was a little disappointed. It had been quite some time since I had seen one at a large dairy. I also saw the mixer before I saw the TMR in the bunk, and I wasn’t sure what to expect. As I turned the corner toward the first feed lane I must say I was quite surprised.

In the bunk was a nice, bulky ration. I stood and contemplated this. My first impression had less to do with the ration I was looking at and more about other rations I see every day that are built using aggressive vertical mixers with knives and kickers all around. It made me ask myself, “Are we over-processing corn silage in most if not all rations?”

When looking at that nice bulked-up (not too much), fluffy (but not too fluffy) and really nice TMR, I became convinced that the aggressive mixing being done with most vertical mixers is heating up the corn silage.

In shaker box lingo, vertical mixers take corn silage roughage and move it from the second shelf to the third. This horizontal TMR mixer that blends doesn’t cut leaves the ¼ inch theoretical length of cut pretty much unchanged from the chopper in the field all the way to the cow’s mouth. And these particles stay in the second shelf of the shaker box.

This really made an impression on me. No matter if it is corn silage, sorghum silage, or small grain silage, the chop length at harvest is likely the correct length in the bunk. It is nearly perfect for maintaining cow health and supporting high intake for high milk production.

So what am I to do with all of the revelations from that day? Well, I am not suggesting everyone run to the dealership and trade in their vertical mixer. But what can we learn from my observation? Sure, vertical mixers complete with knives are necessary for bulkier dry cow and heifer rations. And these same mixers are used to make lactation loads. So the more logical question is how can we minimize over-processing but still take advantage of the mixing power of verticals?

The answer is to go back to the basics of loading order, load size, mixing time, and use of knives. In nearly every case it is advisable to put high-inclusion roughages as late in the order as possible to preserve particle length. In addition, mixing even one minute past complete blending means over-processing begins and should be avoided. Knife management is also driven by the goal of chopping just enough to get the material completely blended and taking great care to not over-cut.

Knife replacement is also a point of potential failure in providing a healthy TMR. They should be changed on a strict schedule, with the goal to maintain a certain “cutting ability” that matches the type of roughages used at the dairy. Be sure to never change out all knives at once. The cows will likely let you know after making such a mistake.

The “edgy” recommendation that could be made here is every dairy needs to have two types of mixers. One would be for mixing high-silage, high quality alfalfa lactation rations that just need blending with little or no cutting. Another mixer could look like a cutlery convention on the inside that can easily transform the roughest forages into nice, palatable dry cow or heifer rations.

But since this two-wagon approach would be a hard sell even on the largest dairies, a better recommendation is to use techniques that insure the wagon used for milk cows is not over-processing roughages.

We often wonder why we have some gut issues in cows even on very well managed dairies. Some of the answer may be in this discussion. Cows were designed to eat roughage that hangs out both sides of their mouths when being eaten. This long material does what was recently described to me by a dairy herdsman as, “it keeps the rumen busy”.

What a great description by a guy who has had to stay late before doing DA surgeries or pumping pink pills into cows. We can’t forget that those cows need roughage first and nutrient density second.

The next time you meet with the breeders to discuss and implement a new shot protocol, or when you are designing a detailed milking procedure poster for the breakroom, ask yourself this question. “Have I gone to the same amount of effort designing protocols and picking the correct equipment to build, mix, and deliver the best rations to my cows?” Making real improvements in this key area of the dairy will insure that you are feeding for the bottom line.

The author is the founder of Dairy Nutrition and Management Consulting LLC, which works with dairies and heifer growers in Texas, New Mexico, Kansas, Colorado, Washington and California.
**Why Do We Do It?**

Agriculture is a very unique business to be involved in, for many reasons. Many variables that are completely uncontrollable have an enormous impact on our productivity.

The emotional considerations are real and meaningful, and often contrary to decisions based solely on economics. Environmental impacts are real and meaningful and they too are often contrary to decisions based solely on economics. Animal welfare considerations are real and meaningful and again, often contrary to decisions based solely on economics.

Notice the pattern developing here? The production of inanimate widgits for profit considers very objective parameters to determine the direction of the business. Agriculture and more specifically animal agriculture must consider the cost of all decisions not only in dollars but in the prism of stewardship of God’s creation both plant and animal. The responsibility is great, the volunteers are few, the economical reward is sporadic and risky, and the long term impact is extraordinary in scope.

“I know of no pursuit in which more real and important services can be rendered to any country than by improving its agriculture, its breed of useful animals, and other branches of a husbandman’s cares.”

**GEORGE WASHINGTON, letter, Jul. 20, 1794**

There is no doubt a different standard for the agriculturist as compared to most other professions in society. Balancing stewardship, profitability and the responsibility of feeding a nation (and world) is not for the faint hearted. Genetic advancements, mechanical improvements and technological growth continue to move our capability forward to achieve the ever increasing demands of food and fiber. The innovation and efficiency improvements that develop from the minds of men and women directly involved in the agricultural process everyday are vital to keep up with the requirements from the world that never stop increasing.

It is easier to be a good steward when prices are high and profits are healthy. Spending money to take good care of the animals under your care, making sure you are doing all that you need to environmentally to safeguard the earth from any harmful byproduct that results from your operation. When the markets go south is when the hard decisions begin. Finding the balance between “adequate” and “unacceptable” in animal comfort and environmental accommodations, while never losing sight of the actual monetary cost involved. Trying to make a living in animal agriculture sometimes just isn’t fair! But it is what we signed up for when we got into this business to begin with - and most of us wouldn’t trade it for anything. There are certainly challenges in most agricultural markets today. Opportunities abound to prioritize the most important aspects of the business while relegating the trivial to the end of the line.

Why do we do it? I will let you answer that question specifically for your operation – but I imagine I speak for the majority when I say we do it because we love it, because it is in our blood, because we feel a special responsibility to take care of our brothers and sisters in this world. Thank you for fighting the fight through good times and bad. Thank you for doing what you do, and thank you for understanding and accepting the responsibility that doing the right thing trumps the urge to base every decision solely on its impact on the bottom line.
Ration Consistency

Straight to Your Bottom Line

The Penn State particle separator, or the way most people refer to it “the shaker box” is a useful, but sometimes frustrating tool. It is easy to fall into the trap of thinking we can find the “ideal” ratio between the boxes and it becomes our goal to make every ration fit into that “ideal” breakdown. The fact of the matter is, each dairy has its own unique feedstuffs and ration mixing capabilities and its own unique cows for that matter. And although general guidelines are helpful, each dairy should have its own relative shaker box targets and not rely solely on general all-encompassing targets as its goal.

For those who are unfamiliar with the shaker box, it is 3 or 4 trays (we use 4 trays) that stack on top of each other with different sized openings in each tray to separate the different particle sizes in a TMR. Then the feed in each tray can be weighed and the physically effective fiber (peNDF) portion can be objectively measured. It gives us the ability to quantify ration length and bulk, instead of “too short”, or “too long and sortable” we have the ability to put a number to the measurement. “The high cow ration has 16% peNDF, we need to add some length to it and get it to an 18% peNDF.”

Now the next phase is – How do we add length to the ration? The answer is - it depends. Is the ration being mixed properly but the ingredients are just too short to begin with? Or are the feedstuffs long enough, but we are over processing in the mixer and creating a ration that is too short? The answer to this question is obviously important as we determine the corrective action to implement. Recently, at a couple of different dairies we work with this very issue was illustrated very nicely. The exact same ration was implemented on both dairies. Forages come from a common source, but each dairy is equipped with its own mixing capabilities. At dairy #1 it was determined that the ration contained 19.3% peNDF. However, dairy #2 was determined to have a 16.1% peNDF ration. Exact same ration formulation with common forages. That is a big difference, especially on the same ration. Dairy #1 was getting 15% more peNDF out of the same ration. Obviously, there is plenty of length to work with from the ingredients we start with, so the issue seems to be over processing at dairy #2. How do we correct that? Mixing time, mixing order, premixing, number of knives, kicker plates, wear and tear, etc…

The point is not whether we need to be feeding a 16% peNDF or a 19%peNDF ration, the point is that rations change for the cows many times even when we don’t do anything differently with the formulation. People are important, processes are important, equipment is important, measuring change is important, because cows love consistency. The more we understand about where inconsistency can come from the better equipped we are address and minimize those negative impacts. Consistent, boring and monotonous might not be how you would describe a good time but to your cows it means efficiency- and that efficiency will go Straight To Your Bottom Line.
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