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Highlights of the 1996 Mid-South Ruminant Nutrition Conference

Ellen R. Jordan, Ph.D.
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The 1996 Mid-South Ruminant Nutrition Conference was held in May. Following is a synopsis of the three major segments of the program.

On-Farm Feed Mixing

As dairies have grown larger, more and more have switched to total mixed rations and on-farm feed mixing. As a result, quality control becomes an additional management responsibility and key to overall success and profitability of a dairy operation.

Dr. Reed Richardson, Texas Tech University, outlined steps to a quality control program.

- Develop specific sampling procedures for all feed ingredients coming onto the farm.
- Establish a sample retention schedule for all ingredients and mixed feeds.
- Determine routine analysis needs for each ingredient.
- Train personnel to ensure quality of feed produced.
- Test all scales and metering devices for accuracy upon installation and at least once a year.

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- Construct and maintain equipment to prevent lubricants and coolants from contaminating ingredients or feeds.

- Install equipment properly, meeting safety standards.

- Follow proper procedures for drugs and premixes.

Mixing uniformity is an issue with many total mixed rations. Ration mixing and uniformity can be influenced by a number of factors, according to Keith C. Behnke, Kansas State University. The general recommendation is that feed variation be less than 10%; however, only about half the samples from commercial feed mills in one study met this standard.

Drought Tip

Check grains harvested from drought stressed crops for aflatoxin. For more information on aflatoxins, refer to the October 1995 *Balanced Dairying*. It's on the Web Site.

Ration uniformity is important because if diets are deficient, animal performance is compromised. In addition, when nutrients or feed additives are added in excess of requirements to compensate for poor mixing, the cost goes up unnecessarily. And in some extreme cases, animals can receive toxic levels of an ingredient, Behnke said. There is very little published information on the effects of nutrient uniformity on animal performance, particularly in cattle where the meal size is larger. Several Kansas State studies with non-ruminants has shown that the youngest animals consuming the smallest meals were most affected by ration uniformity.

Behnke identified these factors as contributing to non-uniform rations: ingredient characteristics, insufficient mix time, mixer overload, worn or broken mixing components, ingredient build-up, and improper sequence of ingredient additions. He recommended routine testing for nutrient uniformity and mixer performance. A goal of less than 10% variation should be set.

Improving Rumen Function

Fiber, carbohydrates and amino acids all influence the ability to optimize rumen function. Traditionally, neutral detergent fiber (NDF) and acid detergent fiber (ADF) have been used routinely in balancing rations. More recently, nutritionists have begun to use physically effective NDF to try to account for the differences in fiber effectiveness which have been due primarily to differences in particle size, and whether the fiber source was from forage or grain.

Mike Allen, Michigan State University, recommended the amount of neutral detergent fiber required in the ration be adjusted up or down from 30% depending upon the following factors: forage particle size, by-product feed utilization, frequency of grain feeding, ruminal starch digestibility, buffers, fiber digestibility and added fat. If there is variation in forage dry matter and quality, additional adjustments need to be made.

By ensuring that adequate effective fiber is available, rumen fermentation efficiency, microbial protein production and energy intake should be enhanced, thus resulting in increased milk production and decreased ration costs.

As we learn more about feeding ruminants, we find that guidelines for nutrient composition of rations need to be expanded to include amino acid (AA) requirements. By providing the optimal amino acid blend, the crude protein content of the ration may be decreased without compromising productivity. According to Charles Schwab, University of New Hampshire,

this reduction in protein results in decreased ration costs, decreased metabolizable energy being used for urea synthesis, and increased "space" in the diet for other nutrients.

Drought Tip

When it rains, beware of prussic acid poisoning.

Schwab's recommendations for ration formulation include:

- Follow feeding recommendations to maximize rumenal fermentation and synthesis of microbial protein.
- Consider differences in intestinal digestibility of rumen undegradable protein sources.
- Do not over-feed rumen undegradable protein.Select protein supplements with the goal of maximizing lysine and methionine in ruminal undegradable protein. Manipulate the proportions of feed proteins to achieve a predicted lysine/methionine ration in absorbable amino acids that approximates 2.8-3.0/1.0.
- Use rumen-protected amino acids, in conjunction with protein supplements to achieve desired levels of lysine and methionine in absorbable essential amino acids.
- These products ***should not*** be fed unless diets have been evaluated appropriately, and animal responses can be predicted and measured.

Before using feed additives to improve productivity, it's advisable to feed the cow to maximize rumen function by providing the proper amount and form of proteins, carbohydrates and fiber, according to William Hoover, West Virginia University. He recommended feeding 11 to 12% degradable intake protein (DIP) and 40 to 50% of the DIP should be from a soluble source (DM basis). The remaining crude protein needed should be from an undegradable intake protein source.

Drought Tip

Beware of high nitrate levels in drought stressed corn silage. Ensiling reduces nitrate levels, but test for nitrates after the corn has fermented. See page 5 for more nitrate information.

Carbohydrates must be balanced to ensure a continuous source of energy for microbes. Non-fiber carbohydrates should provide 35 to 40% of the diet dry matter, indicated Hoover. Use a mixture of sources with fast to moderate fermentation rates.

Ration NDF should be between 27 and 34% and, again, both rapid and slowly fermented sources should be used.

Raising Heifer Replacements

Dairy heifer rearing continues to be a challenge for many producers. According to J.L. Morrill, Kansas State University, some of the most common problems include: failing to ensure adequate colostrum intake soon after calving and for the first few days of life; using low quality milk replacers; using low quality calf starters and poor management of the starter; failing to provide proper management to allow early weaning; and poor nutritional management after weaning.

Current Dairy Projects at Texas A&M

Faries, Floron. Assessment of the impact of confined animal feeding operations (CAFOs) on infectious Cryptospridium species in watersheds.

Greene, L. W., M. A. Tomaszewski, E. M. Sudweeks, E. R. Jordan, and S. R. Stokes. Reducing nitrogen and phosphorus loading from dairy cattle production systems.

Greene, L. W., M. A. Tomaszewski, E. R. Jordan, E. M. Sudweeks, and S. R. Stokes. Implementation of innovative best management practices and a nutrient monitoring system to reduce nitrogen and phosphorus loading from dairy cattle production systems.

Harms, P. G., J. S. Bluntzer, and D. W. Forrest. Fertility in dairy cows inseminated by estrous detection or by appointment in response to hormonal regulation of follicular development.

Jordan, E. R., S. R. Stokes, and E. M. Sudweeks. TQM practices on the dairy farm. A national program.

Jordan, E. R., S. R. Stokes, and E. M. Sudweeks. Ration particle size evaluation as a management tool.

Kasari, T.R. and M.A. Tomaszewski. Foot/lameness survey.

Kinney, Amy. Warm and cool-season annual forage systems for utilization of solid dairy manure.

Magee, D. Detection of Salmonella in bulk milk.

Magee, D. Survey of the State of Texas bulk milk supply for Salmonellae using culture, PCR, and FTIR.

Magee, D. J-5 vaccination study to look at gram negative bacteria's impact on reproduction.

McFarland, M. J. and others. Energy production from animal waste biogas.

Roe, N. and G. Cornforth. Utilization of fresh and composted dairy manure on vegetable crops.

Roe, N. The effects of varying nitrogen rates with dairy manure compost on double-cropped vegetables.

Roe, N. Cheese whey land application project.

Roussel, A. Effect of tolfenamic acid on E.coli heat-stable enterotoxin-induced diarrhea in calves.

Sanderson, Matt. Forage, biomass, and biogas integrated systems for animal waste management.

Editor's Note: From time to time we receive inquiries as to what research is going on at Texas A&M University that pertains to dairy. This list highlights dairy related project across several departments. In future issues of Balanced Dairying, we will highlight different projects that are either in progress or which have been completed.

Nitrates In Dairy Cattle Feeds

E. Max Sudweeks, Professor and Extension Dairy Specialist

Nitrates in feeds and water can be poisonous to dairy cattle and other livestock. The following information taken from the Penn State Dairy Reference Manual will help to properly evaluate nitrate problems.

Guide to Possible Safety of Forages with Varying Nitrate Content[1].

Content of Nitrate Ion (dry-matter basis)	Comment
(%)	
0.0 to 0.44	Considered safe to feed under all conditions.
0.44 to 0.66	Safe for non-pregnant animals under all conditions. For pregnant animals, limit to 50% of the total dry matter in the ration.
0.66 to 0.88	Limit to 50% of the total dry matter in the ration.
0.88 to 1.54	Limit to 35 to 40% of the total dry matter in the ration. Feeds reaching this level should not be used for pregnant animals.
More than 1.76	Feeds with more than 1.76% nitrate ion are potentially toxic. Do not feed.

[1]Should be tempered by nitrate and nitrite content of the water supply. A total intake of more than 30 g of nitrate ion per cwt body weight of normal animals may result in acute toxicity and possible death. Levels of 8 to 22 g of nitrate per cwt bodyweight may result in acute toxicity if animals are undergoing a change in feed or have otherwise impaired rumen metabolism. Nitrites may be six to eight times as toxic as nitrites and are more apt to occur in water. Silo gas is more often involved in animal problems than nitrites *per se*. Most problems of toxicity result from levels exceeding 1%.

Dairy Extension Home Page

Texas A&M Dairy Extension has a home page:

http:/www.dairyext.tamu.edu

TEXAS SUMMARY FOR MARCH 1996

Information Summarized	3/31/95	2/29/96	3/31/96
DHI-DHIR Herds (cows)	486	410	404
DHI-DHIR Cows	120,884	112,287	112,692
Avg. Milk/Cow/Day	54.5	54.4	56.3
Avg. Percent Fat	3.6	3.6	3.6
Avg. Fat/Cow/Day	1.99	1.98	2.03
Avg. Feed Cost/Cwt. Milk	5.54	5.81	5.67
Private Herds	103	86	88
Private Cows	26,273	24,437	25,027
DHI-DHIR Herds (goats)	25	46	51
DHI-DHIR Goats	429	747	730
Total Herds Enrolled	614	542	543
Total Animals Enrolled	147,586	137,471	138,449

High DHI Herds.....Michael A. Tomaszewski

These rankings are furnished by the DRPC at Raleigh for a given period of time. If a herd was tested late one month, it may cause that herd's average not to appear on that month's listing. The average would then be compared to other herd averages in the next month. Herds are ranked by test day averages for all cows. Only official herd averages are used. String averages are not used if they are not official. We have no control over how the herds appear on this list since it is a computer listing.

Ranking by Protein

Herd Owner	Milk (lbs)	Protein (lbs)
* 2X/Day Milking		
Frank Wolf	84.9	2.64
Jimmie & Lydia Bowen	76.5	2.54
Moer-Milk Dairy	75.5	2.45
Lawrence Schroeder	78.6	2.42
Jerry Vieth	76.8	2.41
Larry K Martindale	76.3	2.35
Ted Conrady Dairy	71.6	2.35
Popham Dairy Inc	69.4	2.30
Charles H Vieth	67.9	2.30
* 3X/Day Milking		
Ray Johnston	77.7	2.51
Robert Steinberger Sr	75.5	2.50
Ernie Prescher	81.1	2.45
Alan Caddell	73.4	2.42
John Koster Dairy	73.6	2.41
David Lawrence	81.3	2.40
H U Degroot	74.1	2.38
Gerrard Hoekman	72.1	2.37

Ranking by Milk

Herd Owner	Milk (lbs)	Fat (%)	Protein (%)
* 2X/Day Milking			
Frank Wolf	84.9	3.1	3.6
Lawrence Schroeder Dairy	78.6	3.5	3.1
Jerry Vieth	76.8	3.6	3.2
Jimmie & Lynda Bowen	76.5	3.5	3.3
Larry Martindale	76.3	3.6	3.1
Moer-Milk Dairy	75.5	3.9	3.3
James Veitenheimer Dairy	74.5	4.0	3.1
Kupper Bro Dairy	72.1	3.8	3.2
* 3X/Day Milking			
David Lawrence	81.3	3.7	3.0
Ernie Prescher	81.1	3.4	3.0
Ray Johnston	77.7	3.5	3.2
Robert Steinberger Sr	75.5	3.8	3.3
H U Degroot	74.1	3.6	3.2
Guy & Lori Viss	73.8	0	0
John Koster Dairy	73.6	3.3	3.3
Alan Caddell	73.4	3.4	3.3

Top Ten 305-Day Lactation Records

Following are the ten highest DHI mature equivalent, 305-day lactation records for butterfat production reported to the Extension Dairy Science office during March from the Processing Center at Raleigh, North Carolina.

Herd Owner	Cow Identity	Breed	Date of Birth	% Fat	ME Milk	ME Fat
Nico Deboer	3788811	J	10-20-92	8.4	19,926	1433
Russel & Linda Carpenter	74WDK1487	H	04-29-93	4.6	29,762	1383
Hinders Dairy Inc	74WDE7736	H	11-15-91	4.1	31,660	1280
Nico Deboer	3772050	J	09-26-90	5.0	25,549	1257
Hinders Dairy Inc	14431398	H	12-18-90	4.4	27,572	1225
Hinders Dairy Inc	14724741	H	02-01-92	3.9	31,486	1220
James Veitenheimer Dairy	74WDM7321	H	10-18-92	4.6	27,003	1220
Hinders Dairy Inc	14078803	H	01-25-90	3.6	33,956	1217
Moer-Milk Dairy	15154305	H	12-15-92	4.2	29,033	1217
Rio Grande Dairy	74HDL3317	H	08-27-90	4.8	28,402	1215

TEXAS SUMMARY FOR APRIL 1996

Information Summarized	4/30/95	3/31/96	4/30/96
DHI-DHIR Herds (cows)	486	404	401
DHI-DHIR Cows	121,637	112,692	112,848
Avg. Milk/Cow/Day	53.9	56.3	56.6
Avg. Percent Fat	3.6	3.6	3.6
Avg. Fat/Cow/Day	1.95	2.03	2.03
Avg. Feed Cost/Cwt. Milk	5.62	5.67	5.94
Private Herds	99	88	87
Private Cows	26,770	25,027	24,872
DHI-DHIR Herds (goats)	55	51	63
DHI-DHIR Goats	969	730	892
Total Herds Enrolled	640	543	551
Total Animals Enrolled	149,376	138,449	138,612

High DHI Herds.....Michael A. Tomaszewski

These rankings are furnished by the DRPC at Raleigh for a given period of time. If a herd was tested late one month, it may cause that herd's average not to appear on that month's listing. The average would then be compared to other herd averages in the next month. Herds are ranked by test day averages for all cows. Only official herd averages are used. String averages are not used if they are not official. We have no control over how the herds appear on this list since it is a computer listing.

Ranking by Protein

Herd Owner	Milk (lbs)	Protein (lbs)
• 2X/Day Milking		
Frank Wolf	87.8	2.80
Moer-Milk Dairy	77.5	2.56
James Veitenheimer Dairy	79.0	2.52
Jerry Vieth	75.6	2.45
Bobby J Traweek	67.9	2.39
Lawrence Schroeder Dairy	77.5	2.33
Jimmie & Lynda Bowen	71.1	2.32
Mark Luig	71.2	2.31
• 3X/Day Milking		
Ernie Prescher	86.6	2.61
Dan & Janet Martin Dairy	81.5	2.61
High-Hill Dairy LLC	75.9	2.59
Ray Johnston	79.7	2.55
David Lawrence	77.0	2.43
Robert Steinberger Sr	73.6	2.42
John Koster Dairy	72.9	2.41
Gosse & Aafke Damstra	71.7	2.37

Ranking by Milk

Herd Owner	Milk (lbs)	Fat (%)	Protein (%)
• 2X/Day Milking			
Frank Wolf	87.8	3.5	3.2
James Veitenheimer Dairy	79.0	3.6	3.2
Moer-Milk Dairy	77.5	3.7	3.3
Lawrence Schroeder Dairy	77.5	3.3	3.0
Jerry Vieth	75.6	3.6	3.3
Harold Schreiber Dairy	74.4	3.3	3.1
Jeff Conrady Dairy	73.4	3.8	3.1
Kupper Bro Dairy	73.2	3.6	3.1
• 3X/Day Milking			
Ernie Prescher	86.6	3.5	3.0
Dan & Janet Martin Dairy	81.5	3.7	3.2
Ray Johnston	79.7	3.5	3.2
David Lawrence	77.0	3.8	3.2
High-Hill Dairy LLC	75.9	3.7	3.4
Robert Steinberger Sr	73.6	3.6	3.3
Volleman Brothers	73.5	0	0
John Koster Dairy	72.9	3.3	3.3

Top Ten 305-Day Lactation Records

Following are the ten highest DHI mature equivalent, 305-day lactation records for butterfat production reported to the Extension Dairy Science office during April from the Processing Center at Raleigh, North Carolina.

Herd Owner	Cow Identity	Breed	Date of Birth	% Fat	ME Milk	ME Fat
Douwe Plantinga	74PLS0062	H	05-00-91	4.0	32,755	1287
George De Vries	74WDH9258	H	09-25-90	4.2	30,461	1267
Hinders Dairy Inc	13901428	H	10-27-89	4.1	30,747	1247
Gary Dempsey	74WDR7058	J	04-10-93	4.8	26,296	1245
Dan & Janet Martin Dairy	46VES8708	H	11-10-92	5.2	25,512	1237
James Veitenheimer Dairy	14940753	H	12-06-91	4.1	30,305	1219
Hinders Dairy Inc	15163699	H	01-15-92	3.7	33,130	1204
Dan & Janet Martin Dairy	35TAF0483	H	10-10-90	4.2	28,611	1199
John E Denton	14648112	H	11-14-91	4.0	30,106	1193
Frank Wolf	14324968	H	12-11-90	3.8	31,144	1186

TEXAS SUMMARY FOR MAY 1996

Information Summarized	5/31/95	4/30/96	5/31/96
DHI-DHIR Herds (cows)	483	401	393
DHI-DHIR Cows	121,574	112,848	112,521
Avg. Milk/Cow/Day	51.7	56.6	54.8
Avg. Percent Fat	3.5	3.6	3.5
Avg. Fat/Cow/Day	1.85	2.03	1.95
Avg. Feed Cost/Cwt. Milk	5.69	5.94	6.26
Private Herds	93	87	84
Private Cows	26,019	24,872	24,345
DHI-DHIR Herds (goats)	63	63	68
DHI-DHIR Goats	1084	892	918
Total Herds Enrolled	639	551	545
Total Animals Enrolled	148,677	138,612	137,784

High DHI Herds.....Michael A. Tomaszewski

These rankings are furnished by the DRPC at Raleigh for a given period of time. If a herd was tested late one month, it may cause that herd's average not to appear on that month's listing. The average would then be compared to other herd averages in the next month. Herds are ranked by test day averages for all cows. Only official herd averages are used. String averages are not used if they are not official. We have no control over how the herds appear on this list since it is a computer listing.

Ranking by Protein

Herd Owner	Milk (lbs)	Protein (lbs)
• 2X/Day Milking		
Frank Wolf	79.1	2.48
Moer-Milk Dairy	76.2	2.43
Hinders Dairy	75.1	2.34
James Veitenheimer Dairy	74.6	2.27
Wes Vieth	71.0	2.25
Jones Dairy	68.9	2.23
Jeff Conrady	71.4	2.22
Leo Hoff Jr	69.8	2.21
• 3X/Day Milking		
Dan & Janet Martin Dairy	82.0	2.62
Ernie Prescher	81.0	2.48
High-Hill Dairy LLC	72.7	2.34
Ray Johnston	74.1	2.31
Larry K Martindale	73.8	2.25
Robert Steinberger Sr	71.5	2.24
Harry DeWitt	70.1	2.21
Gerrard Hoekman	68.8	2.19

Ranking by Milk

Herd Owner	Milk (lbs)	Fat (%)	Protein (%)
• 2X/Day Milking			
Frank Wolf	79.1	3.9	3.1
Moer-Milk Dairy	76.2	3.7	3.2
Hinders Dairy Inc	75.1	3.8	3.1
James Veitenheimer	74.6	3.6	3.1
Jeff Conrady	71.4	3.4	3.1
Lawrence Schroeder	71.3	3.5	3.0
Wes Vieth	71.0	3.6	3.2
Harold Schreiber	70.9	3.2	3.1
• 3X/Day Milking			
Dan & Janet Martin Dairy	82.0	3.8	3.2
Ernie Prescher	81.0	3.3	3.1
Ray Johnston	74.1	3.5	3.1
Larry K Martindale	73.8	3.8	3.1
High-Hill Dairy LLC	72.7	3.6	3.2
Robert Steinberger Sr	71.5	3.6	3.1
Harry DeWitt	70.1	3.4	3.2
Willis Dairy	69.4	3.3	3.1

Top Ten 305-Day Lactation Records

Following are the ten highest DHI mature equivalent, 305-day lactation records for butterfat production reported to the Extension Dairy Science office during May from the Processing Center at Raleigh, North Carolina.

Herd Owner	Cow Identity	Breed	Date of Birth	% Fat	ME Milk	ME Fat
Leo Hoff, Jr	14139968	H	05-25-90	4.8	30,935	1533
Indian Ridge	74RED0010	H	07-29-89	5.3	25,091	1350
Indian Ridge	74FER7457	H	07-09-93	6.3	21,809	1348
Hinders Dairy	74WDM4499	H	10-23-91	3.8	34,526	1313
Desperado Dairy	41VHY6573	H	02-00-94	6.0	24,841	1307
Hinders Dairy Inc	14820789	H	05-12-92	3.9	33,869	1303
Hinders Dairy Inc	13629060	H	11-27-88	4.0	31,339	1245
Don De Vries	74DDV0422	H	03-00-88	4.1	30,021	1240
Hinders Dairy Inc	14912426	H	04-13-92	4.0	31,262	1238
Hinders Dairy Inc	74WDH0118	H	03-13-91	4.2	29,799	1237