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EVERYTHING'S BIGGER IN TEXAS--INCLUDING PARTICLE SIZE?

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We always hear everything's bigger in Texas. And it holds true on particle size at least. Recent test results show that the ration particle size here is longer than that reported by a Penn State researcher. This means we need to be cautious in Texas about using Northeast recommendations.

Currently, there is increased interest in evaluating ration particle size to assess the adequacy of fiber in high producing rations. The effects of insufficient fiber in dairy rations include:

- ◆ Acidosis (subacute or acute),
- ◆ Erratic dry matter intakes,
- ◆ Decreased milk yields,
- ◆ Lowered milk fat production, and
- ◆ Health problems (laminitis, ketosis, displaced abomasum).

The Nasco® Forage Particle Separator was designed at The Pennsylvania State University to physically segregate a feed sample into three portions: particles greater than .75 inches; .31 to .75 inches; and less than .31 inches.

Particle Size in Texas TMRs

Although Penn State has developed a series of recommendations for the percentage of a ration found

on each screen, the forage in most of the TMRs they analyzed was either corn silage or alfalfa haylage. The Texas silage-based rations were predominantly wheatlage, although some corn and sorghum silage were fed as well. Alfalfa hay was the primary hay used. Some rations had coastal bermuda grass or sorghum/sudan hay. Virtually every Texas TMR we analyzed exceeded Penn State's recommended amount of long fiber (ie. particle size). In these rations, you wouldn't expect much acidosis if we used Penn State's recommendation. Yet it continues to be a problem in Texas. Furthermore, these samples were taken during the summer, when the typical ration is higher in concentrate to compensate for the effects of reduced dry matter intake.

Not only did these rations exceed the recommended long forage particle length, they differed substantially from the TMR averages reported by Penn State researchers (Figure 1). The major differences were more long particles on screen 1 and less of the TMR on the bottom pan. We have not tested as many rations as the Penn State researchers. However, based on these results, producers feeding TMRs using forages different from those in the Northeast region must be more cautious in using the Penn State guidelines.

Educational programs conducted by the Texas Agricultural Extension Service serve people of all ages regardless of socioeconomic level, race, color, sex, religion, handicap or national origin.

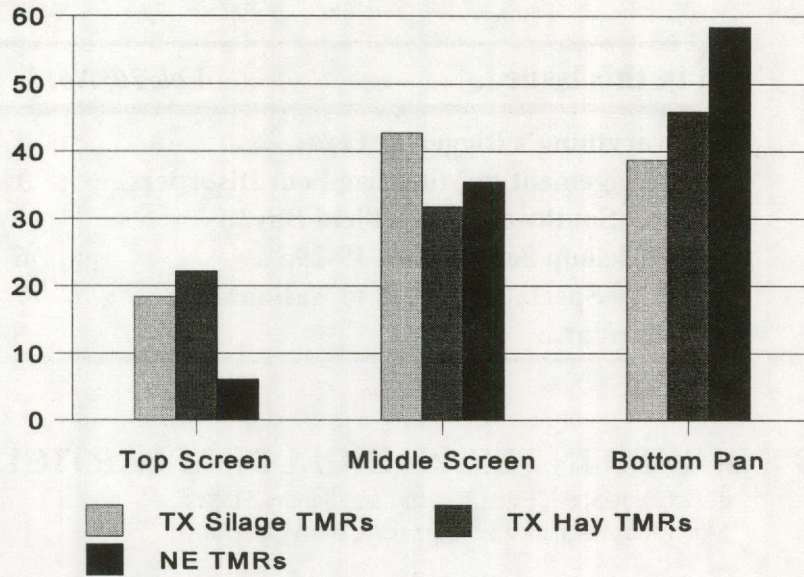


Figure 1: Comparison of TMR particle size between Texas and the Northeastern US.

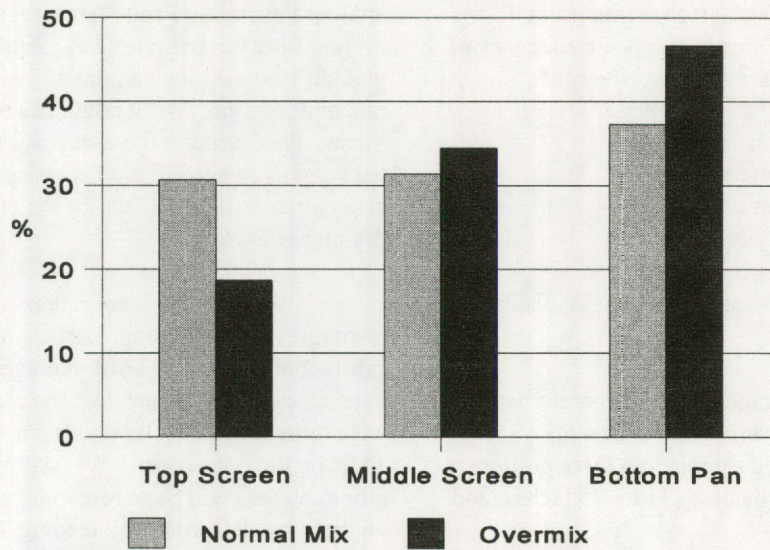


Figure 2: Effect of overmixing by 15 minutes in an example alfalfa hay based TMR

Effect of Overmixing

One of the reasons we evaluated Texas TMRs was to determine if overmixing resulted in particle size reduction and whether either a vertical or horizontal mixer wagon caused more degradation. We identified ten dairies using vertical-type mixer wagons and ten dairies using horizontal mixers. Each dairy mixed their feed using their standard mixing procedures. We placed ten sample containers at equal distances down the feed bunk and then unloaded the mixer wagon. Next, they overmixed an identical ration by mixing the load for an additional 15 minutes.

After analyzing the samples we can make no generalizations as to whether over-mixing affected particle size, or if one type of mixer reduced particle size more than another. On individual dairies it did appear that overmixing reduced particle size. Figure 2 shows the results from one dairy, feeding an alfalfa hay-based ration.

Conclusions

From our work and that of others, it is evident that many factors affect the particle size in the mixed ration, such as:

- ◆ condition of mixer,
- ◆ amount of feed mixed at one time,
- ◆ loading order,
- ◆ type of feed,
- ◆ and particle length prior to mixing.

If you use particle size evaluation on your herd, we recommend you take a minimum of five samples, evenly spaced along the entire discharge of your mixing wagon. By maintaining a log of results from your farm, you can then evaluate how uniformly your ration is delivered; develop an optimum loading order and mixing time; determine if you need to pre-process your hay; and monitor the condition of your mixer.

Acknowledgments

The authors would like to express their appreciation to the Houston Livestock Show and Rodeo and Protiva, a unit of Monsanto, for their financial support of this study. Also, the authors are very grateful for the cooperation of the County Extension Agents and producers in Archer, Comanche, Cooke, Erath, Ellis, Hamilton, and Johnson counties.



**Good Luck to Our
Texas
Collegiate and 4-H
Dairy Cattle Judging
Teams
at World Dairy Expo,
Louisville and Memphis**



MANAGEMENT TO MINIMIZE FOOT DISORDERS

Sandra R. Stokes
Extension Dairy Specialist

Lameness in dairy cattle is a critical problem for managers. Commonly-occurring hoof disorders include laminitis and digital dermatitis. Both conditions result in cows with painful feet.

Typically, these cows return from the parlor and look for a spot to lie down, resulting in significant time away from the feedbunk and, ultimately, a significant decrease in milk production and body weight loss.

BACKGROUND HOOF ANATOMY

Figure 1 illustrates the anatomy of the hoof. Important structures include the following:

- ✗ *Bulb* - structure continuing from the coronary band. Soft, rubbery texture.
- ✗ *Coronary cushion* - mass of elastic tissue and veins lying beneath the coronary band. As the animal moves, this assists in pumping blood through the foot.
- ✗ *Coffin bone* - triangular bone in center of foot.
- ✗ *Digital cushion* - functions as an elastic shock absorber. Also works to force blood back up the limb.

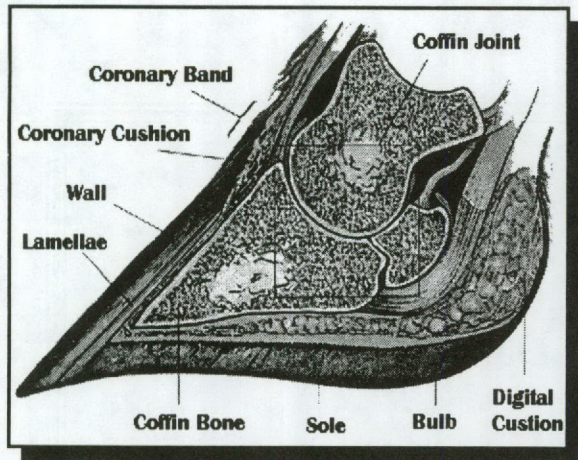


Figure 1. Anatomy of the hoof.
(Courtesy of Zinpro® Corporation)

LAMINITIS

Laminitis occurs in three stages: acute, chronic, and subclinical. Acute laminitis is an immediate reaction and will typically be seen within 48 hours of the incident (ie. grain overload).

Chronic laminitis includes cows with repeat injuries, possibly cows more susceptible to insult. These cows have feet with flat, broad toes with deeply ridged surfaces. While the acute and chronic cases are easily identified, subclinical cases are less

noticeable yet rob producers of significant profit dollars. Cows with subclinical laminitis may not be obviously lame right away, but are under some other source of stress (nutrition, management, environment) that interferes with normal hoof growth and metabolism. They exhibit clinical symptoms at a later date.

Laminitis results from a disturbance in blood supply to the foot. Arteries carry blood to the foot, supplying oxygen and nutrients necessary for normal growth. Veins carry blood away from the foot, removing end-products of tissue metabolism. The two systems are interconnected by capillaries located throughout the coronary cushion. As blood flow through this system is disrupted, foot tissue begins to break down and die. As the coronary cushion disintegrates, the coffin bone may actually shift position. As this occurs, the foot becomes painful and much more prone to injuries and infections.

General symptoms of laminitis include a stiff gait, an arched back, and/or kneeling while eating. These are all signs from the cow that her feet are sore and she's trying to avoid bearing weight on the affected areas. Close inspection reveals inflammation at the coronary band, sole discoloration to a yellowish state, red streaks or bruising on the sole, excessive heel growth, and/or transverse grooves on the hoof.

The majority of laminitis cases are diagnosed 60-100 days post-partum. Estimates of hoof growth suggest the original injury may have occurred 60 days prior to detection, targeting the fresh cow phase as the prime area of concern. While laminitis traditionally has been blamed on nutrition, the cause can actually include several interdependent factors, including nutrition and feeding management, cow management, environment, and/or hormonal changes at parturition. Consider the changes that occur within or to the dairy cow at the time of calving to understand these interdependent factors more clearly. In addition, this substantiates the importance of a sound transition program to help the cow switch from a dry to a lactating state.

Subclinical laminitis is a long process and cows may not exhibit clinical signs immediately. In Texas, summer heat stress exacerbates this condition.

Low feed intakes during the summer create a real struggle for producers walking the fine line between energy intake for milk production and adequate forage fiber intake for stable rumen fermentation and pH.

Diets for high producing cows often contain high levels of starch and rapidly-digestible carbohydrates. Without adequate fiber intake, these diets can cause rapid and prolonged acidotic conditions in the rumen. This depression in pH triggers reactions in the cow's metabolism that can cause laminitis. And, cooling cows during the summer Texas heat often creates a wet environment for their feet. Feet continually exposed to wet conditions tend to be softer and more prone to injury (stone bruises) and subsequent infections.

DIGITAL DERMATITIS

Digital dermatitis is a highly infectious disease causing a sore, raw area to develop on the skin around the heels. The lesion involved is very painful and animals will exhibit lameness rapidly. The edge of this sore may form thin, hairy-like growths, thus giving this disease its common name "hairy wart." The cause of this infection has not been identified to date and there is no vaccine available. However, the condition appears highly responsive to antibiotic treatment.

Digital dermatitis usually occurs in one foot (but can occur in multiple feet). First-calf heifers are very susceptible to this problem. Animals with this affliction tend to walk on their toes (to avoid pressure on the heel sore). Free-stall facilities tend to support greater transmission through groups as compared to drylots.

Treatments for digital dermatitis include the use of footbaths and topical sprays. Footbaths may include copper sulfate, zinc sulfate, or antibiotic solutions. *Use of antibiotics to treat and prevent digital dermatitis is an off-label recommendation and must be done under the advisement of a veterinarian.* Take care when using the antibiotic solution to avoid cows drinking the solution and getting antibiotic residues in the milktank.

Other compounds used include formalin solutions and acids. Formalin toughens the exterior

MANAGEMENT FOR BETTER FOOT HEALTH

- ✓ Provide a sound transition program for cows moving from the dry period to lactation. Consider both ration adjustment and environmental changes.
- ✓ Control postpartum disorders (ketosis, displaced abomasums, milk fevers) that cause cows to reduce feed intake.
- ✓ Control postpartum infections (mastitis, metritis).
- ✓ Prevent rapidly available starch overloads in the ration. Supply adequate effective fiber to avoid drastic pH drops in the rumen.
- ✓ Provide comfortable loafing areas. Keep corrals groomed to avoid holes and keep dry. Keep free-stalls well bedded and dry.
- ✓ Develop and maintain a routine foot trimming schedule. Feet should be examined for heel cracks, transverse grooves, hemorrhages, and bruises. Record incidences to identify problem areas.

wall of the foot, whereas acid footbaths desensitize the painful area and allow the animal to get around. If using a footbath, be sure its dimensions are effectively correct. Footbaths must be long enough to force cows to walk all four feet through the solution and deep enough that the solution will cover the foot. Change footbaths every 150-200 cows to maintain effective solutions. Pre-dip baths or the spraying of feet prior to animals walking through the footbath will aid in successful treatment.

Topical treatments use compounds similar to those in footbaths. However, these treatments may differ in strength, so care should be taken during mixing to achieve the correct, effective solution strength.

Information presented was summarized from material presented by Dr. Jim Nocek to producers in Comanche and Erath Counties in February, 1997 and from Zinpro® Corporation's handbook titled Cattle Lameness.

THE 1997 SOUTHWEST DAIRY FIELD DAY

E. Max Sudweeks
Extension Dairy Specialist

We would like to thank Johannes and Ietsje de Jong and their sons Lieuwe and Tjibbe, owners of the J&I Dairy, for hosting the 1997 Southwest Dairy Field Day. More than 400 attended.

The day started with remarks by Dr. Barry Thompson, Chancellor of the Texas A&M University System, pledging University support in helping Texas Dairy farmers meet the challenge of producing milk for the people of Texas. Dr. Thompson noted that while the Texas Dairy Industry is going through financial adjustments causing many dairy farmers to exit the business, long-term prospects for the industry seem sound.

A large number of commercial exhibitors supported this event with a wide array of new ideas

on equipment, feeds, seeds, medicines, semen, management information, environmental impact information, waste management handling equipment, irrigation equipment, and record systems.

Educational stations supplied information on topics of interest to producers, including: manure composting, feeding programs, waste management, reproduction, intensive grazing, cost comparisons of grazing and conventional dairy farms, milk pricing and how the check off dollars are being spent.

The organizing committee included the Texas Agricultural Extension Service, Oklahoma Cooperative Extension Service, Consolidated Farm Service Agency, Natural Resources Conservation Service, Texas State Soil and Water Conservation Board, and Lake Fork Creek Hydrologic Unit Board.

WORKSHOP SET FOR NOVEMBER 19-20

Alternative Strategies for Dairy Waste Management

A 2-day workshop on November 19-20 on manure management in the dairy industry has been scheduled by the Texas Agricultural Extension Service. The program will take place at the Texas A&M Research and Extension Center in Stephenville.

This workshop will center around the work of Dr. Jack Van Horn from the University of Florida, nationally recognized for his research in animal waste systems. Dr. Van Horn chaired the University of Florida's Animal Waste Task Force in prediction of animal nutrient excretion, minimizing odor and fly problems around dairies, manure system effects on nutrient flow, matching nutrient uptake of cropping

systems, and developing and using nutrient budgets for farms.

The interactive discussion among various Texas Extension groups and Van Horn are designed to revolve around adaptation of new information to commercial dairy production in Texas. The agenda includes site visits to dairies in Erath, Hamilton, and Comanche counties and producers will be invited to attend these tours on the afternoon of Nov. 19 and morning of Nov. 20. For more information on this meeting, contact Sandy Stokes at the TAMU Research & Extension Center in Stephenville (254) 968-4144.

DAIRY SPECIALIST NAMED TO NATIONAL AG HONOR ROLL

Mary Porter
Extension Communications Specialist

Dr. Ellen Jordan, Texas A&M dairy specialist based in Dallas, has been named to an honor roll of 100 national leaders in agriculture for innovative and progressive work.

Alpha Zeta, a professional fraternity in agriculture and life sciences, created the Centennial Honor Roll to mark their 100th anniversary. As part of a celebration in Columbus, Ohio recently, Alpha Zeta recognized 100 local, national and international leaders among their members, plus another 100 non-members for leadership excellence. Jordan is the only non-member named from Texas.

Other honorees from Texas are members of Alpha Zeta and include Texas A&M Chancellor Emeritus Perry Adkisson; Del Deterling, executive editor of Progressive Farmer; Fred R. Bahrenburg, vice president of Bridgepoint Communications in McKinney and Frederick D. McClure, senior vice president of Public Strategies, Inc. in Dallas.

"This is Alpha Zeta's inaugural year in honoring leaders in agriculture," said Brent Natzke, director of member and chapter relations. "Our goal

was to select 100 from each category based on the Fraternity's founding principles of leadership, scholarship, professionalism, fellowship and character."

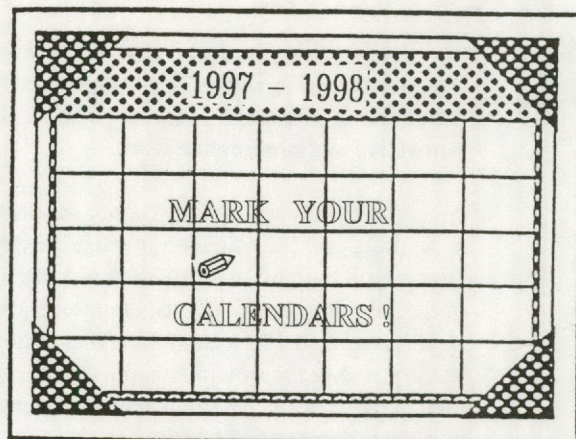
After serving as Extension Dairy Specialist for 10 years in West Virginia, Dr. Jordan came to the Texas Agricultural Extension Service in 1991. She provides statewide leadership in the areas of reproduction and milk quality. In North Central Texas, she works with dairy producers on nutrition, heifer management, genetics, records and general management.

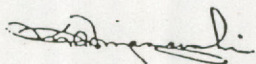
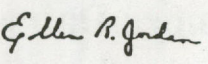
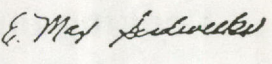
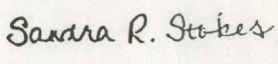
Dr. Jordan is vice chair of the production division of the American Dairy Science Association, chaired the National Reproduction Symposium Planning Committee and serves as editor for Balanced Dairying, Reproduction Section of the National Dairy Database and Mid-South Ruminant Nutrition Conference. In 1993, she took part in a Farmer-to-Farmer team survey of dairy industry needs in the Kyrgyz Republic with Winrock International and the United States Agency for International Development (USAID).

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CALENDAR OF EVENTS

- November 1
College Station
TAMU Dairy Science Alumni Reunion/Tailgate Party
Contact: Glenn Holub (409) 845-6060
- November 19-20
Stephenville
Waste Management Training
Contact: S. Stokes (254) 968-4144
- December 11
Ft. Worth (Tent.)
Texas Animal Nutrition Council
Contact: E. Jordan (972) 952-9212
- December 18
Dallas
Johne's Update
Contact: S. Stokes (254) 968-4144
- December 18
Dallas
Texas Milk and Dairy Beef Quality Meeting
Contact: S. Stokes (254) 968-4144
- May 7-8, 1998
Irving, Texas
Mid-South Ruminant Nutrition Conference
Contact: Ellen Jordan (972) 952-9212
- May 14, 1998
Oklahoma
Southwest Dairy Field Day
Contact: Dan Waldner



 Michael A. Tomaszewski, Ph.D. Extension Dairy Specialist College Station, TX (409)845-5709	 Ellen R. Jordan, Ph.D. Extension Dairy Specialist Dallas, TX (972)952-4212	 E. Max Sudweeks, Ph.D. Extension Dairy Specialist Overton, TX (903)834-6191	 Sandra R. Stokes, Ph.D. Extension Dairy Specialist Stephenville, TX (254)968-4144
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