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Balanced Dairying

PRODUCTION

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Aflatoxins in Dairy Cattle

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During late summer, milk marketing cooperatives in Texas were forced to dump several tanker loads of milk as a result of aflatoxin contamination. Although the initial problem has been brought under control, vigilance is required to prevent a reoccurrence with stored feed.

Aflatoxins are poisonous by-products of the growth of some species of the mold fungus Aspergillus. Some of this year's corn crop has been contaminated with aflatoxins and fed to dairy cows. Lactating animals then excrete aflatoxins into their milk, when fed contaminated feed.

The aflatoxins are capable of causing aflatoxicosis in consumers of milk. This is why government regulations specify that milk must be free of aflatoxin. However, action is not taken until the aflatoxin level exceeds 0.5 ppb in market milk, the level below which there is no hazard for the consuming public.

"Action levels" for livestock represent the level of contamination at which the feed may be injurious to their health or result in contamination of milk, meat or eggs. Action levels by class of livestock are in table 1.

Table 1. The FDA Center for Veterinary Medicine "Action" levels for aflatoxin in feed grain in interstate commerce.

Action Level parts per billion	Class of Animal
20	Dairy Immature Animals Immature Poultry
100	Breeding Cattle Breeding Swine Mature Poultry
200	Finishing Swine (100 lbs. or greater)
300	Finishing Cattle

Aflatoxicosis is a disease caused by the consumption of aflatoxins, the mold metabolites produced by some strains of *Aspergillus flavus* and *Aspergillus parasitisus*. The four most common aflatoxins are B_1, B_2, G_1 and G_2. Contaminated grains and grain by-products are the most common sources of aflatoxins in Texas. Corn silage may also be a source of aflatoxins, because the ensiling process does not destroy the toxins already present in silage.

Aflatoxins are metabolized in ruminants by the liver and excreted in the bile. Aflatoxin B_1 is the most potent mycotoxin (toxic substance produced by a mold). Aflatoxin B_1 increases the apparent protein requirement of cattle and is a potent cancer causing agent (carcinogen). When significant amounts of aflatoxin B_1 are consumed, the metabolite M_1 appears in the milk within 12 hours. Research suggests M_1 is not as carcinogenic or mutagenic as is B_1, but it does appear to be as toxic as its parent compound.

Symptoms

Dairy and beef cattle are more susceptible to aflatoxicosis than sheep. Young animals of all species are more susceptible to the effects of aflatoxins than mature animals. Pregnant and growing animals are less susceptible than young animals but more susceptible than mature animals.

Feed refusal, reduced growth rate, decreased milk production and decreased feed efficiency are the predominant signs of chronic aflatoxin poisoning. In addition, listlessness, weight loss, rough hair coat and mild diarrhea may occur. Anemia along with bruises and subcutaneous hemorrhage are also symptoms of aflatoxicosis. The disease may also impair reproductive efficiency, including abnormal estrous cycles (too short or too long) and abortions. Other symptoms include impaired immune response, increased susceptibility to other diseases and rectal prolapse. In dairy cattle, aflatoxin metabolites appear in the milk before any of the above signs develop.

Pathology

Clinical laboratory findings vary with the species, level of aflatoxin in the ration, and duration of feeding the contaminated feed. Necropsy shows the liver is usually pale tan, yellow or orange. Hepatic fibrosis and edema of the gallbladder may also be observed.

Diagnosis

Aflatoxicosis in milking cows is readily evident from milk samples. However, diagnosis in non-lactating cattle is more difficult because of the variation in clinical signs, gross pathology, and presence of other diseases due to suppression of the immune system. More than one mold or toxin can further complicate diagnosis as well. By the time overt symptoms are noticed, the prognosis is poor.

Feed can be analyzed for aflatoxin and other mycotoxins at the Texas Veterinary Medical Diagnostic Laboratory, P.O. Drawer 3040, College Station, TX 77841-3040, 409-845-3414, or a commercial laboratory of your choice.

Prevention

Aflatoxicosis can only be prevented by feeding rations free of aflatoxin. Preventing aflatoxin contamination requires an on-going and thorough sampling and testing program.

1. Purchase feed from reputable persons and companies experienced in aflatoxin prevention and who have a proven record of properly monitoring their feed products. In addition, a reliable feed company will carry insurance to cover misfortunes with aflatoxins or other problems.

2. Don't buy poor quality feed or feed ingredients. A good deal on feed prices can be the most expensive buy a dairy farmer ever makes if it proves to contain aflatoxin.

3. Store feed at proper moisture levels.

4. Develop a systematic inspection and clean-up program to keep bins, delivery trucks and other equipment free of adhering or caked feed ingredients.

5. Minimize dust accumulation in milling and mixing areas. Keep all feed equipment free of caked feed.

6. Check feed storage bins for leaks.

7. Implement effective rodent and insect control programs in grain storage areas.

8. Grains contaminated with aflatoxins have been successfully treated with ammonia but it is expensive and dangerous to do.

Treatment

Aflatoxicosis is typically a herd rather than an individual animal problem. If aflatoxin is suspected, the ration should be analyzed immediately. If aflatoxins are present, the source should be eliminated immediately. Levels of protein and vitamins A, D, E, and K in the ration should be increased as the toxin binds vitamins and affects protein synthesis. Good management practices to alleviate stress are essential to reduce the risk of secondary infections. Secondary infection must receive immediate attention and treatment.

When Prevention Fails

Because preventing aflatoxin contamination is not always 100 percent effective, here are a few facts to remember when dealing with contaminated feeds.

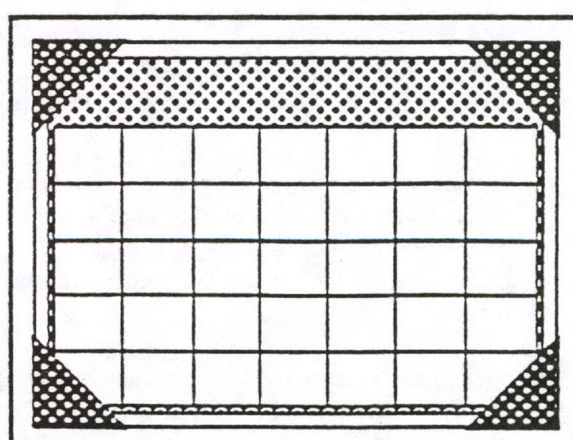
1. The recommended aflatoxin feeding level is 0 parts per billion (ppb).
2. The level of aflatoxin an animal can tolerate will depend on age and sex of the animal, its health status, and overall management on the farm.
3. To avoid contamination of milk, lactating cows should not receive more than 20 ppb aflatoxin in the total ration.
4. Calves should not receive milk from cows fed in excess of 20 ppb aflatoxin.
5. Beef cattle should not receive more than 300 ppb aflatoxin in the total ration. Young stock should not receive more than 100 ppb in their total rations.

Conclusion

Aflatoxins are highly toxic to livestock and people. Even fed at non-lethal levels, aflatoxins can seriously impair animal health and productivity. For lactating cows, do not exceed 20 ppb aflatoxin in the ration to avoid exceeding the Food and Drug Administration level of 0.5 ppb in milk.

CALENDAR OF EVENTS

Date	Location
December 1-2, 1995	Texas Holstein Association Annual Meeting (Contact Bryan Hayes: 214-775-3024)
December 2, 1995	Texas Holstein Association Sale (Contact Bryan Hayes: 214-775-3024)
December 5, 1995	Texas Animal Nutrition Council (Contact Ellen Jordan)
January 16, 1996	Texas DHI Annual Meeting, Waco, TX (Contact Michael Tomaszewski)
May 2-3, 1996	Mid-South Ruminant Nutrition Council Holiday Inn-South, DFW Airport (Contact Ellen Jordan)
May 9, 1996	Southwest Dairy Field Day (Contact Michael Tomaszewski)
June 22-26, 1996	National Holstein Convention Fort Worth, TX (Contact Bryan Hayes: 214-775-3024)



Calf Care Critical-
Whether Selling or Keeping

Ellen R. Jordan, Ph.D.
Texas Agricultural Extension Service

The market for calves has been extremely low lately. It is critical however that calves destined for market receive proper care. This helps protect your future market and minimizes public image problems.

Key points for calf care include:

1. Provide a clean, dry, well-ventilated calving area.

2. Dip navels in 7% iodine.

3. Provide high quality colostrum within two hours after birth. Continue to provide colostrum throughout the calf's first 24 hours of life.

4. If any antibiotics are used on calves to be marketed, use only antibiotics with short or no withdrawal periods. Inform the sales management of any necessary withdrawal times.

5. Feed the calf milk or milk replacer until the calf is marketed.

6. Provide a clean, fresh water supply.

7. Market calves only when they can walk unassisted, are not wobbly, and have dry navels.

8. Transport calves safely and comfortably in vehicles with adequate ventilation, bedding and protection.

9. When loading and unloading calves, minimize stress by walking or lifting the calves. Do NOT drag, pull or throw calves.

10. Transport calves directly to market whenever possible. Practice smooth starts and stops. Avoid erratic driving. Check animals during transit. Make sure that the trailer floor is solid.

11. Provide secure footing for animals. Slippery surfaces can result in animal injuries.

Although current returns from calf sales are minimal at best, the few extra minutes you spend now will pay dividends with buyers and the public in the long run.

Somatic Cell Counts in Texas

Summer is always a trying time to dairy in Texas. The heat and humidity take a toll on production per cow and August somatic cell counts (**SCC**) are usually the highest of any month.

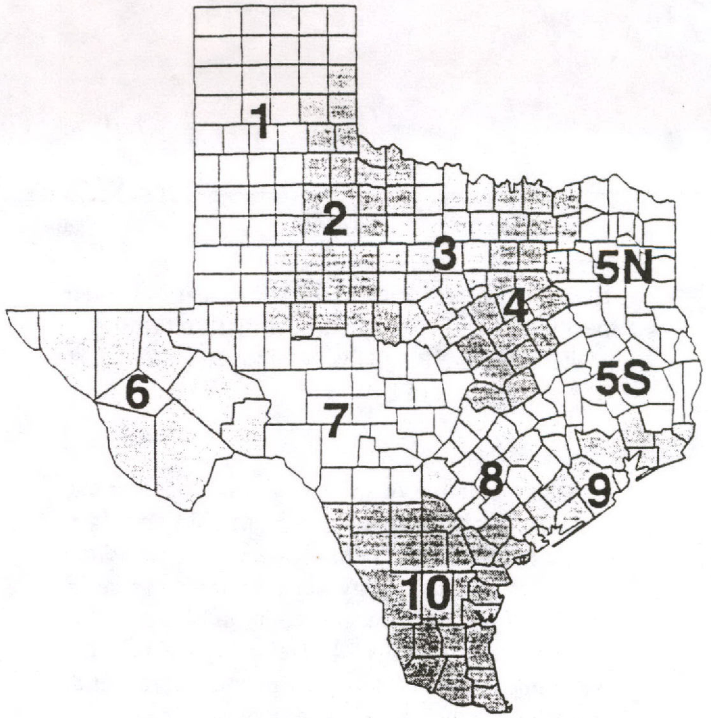
On the next page, SCC are categorized by region of the state. In August, less than 5% of the producers in Texas had average bulk tank SCC between 0 and 250,000 while in May, nearly 16% were in this category. Roughly half of all Texas producers had SCC over 500,000, with 12.27% of those over the legal limit of 750,000.

This means some producers were in jeopardy of losing their ability to market milk during August. Producers also were losing potential milk production as a result of the elevated SCC. Remember, as SCC increases from 400,000 to 1.2 million, 9 to 18% of potential annual production is lost.

Use your milk check to compare your average August SCC to other producers in your region and across the state.

TEXAS GEOGRAPHIC REGIONS

AREA	REGION NAME
1	HIGH PLAINS
2	LOW PLAINS
3	CROSSTIMBERS
4	BLACKLANDS
5N	NORTH EAST
5S	SOUTH EAST
6	TRANS-PECOS
7	EDWARDS PLATEAU
8	SOUTH CENTRAL
9	UPPER COAST
10	SOUTH



TEXAS PRODUCERS NUMBERS BASED ON SCC VALUE AND GEOGRAPHIC REGION AUGUST 1995

	SCC (100,000)			
REGION	**0-250**	**251-500**	**501-750**	**OVER 750**
1&2	9	21	11	7
3	29	289	161	30
4	11	100	107	30
5N	32	337	322	127
5S	-	17	14	4
6&7	4	20	11	2
8	3	40	34	15
9&10	1	9	20	9
TOTAL	89	833	680	224
% OF TOTAL	4.87%	45.62%	37.24%	12.27%

RESEARCH REPORTS

Effects of heifer diet and growth rate on their performance in second and third lactations. 1995. Gaynor, P.J., D.R. Waldo, A.V. Capuco, R.A. Erdman, and L.W. Douglass. J.Dairy Sci. 78:1534.

The objective of the study was to determine the effects of rate of body weight gain and type of silage fed to heifers before puberty on partitioning of excess dietary energy between milk synthesis and body weight gain in second and third lactation. Accordingly, 41 Holstein heifers weighing approximately 400 pounds were fed diets containing either alfalfa silage or corn silage to gain either 1.6 or 2.1 pounds per day until body weight was about 700 pounds and two estrous cycles had been observed. Puberty occurred at about 600 pounds. During second lactation (cows=36) or third lactation (cows=5) the cows were fed a control diet (60% forage and 40% concentrate) and a high energy diet (20% forage and 80% concentrate) in a double reversal experimental design with three six-week periods. The rate of gain before puberty did not affect dry matter intake, milk yield, milk composition or concentration of thyroid hormones when cows were switched from control to a high energy diet during second or third lactation. However, cows fed alfalfa silage before puberty, had more depressed yields of fat, total solids and fat-corrected milk when fed the high energy diet than when fed the control diet during the second or third lactation. Increased deposition of fat in adipose or mammary tissue during prepuberty did not result in more pronounced depression of milk fat when cows were switched from the control diet to the high energy diet in either lactation. Overall, neither rate of prepuberty body weight gain nor type of silage had a major influence on partitioning excess dietary energy between milk synthesis or body weight gain during subsequent second or third lactations. *Summary by E. Max Sudweeks, Extension Dairy Specialist.*

Utilization of supplemental fat by dairy cows fed diets varying in content of nonstructural carbohydrates. 1995. Elliott, J.P., J.K, Drackley, G.C. Fahey, Jr., and R.D. Shanks. J.Dairy Sci. 78:1512.

Sixteen Jersey cows were fed one of four experimental diets varying in nonstructural carbohydrates and fat level as follows: 1) high nonstructural carbohydrates, no added fat; 2) high nonstructural carbohydrates, 2.5% added fat; 3) low nonstructural carbohydrates, no added fat; and 4) low nonstructural carbohydrates, 2.5% added fat. The diets consisted of alfalfa haylage, corn silage, and concentrate (22:22:56, DM basis). Soy hulls replaced corn in diets 3 and 4; high and low diets contained 37.3 and 27.2% nonstructural carbohydrate. Under the conditions of this study, additions of fat reduced contents of crude protein, casein and true protein in milk. Low nonstructural carbohydrates increased acetate and total volatile fatty acids but reduced propionate and butyrate concentrations in the rumen fluid. Additions of fat reduced total fatty acid digestibility. Fiber component and total fatty acid digestibilities were higher for diets containing low levels of nonstructural carbohydrates.

Dry matter intake, milk production, and milk fat content were not significantly affected by dietary fat or nonstructural carbohydrate variations, although milk production tended to be slightly higher for the cow being fed fat. Dietary nonstructural carbohydrates did not affect milk production or milk composition in this study. If economically favorable soybean hulls can be used to replace a portion of the corn in diets of lactating dairy cows without reducing dry matter intake, milk production, rumen fermentation, or nutrient digestibility. *Summary by E. Max Sudweeks, Extension Dairy Specialist.*

TEXAS SUMMARY FOR AUGUST 1995

Information Summarized	8/31/94	7/31/95	8/31/95
DHI-DHIR Herds (cows)	501	458	447
DHI-DHIR Cows	120,163	118,658	118,074
Avg. Milk/Cow/Day	44.6	45.2	42.4
Avg. Percent Fat	3.5	3.5	3.5
Avg. Fat/Cow/Day	1.58	1.60	1.49
Avg. Feed Cost/Cwt. Milk	6.21	6.26	6.39
Private Herds	108	91	93
Private Cows	27,529	25,966	26,746
DHI-DHIR Herds (goats)	22	59	58
DHI-DHIR Goats	568	1007	976
Total Herds Enrolled	631	608	598
Total Animals Enrolled	148,260	145,631	145,796

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. 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		
Ken Miller	68.7	2.12
Mrs. Vincent Braddock Estate	55.1	2.05
Ralph Albracht	61.0	1.98
McCatharn North	59.4	1.88
Brent Eady	57.7	1.88
Fine-Meadow Farm	57.1	1.86
Rick Stephens	55.8	1.86
Owen & Janet Sieperda	55.9	1.83
▪ 3X/Day Milking		
Hinders Dairy, Inc.	69.1	2.30
Clyde Birkenfeld	68.7	2.17
Roy Roy Dairy Inc	65.3	2.07
Brian Boehning	63.1	2.00
Ray Johnston	63.3	1.98
Sun Valley Dairy	61.3	1.92
Martin Vanbeek	61.2	1.92
Albin Smith	59.2	1.90

Ranking by Milk

Herd Owner	Milk (lbs)	Fat (%)	Protein (%)
▪ 2X/Day Milking			
Ken Miller	68.7	3.3	3.1
Ernie Prescher	61.1	3.5	3.0
McCatharn North	59.4	3.4	3.2
Green Valley Dairy	57.9	3.4	3.1
Brent Eady	57.7	3.5	3.3
Steve Zotz	57.6	3.5	3.0
Ralph Albracht	57.4	3.5	3.1
Fine-Meadow Farm	57.1	3.3	3.3
▪ 3X/Day Milking			
Hinders Dairy Inc	69.1	3.3	3.3
Clyde Birkenfeld	68.7	3.2	3.2
Roy Roy Dairy Inc	65.3	3.0	3.2
Ray Johnston	63.3	3.3	3.1
Brian Boehning	63.1	3.5	3.2
Sun Valley Dairy	61.3	3.5	3.1
Martin Vanbeek	61.2	3.3	3.1
Tony T Bos & Family	60.7	3.6	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 August 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	4.2	34,542	1414
James Veitenheimer Dairy	14447031	H	02-03-91	3.6	39,651	1401
Jeff Conrady Dairy	74WDI6941	H	06-04-91	4.2	34,048	1394
Jeff Conrady Dairy	74WDJ9537	H	01-16-91	3.8	37,260	1392
James Veitenheimer Dairy	74WDG6101	H	09-06-89	4.8	28,642	1358
Leo Hoff Jr	13681205	H	03-10-89	3.8	36,620	1348
Jeff Conrady Dairy	74WDH8168	H	11-19-90	4.7	29,741	1347
Roy Roy Dairy Inc	15466568	H	06-21-91	3.8	36,271	1344
Jeff Conrady Dairy	74WDJ9805	H	12-13-90	4.1	33,620	1343
Danny Schenk	74WDA0114	H	03-23-88	4.4	31,009	1343

TEXAS SUMMARY FOR SEPTEMBER 1995

Information Summarized	9/30/94	8/31/95	9/30/95
DHI-DHIR Herds (cows)	502	447	442
DHI-DHIR Cows	119,319	118,074	117,832
Avg. Milk/Cow/Day	44.4	42.4	42.6
Avg. Percent Fat	3.5	3.5	3.5
Avg. Fat/Cow/Day	1.56	1.49	1.50
Avg. Feed Cost/Cwt. Milk	6.15	6.39	6.36
Private Herds	103	93	89
Private Cows	25,351	26,746	25,814
DHI-DHIR Herds (goats)	22	58	54
DHI-DHIR Goats	564	976	833
Total Herds Enrolled	627	598	585
Total Animals Enrolled	145,234	145,796	144,479

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. 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**		
Keith Tiechman	61.1	2.01
Steve Zotz	61.3	1.98
Ernie Prescher	64.4	1.97
Mrs. Vincent Braddock Estate B-all	53.3	1.95
High-Hill Dairy LLC	56.3	1.89
Ted Conrady Dairy	58.6	1.82
Don De Vries	54.7	1.81
Fine-Meadow Farm	53.9	1.80
▪ **3X/Day Milking**		
Nico Deboer	66.3	2.39
Roy Roy Dairy Inc	68.0	2.24
Hinders Dairy Inc	65.2	2.13
Ray Johnston	67.9	2.09
Albin Smith	60.6	1.92
Dan Martin Dairies Inc	57.1	1.92
Brian Boehning	62.5	1.91
Christian Dairy	58.1	1.87

Ranking by Milk

Herd Owner	Milk (lbs)	Fat (%)	Protein (%)
▪ **2X/Day Milking**			
Ernie Prescher	64.4	3.3	3.1
Steve Zotz	61.3	3.5	3.2
Keith Tiechman	61.1	3.9	3.3
Ted Conrady Dairy	58.6	3.6	3.1
Frank Wolf	56.4	3.5	3.1
Robert G Veitenheimer	56.4	3.4	3.0
High-Hill Dairy LLC	56.3	3.6	3.4
Don De Vries	54.7	3.0	3.3
▪ **3X/Day Milking**			
Roy Roy Dairy Inc	68.0	3.1	3.3
Ray Johnston	67.9	3.5	3.1
Nico Deboer	66.3	4.6	3.6
Hinders Dairy Inc	65.2	3.4	3.3
Brian Boehning	62.5	3.5	3.1
Albin Smith	60.6	3.4	3.2
Tony T Bos & Family	59.1	3.6	3.1
Frans Beukeboom	58.7	0	0

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 September from the Processing Center at Raleigh, North Carolina.

Herd Owner	Cow Identity	Breed	Date of Birth	% Fat	ME Milk	ME Fat
David M Owens	14380577	H	08-25-90	3.8	25,879	1408
Moer-Milk Dairy	74WDN6888	H	04-22-92	4.1	34,478	1374
Kenneth Lambert	14311552	H	02-16-91	4.5	31,550	1372
James Veitenheimer Dairy	14132746	H	03-16-88	4.3	31,820	1347
Jeff Conrady Dairy	74WDG2270	H	12-24-91	4.8	28,951	1327
Moer-Milk Dairy	13022279	H	01-19-87	4.0	33,167	1325
James Veitenheimer Dairy	14687096	H	09-09-91	5.0	26,902	1313
Moer-Milk Dairy	74WDM1005	H	04-26-91	4.2	31,273	1292
Leo Hoff Jr	14428632	H	05-13-91	4.0	32,954	1277
Moer-Milk Dairy	13522625	H	10-07-88	3.7	34,502	1274