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Mastitis in Heifers (Part 1)

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In this Issue

- Mastitis In Heifers (Part 1)
- MS/LA Annual Dairy Conference
- September 2001 Honor Roll
- Farm Bill
- November Class I Milk Prices

- I. Introduction
- II. Research & Commercial Studies
- III. Efficacy of Antibiotic Treatment
- IV. Dietary Supplementation
- V. Role of Vaccination
- VI. Other Factors
- VII. Summary

Introduction

Replacement heifers, are critical to herd productivity because they represent future milking stock. In rearing these young animals, the goal is to provide an environment for heifers to develop full lactation potential at the desired age with minimal expense. Animal health and well-being play vital roles in achieving this potential, and one disease that can influence future productivity is mastitis.

In most cases, intramammary infection (IMI) is considered a disease of mature lactating and dry cows. Several mastitis control practices have been developed for this age group of animals, (i.e., proper milking hygiene, pre/post dipping of teats, dry cow therapy, prompt treatment of clinical mastitis, & culling of infected cows). Management practices and disease control in heifers, however, emphasize housing, vaccinations against calfhood diseases, nutrition, and artificial insemination, without any regard to mastitis control. IMI can develop in these young dairy animals, and mastitis-causing bacteria may be found in heifers with mammary secretions as early as

6 months of age. Unfortunately, most dairymen regard young heifers as uninfected, and the presence of mastitis is not noticed until freshening or until the first clinical flare-up in early lactation. An animal may carry IMI for a year or more before it is diagnosed. The greatest development of milk-producing tissue in the udder occurs during the first pregnancy, so it is important to protect the mammary gland from pathogenic microorganisms to insure maximum milk production during the first, and possibly subsequent lactation. Research in New Zealand has shown that *Staphylococcus aureus* mastitis in heifers results in significant production losses during the first lactation, which carries over into the subsequent lactation even if the infected quarters are successfully treated.

Research and Commercial Herd Studies

Scientists at the Hill Farm Research Station became interested in heifer mastitis in the mid-1980s after several area dairymen complained that a large percentage of their heifers were freshening with clinical signs of mastitis. A subsequent study at the Hill Farm Research Station revealed that intramammary infections were initially diagnosed at approximately 9 months of age and persisted throughout pregnancy into lactation. A follow-up study on four commercial dairies demonstrated that about 97% of breeding age and bred heifers were infected. Most of the infections were caused by the coagulase negative staphylococci (*Staphylococcus chromogene*, *Staphylococcus hyicus*;

followed by *Staphylococcus aureus* and environmental streptococci. *Streptococcus agalactiae* were never isolated, and coliforms were only rarely found.

Efficacy of Antibiotic Treatment

Because of the high level of infection found in heifers at local dairies, especially that caused by *Staph. aureus*, attempts to treat infected quarters were made, while management procedures to prevent the disease were developed. From a practical standpoint, the administration of antibiotics by either subcutaneous or intramuscular injections of drugs would be preferred; however, neither of these routes was found to cure IMI. This was because sufficient antibiotic did not pass into the mammary gland, as evidenced by the analysis of secretion samples and tissue biopsy samples for drug residues. Thus intramammary infusion became the route of choice.

A product containing penicillin and streptomycin (Quartermaster, Pharmacia & Upjohn) was used initially in several herds to treat both breeding-age heifers and those in various stages of pregnancy with confirmed infections caused by various bacterial species; several animals of all age groups served as controls. Heifers were restrained; teat ends were sanitized prior to infusion. While administering the antibiotic, the partial insertion technique was used to avoid stretching the teat canal as well as to avoid the introduction of bacterial contaminants. After infusion, teats were immersed in a barrier teat dip to seal the teat orifice and prevent entrance of bacteria. Results showed that the overall infection level in treated heifers was reduced almost 60% compared with controls.

The percentage of quarters infected with *Staph. aureus* was reduced 91% in heifers that had received treatment. This cure rate for heifers is greater than the 25% cure rate observed after cows are treated during lactation using conventional lactating cow therapy. Reasons for this high cure rate are unclear, but the relatively small secretory tissue area of heifer mammary glands might allow for greater drug concentrations in the udder. Similarly, histological studies have demonstrated less scar tissue and abscess formation in the mammary glands of heifers, which would allow for better drug distribution and better contact with colonized bacteria.

In one of the Jersey herds evaluated, an economic analysis was performed to justify use of the heifer treatment program. Production data collected over the first two months of lactation showed that mastitic heifers that had received nonlactating cow therapy during pregnancy produced an average of 5.4 lbs more milk per day than non-treated herd mates that did not receive treatment. At the milk price received at that time, this greater yield translated to a \$42.12 increase for treated heifers, which was well worth the \$5.00 cost of treatment.

A mammary gland infected with *Staph. aureus* for several months to a year will not develop normally, and treatment during the immediate prepartum period would most likely be of little, if any benefit. At this point, the damage is already done. The affected quarters should have been treated earlier in gestation to cure the existing infections, reduce the chronic inflammation, and allow the mammary tissue to develop normally.

When is the best time to treat bred heifers for optimizing cures against *Staph. aureus* mastitis? In a 2-year 175-heifer trial, heifers were sampled shortly after they were confirmed pregnant and at 4-week intervals. After initial sampling, animals were treated with a one-time infusion of one of four nonlactating cow infusion products during the first (0 to 90 days), second (91 to 180 days), or third (181 to 270 days) trimester of pregnancy.

In untreated control quarters, the percentage of quarters infected with *Staph. aureus* remained > 20% through much of the prepartum period, then decreased to 13.3% at calving. In treated quarters, percentages of infected quarters decreased to less than 5% at the first sampling and remained low through calving. An examination of cure rates among treatments indicates that all antibiotics used were equally effective in curing infections, and there was no apparent effect of the timing of therapy; treatment efficacy ranged from 83.3 to 100%.

Therapy during the 1st, 2nd, or 3rd trimester of gestation had no effect on treatment efficacy. The timing of treatment is probably best determined by what is most convenient for the management practices of a dairy or custom grower as long as treatment is administered no less than 45 days prior to expected calving date.

The treatment of heifers during pregnancy with a nonlactating cow product is advantageous because the cure rate is higher than during lactation, especially against *Staph. aureus*. In addition, there are no milk losses during therapy, the risk of antibiotic residues is minimal, SCC at calving is reduced, and milk production is increased in successfully treated cows. Treatment is indicated only in herds experiencing a high prevalence of heifers calving with clinical mastitis. The potential for residues at calving should be considered, especially in animals that calve early. Residue testing should be carried out before mixing milk from treated animals with herd milk.

[Coming in November, Part 2 of this article covers the influence of dietary supplementation, the role of vaccination in mastitis control and other factors to consider.]

Twelfth Annual Mississippi/Louisiana Dairy Management Conference

November 8, 2001

Percy Quin State Park Convention Center
McComb, Mississippi
(Six miles South of McComb, Exit 13 off I-55)

9:00 AM Registration and View Commercial Exhibits

9:30 AM Program

Feed Additives, Management Changes and Marginal Milk

*Dr. Dana Tomlinson, Research & Technical Service Specialist
Zinpro Corporation, Eden Prairie, Minnesota*

Dr. Tomlinson provides nation-wide technical expertise and research guidance for the Zinpro Corporation. Reared on an Ohio dairy, Dr. Tomlinson has focused his research and consulting work on management techniques and products that yield positive returns. He will focus on marginal milk production (the last 5 to 10 pounds of milk) which is where the largest profit is made on dairy farms.

➤ Dr. Tomlinson's presentation is being sponsored by the Zinpro Corporation.

Update on Estate Tax and Planning

*Mr. Frank Blossman, Estate Planning Specialist
Mississippi Farm Bureau Insurance, Jackson, Mississippi*

Mr. Blossman works with agricultural producers to help prepare them for future business decisions such as liquidation, in-family transfers and corporation development. Mr. Blossman will also present recent changes in the estate tax laws. Dairy producers both young and old will benefit from this presentation.

Reproductive Management of Dairy Cattle: Tools for Success

*Dr. Scott Willard, Dairy Science Professor
Mississippi State University Animal and Dairy Sciences Department*

Producer Response Panel

- *Mr. Mike Glenn, Glenn Jersey Farm, Columbia, MS*
- *Mr. Grandy Ladner, Heritage Dairy, Holly Springs, MS*
- *Mr. Stephen Eubanks, Hill Farm Research Station, Homer, LA*

Dr. Willard, a research and teaching professor in the MSU Animal and Dairy Sciences Department, has been researching new techniques and technologies that will improve reproductive efficiencies on dairy farms. Dr. Willard along with the producer response panel will present their management techniques, which have assisted them in achieving reproduction goals.

Please make plans to attend. Lunch will be served at the conclusion of the program, sponsored by the commercial exhibitors and sponsors of the conference. For further information, contact Wesley Farmer at (601) 835-3460 or Dr. Charlie Hutchison at (225) 578-2214.

SEPTEMBER 2001 HONOR ROLL HERDS**

DAIRY	COUNTY	NO. COWS	LBS. ECM	2X 3X	Rolling Herd Average			
					MILK	FAT	PROT	DOT
FREEMAN DAIRY	PIKE	144	50.0	2X	20435	709	639	09/14
MILTON & TERRY JEFCOAT	JONES	172	47.4	2X	19711	655	596	09/20
MS.STATE UNIVERSITY	OKTIBBEHA	169	47.0	2X	21995	856	677	09/26
DIXIE DAIRY SALES	CARROLL	475	46.9	2X	21800	997	638	09/04
TIM WEEKS	COPIAH	73	44.0	2X	21756	849	677	09/03
MACTOC FARM	OKTIBBEHA	190	43.2	2X	28294	887	842	09/03
A L BOYD JR	WALTHALL	76	43.1	2X	20667	622	612	09/05
DAVID ROBINSON & SONS	RANKIN	131	43.1	2X	23176	854	678	09/20
RUTLAND FARM	LINCOLN	101	42.4	2X	15352	510	463	09/21
THOMPSON BROTHERS	MARSHALL	116	42.0	2X	19495	745	594	09/03
LEON BARDWELL DAIRY	LINCOLN	44	41.5	2X	20853	604	620	09/15
JOHN T MCREYNOLDS	OKTIBBEHA	111	40.7	2X	16120	584	485	09/20
SPEAKS & SON	WALTHALL	271	40.6	2X	18676	711	574	09/22
HERITAGE DAIRY	TATE	415	40.6	2X	23233	921	710	09/19
BRAD BEAN	AMITE	223	40.4	2X	20151	748	602	09/26
ROWZEE JERSEY FARM	NEWTON	168	40.4	2X	16534	763	612	09/11
QUIN'S DAIRY	PIKE	55	40.2	2X	16622	530	498	08/31
LARRY WALKER	NOXUBEE	108	39.8	2X	18153	602	550	09/16
NORTH MS BR EXP STA	MARSHALL	112	38.5	2X	18901	691	597	09/10
CLEMMER & HILL DAIRY	TIPPAH	149	36.6	2X	20609	760	620	09/11
LEN SMITH	AMITE	98	36.5	2X	14403	503	446	09/13
PAT ARD	LINCOLN	183	35.3	2X	16356	616	520	09/13
COASTAL PLAIN EXP STA	NEWTON	170	35.1	2X	22033	817	661	09/10
G & B DAIRY	LINCOLN	64	34.9	2X	20809	893	761	09/04
W E & CRAIG JACKSON	COPIAH	144	34.1	2X	13399	562	469	09/26

Top 25 herds enrolled on supervised DHIA testing programs by test day energy corrected milk for all cows.

**ECM = (.3246 x test day milk) + (12.86 x test day lbs. fat) + (7.04 x test day lbs. protein)

Will There be a New Farm Bill Passed by Congress during 2002?

Dr. C.W. "Bill" Herndon
Dairy Economist, MSU

Many political experts in Washington, D.C. & the dairy industry have been amazed by the fact that the U.S. House of Representatives was able to pass farm legislation (H.R. 2646) that would provide the framework for agricultural policy & programs over the next 10 years. Under the leadership of two Representatives from TX, the Chair of the House Agriculture Committee (Larry Combest-R) & the Committee's ranking minority leader (Charlie Stenholm-D), the House passed a farm bill on a vote of 291 to 120 that would be effective from January 1, 2002 to December 31, 2011. The most astonishing aspect of this process has been the speed in which the full House offered, debated & dealt with (mostly defeated) a wide range of amendments. Some of the issues that fueled a quick passage of this legislation were changing political priorities with the War on Terrorism, expectation of less government tax revenues, & need for a farm revenue "safety net." The House version of the Farm Bill had several relatively "minor" dairy provisions; the most important being a continuation of the Dairy Price Support Program (DPSP) at the \$9.90/cwt. level for the 10-year period. Other features

were a continuation of the Dairy Export Incentive Program (DEIP) & the Fluid Milk Processor Promotion & Education Program, & an economic study of the impact of national dairy programs. Notably absent in the legislation was the lack of any authorization of any/all dairy compacts despite several last-minute efforts to devise a new dairy bureau to regulate regional Class I milk prices & distribute revenues to farmers under a national pooling procedure.

After the House passed H.R. 2646, the U.S. Senate is now considering this bill & getting pressure from a variety of sources including: the Bush Admin., farm organizations, their own members, & House colleagues. The USDA (via the White House) does not support the House version because the way money will be distributed to farmers & the \$73+ billion cost of the farm bill. Most farm organizations have urged the Senate to pass the House version to bring a quick closure to these issues & provide a "safety net" for their farmer constituents. Several Senate members are considering making changes to H.R. 2646 or providing their own features that would redirect monies away from commodity programs to increase environmental "green" payments. House members are asking the Senate to pass H.R. 2646 without any major changes in the legislation. Because of what happened in the House, no one seems willing to speculate about what to expect but more & more people now think that there is a "good" chance that a new Farm Bill will be passed by Congress in 2001.

November Advanced Class I Milk Declines by 17 Cents to \$18.86/cwt.

Dr. C.W. "Bill" Herndon
Dairy Economist, MSU

Dairy farmers & the industry are preparing for sharp declines in milk prices. Weakening demand for butter & cheeses & the events related to the terrorist attacks have quickly reversed this year's "bullish" market psychology & have driven down prices 35 - 40% since August. These plunging prices have been fueled by worries about consumer reactions to the horrific acts despite the fact that milk supplies continue to lag behind last year's levels. The recent near-record high milk & dairy prices have forced replacement heifer & cow prices up causing producers to evaluate how to pay for the \$2,500+ animals. Most dairy analysts have the opinion that the market has overreacted to the downturn in the economy, the attacks, & has been overwhelmed by a "negative market psychology." The silver lining is that peaking demand leading up to the Thanksgiving & Christmas holidays should stabilize prices. However, drastic declines in travel & up-scale dining have severely curtailed institutional consumption of products especially cheeses.

The USDA reports that the Nov. 2001 Advanced Class III Skim Milk price was \$9.60 / cwt. compared to the Advanced Class IV Skim Milk price of \$7.26 / cwt. The USDA announced on Oct. 19 that the Nov. 2001 Advanced Class I "base" milk price would be \$15.76 / cwt. (3.5% butterfat). After adding the \$3.10 Class I price differential for the pricing zone (Atlanta & Starkville) to this "base" price, the Advanced Class I milk price for Nov. will be \$18.86 / cwt. Since about 65 % of Mississippi milk is processed into Class I products, farmers will most likely realize an even greater decline in revenues because butterfat, Class II, III &/or IV prices will certainly decline severely before the end of Nov. & accentuate this Class I price decline.

Market Conditions. The U.S. economy is showing resiliency & is steadily recovering from the one-two punch delivered by our slowing economy & terrorist attacks. Clearly, every American has been/will be radically affected by these acts & the subsequent bioterrorism scares. Fewer Americans are traveling regularly. Airlines, hotels & white tablecloth restaurants are suffering serious setbacks. Travel-related cutbacks have caused a decline in institutional (hotels, restaurants, etc.) demand for dairy products. This newsletter incorrectly reported that the terrorist acts would have little impact on demand because "it was assumed that" consumers would replace out-of-home with in-home consumption. In reality, cheese consumption has been especially hurt because more than 60% of cheese is eaten outside the home. With an anticipation of milk output recovery, buyers have been reluctant to make purchases in the hope that prices will decline further. This hesitation has pushed dairy prices down even more. Oct. & Nov. are usually the months when processors are filling their pipelines in anticipation of holiday demand for butter & cheeses. Demand normally peaks during the fall, which

should stabilize cheddar cheese & butter prices until the end of 2001. Milk production has begun to increase with the cooler temperatures & processing schedules are expanding.

Current demand-supply conditions have caused Grade AA butter prices to plunge to \$1.25 / lb. on Oct. 19. Block & barrel cheddar prices have plummeted to less than \$1.20 in mid-Oct.. The market tone is described as "weak" indicating that deteriorating demand has dominated in Oct. but the current price outlook is confused by peaking holiday demand. Class III futures contracts settlement prices closed as low as \$10.75 / cwt. for the Nov. contract & \$10.90 for the Dec. contract. Grade AA butter futures contracts were being traded at \$1.30 / lb. for the Dec. contract & near \$1.37 & \$1.42 for the March & May 2002 contracts, respectively. It is expected that these factors should force Class I prices (Atlanta/Starkville zone) to fall sharply (more than \$3.50) & be reported near \$15.25 / cwt. for Dec. with a slight recovery forecasted in the first quarter of 2002.

Milk Production. Sluggish milk output continues to be subjugated to significant declines in the national dairy herd. Improving weather & forage quality during Oct. & Nov. should cause milk production to recover. Revised USDA statistics indicated that Sept. milk production was down 0.8% compared to 2000 (144,000 fewer cows milked at +11 lbs. / cow). Comparing the first nine months of 2001 to 2000, the amount of milk produced in the Southeast fell 6.5%. Mississippi farmers marketed 6.2% fewer lbs. of milk during this 9-month span & sold 6.3% less milk during the 3rd quarter of 2001 vs. 2000. The number of milk cows in Mississippi fell from 36,000 to 35,000. The USDA 20-state monthly report showed national milk production declined 0.7% between Sept. 2000 & 2001 (91,000 fewer cows yielding an avg. of +7 lbs. / cow). During this period, seven states recorded constant or increased output while 13 states suffered decreases. The three southeastern states in this report had mixed changes. The milk-feed price ratio for Sept. was 3.71. Recent economic conditions have provided dairy producers with motivations to boost milk production.

Dairy Product Prices. Chicago Mercantile Exchange (CME) cheese markets finds that 40# block prices decreased to \$1.20 on Oct. 19. Barrel cheddar prices have undergone a similar experience. 500# barrel cheddar cheese dropped to \$1.17 on Oct. 19. Many processors complained that butterfat prices were "too high" as spot cream prices approached \$3.00 / lb. & were anxious to see milkfat prices decline. Processors were pleased to see the crash in product prices that triggered a drop in Class II cream. To the industry's surprise, nonfat dry milk prices (NDM) have remained stable. Export demand for NDM & related dairy products have bolstered NDM prices above the support level. The USDA made no purchases of non-fortified & fortified NDM from late Aug. to early Oct.. But, western NDM processors have begun weekly offerings of 2-3 million lb. of NDM to the CCC during mid-Oct. despite cash prices ranging from 93 to 96 cents / lb. in the West. NDM cash prices across all regions of the country, particularly in the Southeast, have declined & have ranged between \$0.96 & \$1.02 / lb. in mid-Oct..

Near-term Market Outlook. As of mid-Oct., Class I milk prices are expected to decline by as much as \$3.50 to \$4.00 before the end of 2001. The price outlook over next three to nine-month period appears very troubled. Sharp declines in dairy & milk prices are being predicted with the December Advanced Class I milk price for Mississippi (Starkville zone) expected to be in the range of \$15.00 to \$15.50. Additionally, the Oct. Class III price is expected to decrease & be reported near \$14.30 with the Nov. & December Class III prices predicted to be near \$11.00 / cwt. The CME reported on Oct. 22 that Class III (Class IV, in parentheses) futures contracts settlement prices were \$14.40 (\$14.25) for the Oct. contract, \$10.90 (\$10.75) for Nov., \$11.05 (\$11.00) for December, & \$11.48 (\$11.25) for the January 2002 contract.

Uniform Or "Blend" Price For September 2001

North Zone:	\$17.89
North Central Zone:	\$18.09
South Central Zone:	\$18.29
South Zone:	\$18.39
Coastal Zone:	\$18.49

Southeast F.O. #7 "Blend" Price Increases for Seventh Month in a Row

The Southeast Federal Order Milk Market Administrator reported the Sept. 2001 "blend" or uniform price in the Atlanta & Starkville "base" zone of FO #7 was \$18.09 / cwt. for 3.5% butterfat milk. (North Zone - \$0.20, North Central Zone "base" zone, South Central Zone +\$0.20, South Zone 10 +\$0.30, Coastal Zone +\$0.40 / cwt.). For Sept., the butterfat prices & avg. butterfat tests for each class were: Class I, \$2.24 / lb. & 2.17%; Class II, \$2.45 / lb. & 7.99%; Class III, \$2.44 / lb. & 4.02%; & Class IV, \$2.44 / lb. & 8.12%. Factoring the avg. butterfat test with the lbs. of skim milk used in the four milk classes provides this newsletter's "net" milk price for each class. The Sept. blend price of \$18.09 / cwt. was determined by: (1) "net" Class I price of \$15.65 on 64.5% of the milk; (2) "net" price for Class II of \$26.85 on 9.97% of the milk; (3) "net" price of \$17.19 on 17.8% of the milk used for Class III; & (4) "net" Class IV price of \$29.75 on 7.68% of the milk.

Prices of Holstein Dairy Cattle Replacements

<u>Location of Sale</u>	Blansit, MO	Thomasville, GA
<u>Auction Date</u>	October 16	October 22
<u>No. of Head Sold</u>	191	404
<u>Springer Heifers</u>		
Supreme	\$1,775	\$1,760-\$2,160
Approved	\$1,600	\$1,500-\$1,740
Common	Not Available*	\$810-\$1,210
<u>Springer Cows</u>		
Supreme	NA*	NA*
Approved	\$1,400-\$1,440	\$1,350-\$1,450
Common	\$700-\$800	\$600-\$900
<u>Fresh Milking Cows</u>		
Supreme	NA*	\$1,730-\$1,805
Approved	NA*	\$1,605-\$1,720
Common	\$800-\$900	\$590-\$1,090
<u>Calves 1-7 Days Old</u>		
Holstein Heifers	\$250-\$350	NA*
Holstein Bulls	\$45-\$85	NA*
Combined	NA*	\$50-\$300

Class I Price For November 2001 (Advanced Price)

North Zone:	\$18.66
North Central Zone:	\$18.86
South Central Zone:	\$19.06
South Zone:	\$19.16
Coastal Zone:	\$19.26

