

Colorado Dairy News

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Factors Influencing Dairy Cow Reproductive Efficiency

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The goal of maintaining herd pregnancy rates in current production systems is a challenge due to large herds, confinement systems that are not necessarily conducive to heat detection, cow identification and implementation of nutritional management systems that meet individual cow requirements during both the transition and lactation periods.

An ovulation synchronization and timed insemination program like Ovsynch was developed to eliminate reliance on detection of natural heat. However, it is imperative that the producer and the veterinarian have a thorough understanding of the principles of ovarian manipulation in order to understand how the system functions when they make herd management decisions to implement the program. Implementation of the Ovsynch program is not successful unless the lactating dairy cows are cycling and the protocol is initiated at the appropriate stage of the estrous cycle. A presynchronization program involving PGF_{2a} can manipulate the timing of the estrous cycle to improve the success of the Ovsynch program. Use of the pre-synchronization program with the Ovsynch program can improve pregnancy rates to 48% from 36% with no pre-synchronization program. A new program, Heat Synch, involves the strategic use of ECP to induce ovulation as part of a timed insemination program.

Anestrous is a significant component of poor fertility rates. In our study of 499 cows in which blood progesterone levels were measured prior to initiation of the Ovsynch protocol, 23% had not started to cycle by 63 days postpartum. First calf heifers had a higher frequency of anestrous than multiparous cows. Pregnancy rates to Ovsynch were 22.4% for anestrous cows versus 41.7% pregnancy rate at 74 days after insemination of cycling cows. Efforts to maximize cow health, comfort and nutritional status following parturition will be reflected in lactation, higher numbers of cycling cows and improved reproductive performance.

Concern that low body condition score (BCS) adversely affects the Ovsynch program has been confirmed in our field trials. Cattle with BCS less than 2.5 had lower pregnancy rates at days 27 and 45 after insemination than those with BCS of 2.5 or greater. Based on these results, the economic impact of low BCS (<2.5) was predicted by dynamic modeling. There was a difference in net revenue of \$10.33 per cow per year as to whether 10% versus 30% of the herd had low body condition scores at the

(Please continue on page 3, under Reproduction)

Colorado # 2 in 2001 Milk Production Per Cow

The US milk production statistics are in for 2001 and Colorado has done very well. Nationally, Colorado ranks 18th in total milk production 2nd for milk production per cow only behind Washington State.

Nationally U.S. milk production decreased in 2001 by 1.3% or 165.3 billion pounds. The last year that annual milk production decreased from the previous year was 1996. Only 25 states posted increased total production when 1996 is compared to 2001. The average production gain was 12.8%. Only seven states exceeded this average percentage increase, including Colorado with a gain of 20.6%.

Of the states ranked in the top 10 for total milk production, 5 are west of the Mississippi and 5 are east. In the rankings for top 10 states for milk production per cow, 9 states are west of the Mississippi. California, Idaho, Michigan, New Mexico and Washington are the only states ranked in the top 10 in both total milk production and production per cow.

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Important Dates:
Mark Your Calendar

March 25, 2002 (6:00-9:30 pm.) and March 26, 2002 (10 am-2:30 pm.): Peak Performance Seminars, Greeley Guest House. Dr Jim Spain from the University of Missouri and Dr William Thatcher from the University of Florida. Sponsored by Pharmacia Animal Health and Monsanto Dairy Business. For more information contact Chris van Anne (970)282-8060 or Teena Barnett, (303) 255-4563.

March 30, 2002: 2002 Beef Challenge Calcutta, CSU ARDEC Facility. View cattle at 5 pm and bid on the best at 6:30 pm. Event sponsored by the Colorado Livestock Association. For more information contact Brett Kaysen at Colorado State University, (970) 491-1427.



**Integrated
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A Message From Your Extension Dairy Specialist.....

Congratulations to all of the dairy producers in Colorado! Dairy producers in our state need to be extremely proud of production levels achieved in Colorado in the past year. Colorado now ranks as the 18th largest dairy state based on total production. Since 1996 we have improved 8 places within states for total production. Twenty-five states recorded milk production increasing since 1996. Colorado ranks 5th among those states with approximately 20.65% increase in production since 1996. The top five production state are 1) California, 2) Wisconsin 3) New York 4) Pennsylvania and 5) Minnesota.

The most significant ranking for which Colorado producers need to be proud is the 2001 milk production per cow ranking. Colorado is now the 2nd highest as far as production per cow rankings. We are second only to Washington State, a position held by this state for years. Colorado dairy producers moved from position number 6 to position number 2 in the last 8 years.

Reproduction, Reproduction, Reproduction. If you saw our state's summary of reproductive goals and benchmarks you will want to attend the Peak Performance Seminars March 25 and 26th sponsored by Pharmacia Animal Health and Monsanto Dairy Business. Dr Jim Spain from the University of Missouri and Dr William Thatcher from the University of Florida will discuss reproduction and the transition cow. Dairy producers in our state need to do a better job on reproduction if we are to maintain the current milk production status. I look forward to seeing you there.

Sincerely,

William R. Wailes, Colorado Extension Dairy Specialist

Commodity Price Quotes

By-Product Feeds	Price/Ton Spot Loads	Price/Ton June-Sept
Bakery Waste	\$92.00	NA
Blood Meal	\$340.00	NA
Corn Gluten Feed	\$83.00	\$83.00
Corn Gluten Meal	\$255.00	\$255.00
Corn Hominy	\$87.00	\$88.00
Flaked Corn	\$102.00	\$105.00
Whole Corn	\$87.00	\$90.0
Cottonseed Meal	\$146.00	\$152.00
Whole Cottonseed	\$152.00	\$158.00
Distillers Grains	\$98.00	\$100.00
Pork - Meat & Bone Meal	\$205.00	NA
Tallow	\$0.1375	\$0.16
SBM - 48%	\$172.00	\$175.00
Wheat Middlings	\$85.00	\$73.00
Soybean Hulls	\$83.00	\$86.00
Canola Meal	\$150.00	NA

These price quotes are delivery at Greeley, Co

Developing a Plan for Treating Mastitis: Part 2

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Pharmacia Animal Health, Fort Collins, CO**

There are five things that a dairy producer should consider when developing treatment protocols for clinical mastitis. The first is the bacteriological causes of mastitis and how the causes affect treatment protocol. This was discussed in the first article in this series published in the January 2002, Colorado Dairy News. Other considerations in developing treatment protocol include:

*****A simple system of grading the severity of mastitis into three categories of mild, moderate and severe.

*****Development of cost effective treatment protocols that consider the drug cost, the amount of milk discarded, and the success in achieving bacteriological cures, reducing somatic cell counts, and preventing future relapses.

*****Establishment of a bacteriological cure as well as a clinical cure.

*****An appropriate record system to allow outcome assessment of treatment protocols.

Grading system for mastitis

A simple system for grading the severity of mastitis is the basis for deciding which treatment protocol to initiate.

Grade 1 mastitis is a mild case of mastitis characterized only by changes in the appearance of milk. These changes may include flakes or clots seen only in foremilk. If dairies are not routinely practicing forestripping, most cases of mild mastitis may be missed.

Grade 2 mastitis is a moderate case of mastitis characterized by changes in the milk and signs of inflammation in the affected quarter such as swelling, increased temperature and sensitivity, and redness.

Grade 3 mastitis is a case of mastitis characterized by changes in the milk, signs of inflammation in the gland, and signs that the cow is sick. Figure 2 shows that as the severity of mastitis changes, the bacterial isolates for the mastitis change. The proportion of coliform cases (Coliform + No Growth) more than doubles as the severity of cases goes from mild to severe (27% vs. 60.2%, respectively). The proportion of cases caused by streps and staphs decrease from 52% in mild cases to 28% in severe. *(Please continue on page 4, under Mastitis)*

Bacterial Isolates from Mild and Severe Cases of Clinical Mastitis

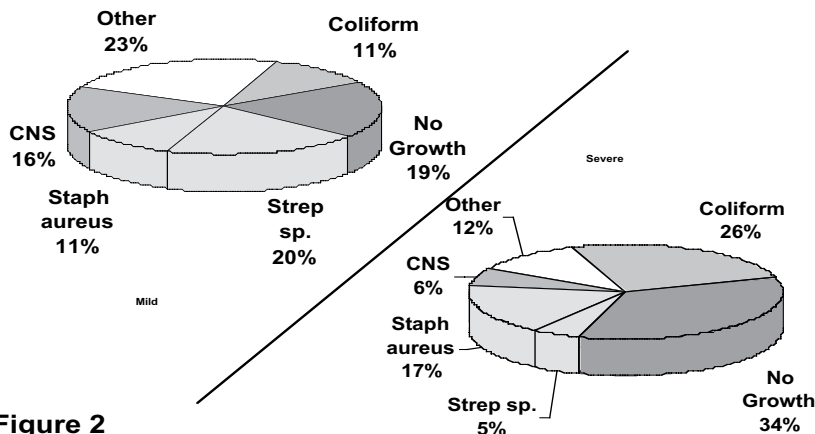


Figure 2

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time the Ovsynch program was initiated. Thus, it is essential that producers try to nutritionally manage the dynamics of body condition postpartum to optimize fertility rates.

Also in our field studies use of bST treatment in a Presynchronization/Ovsynch program for first service increased first-service pregnancy rates to the Ovsynch protocol. The beneficial effect of bST is probably due to enhancement of early embryonic development.

Peak Performance Seminars Focus on Reproduction and The Transition Cow

Dr Jim Spain
University of Missouri
and
Dr William Thatcher
University of Florida.

March 25, 2002
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Greeley Guest House.

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8060 or Teena Barnett, (303)
255-4563.

(Mastitis, continued from page 3)

The common recommendation to treat mild cases of mastitis with intra-mammary antibiotic tubes seems logical because over half the cases of mild mastitis are caused by bacteria that are likely to be susceptible to the antibiotics in commercial tubes. On other hand, it makes sense to treat severe cases of mastitis with antibiotics that are given intravenously or intramuscularly because a greater proportion of severe cases are caused by coliform bacteria. Moderate cases of clinical mastitis will likely benefit from a combination of systemic and intra-mammary therapy.

Treatment of Mild to Moderate Cases of Mastitis

Studies of Gutterbock have shown that clinical cure rates for mild cases of mastitis were similar whether antibiotics were used or not. (See sidebar this page, under Mastitis Research.) Fifty to 60% of the mild clinical mastitis cases were caused by coliform bacteria and would not have benefited from intra-mammary antibiotic therapy. Although clinical cure rates are similar whether antibiotics are used, the relapse rates are higher when antibiotics are not used. Hence, intra-mammary antibiotics are used to achieve bacteriological cures and prevent future relapses of mastitis. A significant part of the cost of treatment with some antibiotics is the cost of extended milk discard needed to prevent antibiotic residues in milk.

At the other end of the spectrum are severe cases of clinical mastitis, 60 % of which are caused by coliform bacteria. Research at Colorado State University demonstrated that 40 to 45% of cows with severe coliform mastitis have a bacteremia. Thus, systemic antibiotics that are effective against gram-negative bacteria are indicated for the treatment of the mastitis as well as the bacteremia. Another 33% of severe mastitis cases are caused by gram-positive cocci, staph, strep and CNS bacteria. Since antibiotic therapy should be initiated before culture results can be obtained, the logical choice is a broad-spectrum antibiotic given systemically. In addition to the broad-spectrum antibiotic, supportive therapy including fluids and anti-inflammatory drugs should be administered.

Clinical versus Bacteriological Cures

A clinical cure occurs when the appearance of the milk returns to normal. Bacteriological cures occur when the bacteria causing the mastitis are eliminated from the quarter. Clinical cures can occur without bacteriological cures. The cows' immune response returns the appearance of milk to normal in 6-8 milkings from the onset of the mastitis whether bacteria have been eliminated or not. The important reasons for achieving bacteriological cures are that the rate of relapses are reduced, somatic cell counts are reduced, and the quarter is not a source of bacteria to infect herd mates.

The effectiveness of commercial intra-mammary antibiotic tubes are usually evaluated on the basis of clinical cures. Yet, the milk of most cows with mild mastitis returns to a normal appearance within 6-8 milkings from onset of clinical mastitis whether or not cows are treated with intra-mammary antibiotics. The clinical cure rates were essentially identical whether cows were treated with oxytocin or commercial intra-mammary antibiotic tubes. The real benefit for using commercial intra-mammary antibiotic tubes is not to achieve clinical cures but to achieve bacteriological cures for environmental strep and CNS mastitis. By achieving bacteriological cures, the risk of cows having relapses of clinical mastitis is markedly reduced, somatic cell counts are reduced, and with bacteriological cures, bacteria are not being shed from the quarter and it is not a source of infection for herd mates.

Developing record systems for mastitis

Record systems provide a means to evaluate the effectiveness of treatment regimens for mastitis. Good record systems can help determine not only when milk can be sold for human consumption but also when it is safe to sell the cow for slaughter.

Mastitis Research

A trial comparing three treatments for mild mastitis was conducted by Gutterback in three California dairy herds. All cows were milked twice daily.

Group A received a treatment of amoxicillin (Amoximast®) in the affected quarter every 12 hours for a total of three treatments.

Group C received a treatment of cephalosporin (Today®) every 12 hours for a total of two treatments.

Group O were treated with 100 units of intramuscular oxytocin every 12 h for two or three milkings. Clinical cures were defined by the return of the quarter and milk to normal.

No difference existed in clinical cures (67.6, 67.7 or 66.7%) between groups. Two thirds of the quarters were perceived as having clinical cures whether the quarters received antibiotics or not.

A second trial was conducted using the same treatment groups to assess the costs of the three treatment strategies.

The clinical cure rates were 83% for oxytocin, 79% for amoxicillin, and 86% cephalosporin. Again the clinical cure rates were high and nearly equal for the treatments.

The cost of treatments was different for the 3 groups: The total cost of treatment per case of mild mastitis was \$34.88 per case for Group O (oxytocin), \$35.52 per case for Group A (amoxicillin), and \$54.47 per case for Group C (cephalosporin). The cost of treating cows with cephalosporin was \$20 greater per case than amoxicillin because of the need to discard normal appearing milk that contained antibiotic residues.

Though not included in the financial analysis, relapse rate differed between groups. Cows with a mastitis caused by strep and treated with oxytocin had a 75% relapse rate compared to a 20 to 25% relapse rate when treated with amoxicillin or cephalosporin.