UK UNIVERSITY OF KENTUCKY College of Agriculture

Kentucky Dairy Notes

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Strategies to Deal with the Volatility and Increased Dairy Feed Costs … Fall Forages, Culling Decisions, and Feedstuff Substitution Options

By Donna M. Amaral-Phillips

Prices for corn grain, soybean meal, and other commodities used in grain mixes have increased dramatically over the past month or two. Much of this increase in cost has resulted from lower carryover from stockpiles of last year's corn crop(lowest in 16-17 years), drought conditions that have limited or prevented pollination and/or development of corn kernels, drought conditions limiting soybean production in South America, and uncertainty of this year's crops in the US for both corn and beans. In July, the USDA decreased projected yields of corn grain by 20 bushels to 146 bushels/acre, the lowest in 7 years. Prices of all feed commodities are tied to the prices of corn and soybean meal, thus major increases have been seen in these also. Milk prices seem to be improving, thus giving a positive spin on a very trying situation. One key for surviving these very trying times is to step back from the situation and think through ways you can make the best of the cards being dealt. This article covers some areas you might want to consider.

What can Dairy Farmers do to Endure Fluctuating Prices?

- **Be proactive** – Step back and re-examine your dairy's feeding program- not only from a standpoint of what you are feeding your cows but also how you feed and manage your cows. Sometimes we get caught up in the smaller day-to-day tasks and forget the big picture. There are things you can do to make a difficult situation better than it could be. This may entail trying new feedstuffs in your dairy herd's diet, reexamining how you do things, and listening to suggestions from neighboring farmers and industry personnel and seeing how you might incorporate these suggestions.
- **Plan ahead for this next feeding year now:**
  - ☑ *Step 1: Test all forages*-- If you have not already done so, sample and test all of the forages for their nutrient content you have to feed this next year. This includes forages that are targeted to be fed to the dry cows and heifers. Cost savings may be realized through feeding programs for heifers and dry cows. In this financial climate, small savings in multiple places can help cash flow. Also, nutrient content of forages will definitely vary from previous crops on your farm.
  - ☑ *Step 2: Sort forages by their quality.* Energy is the hardest nutrient to provide to lactating dairy cows. Thus, they need to consume the higher energy forages available. Within the milking herd, the highest quality forages should be fed to the early lactation cows, high producing group, and/or fresh cows. This may mean feeding more than one ration to your herd or more rations if you already group feed. By sorting the available forages by quality, these can be targeted for these with higher nutrient needs or times of the year when more cows are in early lactation. Within a particular forage, increases in the content of acid detergent (ADF) or neutral detergent fiber (NDF) result in cattle eating less of the feed and what they do eat, they get less energy for milk production or growth.
  - ☑ *Step 3: Inventory available forages separated by their quality* and share these inventories with your nutritionist.
  - ☑ *Step 4: Develop a plan for using available forages* considering where they are best suited based on their quality. Now is the time to identify shortfalls and develop a plan to purchase forages if needed. Western and local alfalfa hay is already projected to be in short supply and prices are increasing. Some farmers have replanted both corn and/or sorghum-sudangrass for additional

Figure 1. Forages that can be planted after mid August with adequate rain for germination and growth in KY

Cereal rye
- Can provide fall and spring growth if planted from mid August till Sept 1st
- Low chance of fall growth for harvest or grazing if planted after October 1st
- Can be planted up to November 1st for spring forage

Spring oats
- Planted in mid August till Sept 1st for fall forage
- Can yield 1.5-2.5 tons of hay per acre
- Does not survive the winter- only fall forage

Cereal Rye and turnips
- Planted mid August to mid September
- Fall grazing- rye and turnips
- Spring grazing—just cereal rye (turnips die over winter)

Spring oats and turnips
- Planted mid August to mid- September
- Fall grazing only

Annual ryegrass planted in fall
- Not harvested until next spring
- Compared to other annual spring crops- grows longer in the spring

crops this season. Unfortunately, planting dates (before August 1st) for these crops has gone past. Options for crops you might consider for grazing, hay or silage are identified in figure 1.

- **Review cow production and management records** to identify cows that should be culled or dried off early: Cows with longer days in milk and short bred, problem breeders, and/or those with milk production below the level needed to cover at least feed costs may need to be culled or dried off early. For example, if it costs on average $7.18 per day to feed the average cow in your herd, cows would have to produce over 40 lbs of milk (assumes $18/cwt milk) to cover feed costs alone.
- **Review feed storage methods to minimize losses**: Feed losses can quickly increased feed cost and good management and feeding practices can help minimize these losses.

Example to calculate feed costs

65 lbs corn silage @ $45/ton = $1.46
5 lbs alfalfa hay @ $250/ton = $ 0.62
24 lbs grain @ $425/ton = $5.10
Total Feed Cost = $7.18/cow/day

Amount of milk needed to cover average feed cost
@ $18/cwt milk = 40 lbs milk ($7.18/0.18)
@ $20/cwt milk = 36 lbs milk

* Dairy farmers should use their own prices to calculate their feed cost- This is an example for illustration purposes only.

☑ *Properly covered silage decreases losses:* Improperly or uncovered silage structures result in excessive losses of dry matter or potential feed. A study with uncovered bunker silos showed a 75% loss of dry matter of corn silage within the top 10 inches and 25% losses within the next 10 inches of surface area on top of the bunker compared to bunkers properly covered with plastic and tires. For a 30 ft by 100 ft bunker, approximately 50 tons of silage would be lost equal to $2250 of silage (worth $45/ton silage). These losses are substantial and are not seen unless the difference between the amount of silage entering and fed out of a structure is measured. Bunkers and piles need to be packed well especially the top 6 inches of silage and then covered with plastic. Tires are placed on top of the plastic to not only hold the plastic in place but also exclude oxygen. Tires should touch one another to achieve these goals and minimize spoilage and dry matter losses in the top layers of silage. Uprights should be leveled off and also covered with plastic. Take time to limit access by raccoons and other wildlife that can dig holes in the surface of plastic and greatly increase spoilage. With bags of silage, it is important to prevent birds and rodents from damaging the bags.

☑ *Manage the face of bunkers, bags and upright silos* to minimize silage heating by maintaining a clean face between feedings. Silage removed from the packed surface and left unfed will heat and decrease consumption by cattle. Silage from bunkers should be removed using a silo defacer or carefully from the top down with a tractor bucket.

☑ *Prevent losses when storing concentrates and/or commodities.* Losses can occur when they are loaded into the grinder mixer or TMR wagon in unprotected locations (wind losses). Rodents also need to be controlled to prevent losses. Assuming a dairy herd with 100 milking cows are fed 22 lbs of grain mix daily, a 2% additional loss of this concentrate mix to wind, rodents, and wasted feed amounts to over 1300 lbs of feed monthly, $276 wasted for a grain mix valued at $425/ton, or enough grain mix to feed 2 cows for a month.

☑ *Check scales* on the grinder mixer and/or TMR mixer to make sure they are working properly and the mix contains the correct amount of each ingredient.

☑ *Routinely measuring dry matter content of forages* and routinely adjust amounts feed will be critical this year as some silage was put of wetter than normal.

- **Call your nutritionist** and ask them for suggestions regarding your dairy's feeding program: Nutritionists serve many dairy farms in your area and are getting many questions regarding how to get milk from cows with cheaper feed costs. They may not have time to stop by and visit unless they are specifically invited. By taking the time to communicate with them, you are showing that you are not only concerned but want to look at other options which may lower feed costs while maintaining production. Be willing to listen to their suggestions and investigate ways to make their suggestions work. Most of all, remember the expression "you catch more flies with sugar than with vinegar". Your nutritionist has probably lost as much sleep as you trying to figure out ways to deal with this situation.
- **Constantly review balanced rations** for the milking dairy herd: The dry weather pattern has greatly changed the quality of forages available to feed the milking herd. Early reports are showing that drought stressed corn is lower in energy than anticipated. In addition, commodity prices are fluctuating widely. For example, some commonly used grain or byproduct commodities are seeing prices increase 20 to 50% from July 2012 to August 2012. Working closely with your nutritionist is very important to capitalize on any available feed savings. To deal with these rapidly fluctuating feed costs dairy farmers will need to balance and evaluate feeding programs more frequently than previous years.
- **Lower priced commodities can replace some corn and soybean meal in diets:** Dairy cows and heifers need nutrients not ingredients to support milk production, growth, and the cow/heifer herself. By replacing some of the corn, soybean meal, or other high priced commodities in the diet, feed costs can be reduced. Commodities and byproducts often increase in price alongside increased prices seen for corn and soybean meal. Computer programs, like FeedVal (http://www.uwex.edu/ces/dairynutrition/spreadsheets.cfm) and Sesame (http://www.sesamesoft.com), can be used to calculate the feeding or nutritional value of these feeds. If these feeds can be purchased cheaper than their nutritional value, they may be able to partially substitute for higher prices ingredients (see table below).

Break Even Price: If you can purchase commodity less than this price, consider purchasing or substituting this feed into diets for dairy cattle. This table assumes 3% waste for dried commodities and 10% for wet.			
Commodity	Corn $8/bu SBM $ 525/ton	Corn $9/bu SBM $ 575/ton	Corn $10/bu SBM $ 625/ton
Bakery product, dried	$ 303	$ 341	$ 379
Barley	$ 298	$ 333	$ 369
Brewer's grains, wet (22% DM)	$ 77	$ 85	$ 93
Corn gluten feed			
Dried	$ 350	$ 386	$ 423
Wet (49% DM)	$ 177	$ 195	$ 214
Cottonseed meal, 41% CP	$ 459	$ 502	$ 545
Distillers grains with solubles			
Dried	$ 381	$ 413	$ 453
Wet- Bourbon (28% DM)	$ 108	$ 119	$ 141
Wet- Ethanol (34% DM)	$ 131	$ 145	$ 159
Wet- Ethanol Modified(50%DM)	$ 192	$ 213	$ 234
Hominy	$ 283	$ 319	$ 355
Rice Bran	$ 314	$ 345	$ 377
Soyhulls	$ 282	$ 316	$ 350
Wheat bran	$ 291	$ 322	$ 354
Wheat grain	$ 306	$ 343	$ 379
Wheat middlings	$ 336	$ 372	$ 408
Whole cottonseed	$ 398	$ 443	$ 488

Weekly, the University of Missouri updates a price list with potential vendors and availability of common byproducts (http://agebb.missouri.edu/dairy/byprod/bplist.asp). Shipping costs should be added to the prices listed. In addition, check to make sure you understand the nutrient content of the product you are purchasing. For example, some dried distillers grains have the oil removed and contain less energy than those containing the oil. This listing also contains some ingredients not typically included in dairy rations, such as bakery feed and cereal, but may be a good addition depending on other nutrients in the ration. Rice hulls should not be used in dairy feeds and are used as bedding in poultry houses.

As an example, for the week of July 19, 2012, the University of Missouri byproduct feed price listing had two sources of cottonseed meal listed averaging $390/ton ($360/ton plus assumed $30/ton shipping cost). Using the table below, cottonseed meal would be economical to investigate its use in dairy cow diets to substitute for soybean meal (generally substitute less than 50% of soybean meal assuming whole cottonseed is not being fed) at current corn and soybean meal prices.

- **Evaluate dry cow and heifer feeding programs:** Testing the nutrient content of forages, allocating forages based on their quality, and using these results to balance rations for dry cows and heifers will help keep feed costs in line, effectively use forage and financial resources, and ensure that heifers grow properly and milk production does not suffer after calving. Like the milking herd, these animals require the proper amount of nutrients and do not need to be fed certain ingredients, i.e. corn or soybean meal. Dry cows have specific needs for energy and protein and should not be over or underfed these nutrients. In this economic climate, these two groups of cattle may be an area we can save some feed dollars and higher quality forages and use them to feed the milking herd—the current income generators.

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Management of the Dry Cow to Prevent Mastitis

Michelle Arnold, DVM

As we move to a new era of lower acceptable somatic cell levels, the prevention and control of mastitis takes on new importance. For many years, the contagious mastitis pathogens including *Staphylococcus aureus*, *Streptococcus agalactiae* and *Mycoplasma bovis* were the focus of control measures primarily implemented in the milking parlor to stop the spread of these organisms from cow-to-cow. These contagious organisms often cause high individual somatic cell counts and ultimately high bulk tank somatic cell counts. As these high somatic cell count cows have been culled due to milk marketing regulations, the contagious pathogens are decreasing in prevalence and importance. Meanwhile, the environmental mastitis pathogens are becoming more important in many herds as the cause of clinical mastitis ("clinical"=visibly abnormal milk including the presence of clots, heat, pain, or swelling of a gland), especially in the first 100 days of lactation. Prevention of infection by these "environmental" organisms including the coliforms (*Escherichia coli*, *Klebsiella spp.*, *Enterobacter spp*.) and environmental streptococci *(Streptococcus uberis*, *Streptococcus dysgalactiae)* begins with the dry cow. Studies have shown that over 60% of new intramammary infections occur during the dry period and an overwhelming majority of these are due to environmental bacteria.

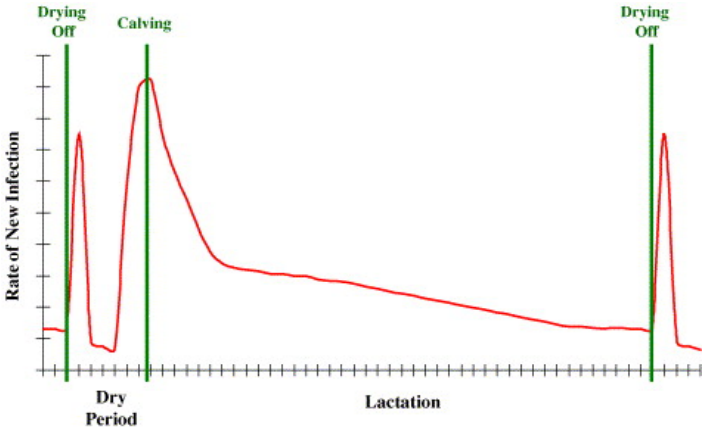
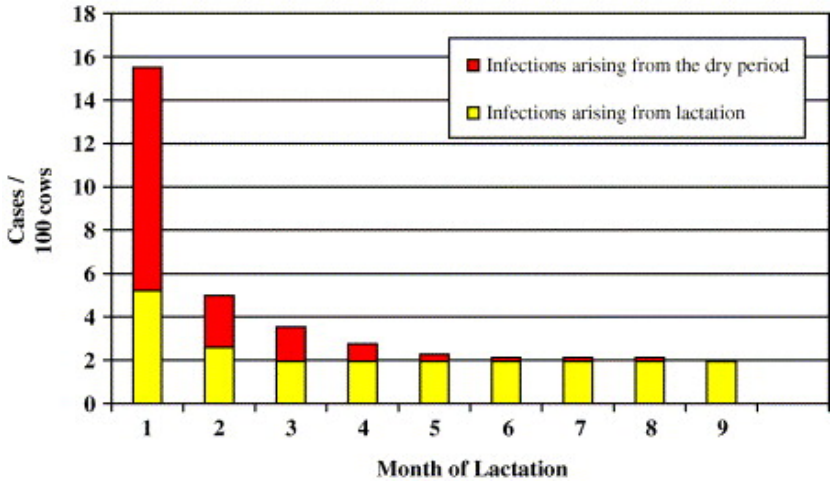


Illustration of the incidence of new intramammary infection during the lactation cycle. The peak in new infection rate, after drying off, is higher in cows not receiving any form of dry cow therapy. (*Data from* Bradley AJ, Green MJ. The importance of the nonlactating period in the epidemiology of intramammary infection and strategies for prevention. Vet Clin Food Anim 2004;20:547-568.)

The dry period is a time of change for many body systems including the mammary gland. Generally speaking, there are three phases of change in the mammary gland during the dry period, two of which are periods of increased susceptibility to infection. The first of these occurs immediately following dry off in the first 3 weeks of the dry period (involution) and the second period is immediately prior to and just after calving (colostrogenesis).

1. Involution-This is the first transition that prepares the gland for stopping the production of milk. Milk accumulates in the udder causing increased pressure, decreased secretory activity, and changes in the structures and secretions in the gland. There is an increased risk of infection because there is no flushing of bacteria from the streak canal, no teat dip protection, and there is leakage of milk. Development of the keratin plug to seal the streak canal is crucial in preventing entry of bacteria into the gland but studies have shown that 50% of quarters are still open at 10 days post dry-off and 5% are still open at 60 days. For most cows, involution is considered complete and the udder is resistant to infection after 21-30 days into the dry period.
2. Steady state involution (involuted)-Once fully involuted, the mammary gland is very resistant to infection. There are several protective factors during this time that inhibit bacterial growth and the physical barrier of the keratin plug effectively seals the streak canal.
3. Colostrogenesis (transition)-As calving approaches, the second transition in the mammary gland occurs as the udder prepares for milk synthesis. These changes are essentially opposite of involution as there is growth of mammary tissue and increased secretory activity in the last two weeks of gestation. Susceptibility to infection increases as the keratin plug breaks down, leukocyte function is impaired (the protective white blood cells do not work as well) and leakage of colostrum often occurs. By this point in time, the dry cow treatment is usually no longer effective.

The ultimate goal of the dry period is to have as few quarters infected with bacteria as possible at calving. Attainment of this goal goes a long way towards maximum production of low somatic cell count milk during the next lactation. To attain this goal, there must be an emphasis on: 1) prevention of new infections caused by environmental organisms and 2) infections already present at dry off must be eliminated. It is reported that 95% of all new intramammary infections in the dry period are caused by environmental pathogens and most are acquired in the last 2-3 weeks of gestation. These infections are not noticeable during the dry period but cause clinical mastitis early in the next lactation. To prevent new infection in the dry period, it is important to decrease the bacteria in the environment and increase the cow's defenses to infection.



Data showing the origin of infection (dry period or lactation) in cases of clinical mastitis. (*Data from* Green MJ, Green LE, Medley GF, Schukken YH, Bradley AJ. Influence of dry period bacterial intramammary infection on clinical mastitis in dairy cows. J Dairy Sci 2002;85(10):2589–99.)

Keys to Prevention of New Infections in the Dry Period

1. Antibiotic dry cow therapy (DCT) -The use of long-acting intramammary antibiotics administered to all quarters of all cows after the last milking of lactation is the key step in mastitis control in dry cows. It is estimated that 70-98% of infections present at dry off can be eliminated with DCT except in the case of *Staphylococcus aureus* which is much more difficult to cure (See UK Extension Publication ID-190: *Staphylococcus aureus* Mastitis). The reduction of new infections has been estimated at 50-80% with DCT. Other benefits include reduced somatic cell count, reduced incidence of clinical mastitis, and increased milk yield in the next lactation. However, there are some issues with the effectiveness of dry cow therapy against environmental organisms. Most dry cow products are formulated for treatment of Gram (+) organisms (*Staphylococcus spp.* and *Streptococcus spp.*) and not Gram (-) organisms such as *E.coli*. New products with a broader spectrum of coverage are available but it is important to know what organisms are causing problems in your herd. Talk with your veterinarian about culturing for mastitis organisms and proper antibiotic selection.
2. Teat Sealants- Many of the dry cow formulations do not persist late into the dry period and leave the udder unprotected in the period of time just before calving, especially if the dry period is long. A 2007 study comparing the use of the internal teat sealant OrbeSeal combined with dry cow therapy versus dry cow therapy alone found a significant reduction in new infections at calving in the combination treatment group compared with the antibiotic alone treatment (3.7% vs. 7.3%). Perhaps more importantly, the incidence of clinical mastitis in the first 100 days of lactation was significantly lower for the combination treatment group than for the antibiotic treatment alone.
3. Environmental Management- Keeping dry cows clean, dry, cool, and comfortable is critical in terms of udder health. Cows lay down 12-14 hours a day and their teats are in direct contact with the material where they rest. Populations of bacteria in bedding are related to the number of bacteria on teat ends and rates of infection. These bacterial numbers increase in the environment as the outside temperature and moisture levels increase.
4. Nutrition-Dry matter intake, energy balance, and mineral supplementation are all important considerations during the transition period to reduce clinical episodes of production diseases including mastitis, ketosis, retained placenta, and left displaced abomasum.
5. Vaccination-J5 core antigen vaccines (J-5, J-Vac®) are not associated with a reduction in the number of new dry period infections but they do decrease the clinical effects of the infection. These vaccines are able to reduce bacterial counts in milk, resulting in fewer clinical symptoms by enhancing the ability of white blood cells to destroy the bacteria. Clinical mastitis caused by environmental pathogens varies from mild, local signs (abnormal milk, swollen gland) to systemic signs and death. Only about 10% of clinical coliform cases result in systemic signs such as fever, anorexia (off feed), altered respiration (rapid breathing), and possibly death. In these severe cases, vaccination will decrease the incidence of these symptoms of mastitis and will decrease culling losses, especially in the first 2-3 months of lactation.

The dry period is of great importance when it comes to overall health and productivity in the next lactation. Many changes occur to the mammary gland during this time which must be taken into consideration when developing a health management program. The goal of the dry period is to have as few quarters infected with bacteria as possible at calving. Keeping dry cows cool, dry, and comfortable and administration of dry cow therapy to all quarters of all cows at the end of lactation will go a long way towards achieving this goal.

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August 29-30
KY Milk Quality Conference
Lake Barkley Lodge

September 11-12
Kentucky Grazing School
Woodford Co. Extension Office

October 2-6
World Dairy Expo

October 20
Dare to Dairy
UK Coldstream Dairy