The North Carolina Dairy News has begun. The necessary funds to conduct the program have been obtained from the NC Dairy Producers Association, the NC Dairy Foundation, the NC Agricultural Foundation, and the Golden Leaf Foundation. The ad hoc Executive Committee, made up of representatives from NCDPA, NCDA&CS, NCSU, and NC Farm Bureau, has hired Mr. Jim Cummings as the project manager. An advisory Committee has been formed to help provide direction in developing a strategic plan for the state’s dairy industry. The goal of the project is to identify the ways and means to stabilize and grow North Carolina’s dairy industry through retention, growth or relocation of existing dairies, and also recruitment of new dairies.

During the past year the North Carolina Dairy Producers Association, along with the Georgia Milk Producers Association, the Upper South Milk Producers Association, the Kentucky Dairy Development Council, the North Carolina Department of Agriculture and Consumer Services, and the North Carolina Farm Bureau Federation joined together and formed the Southeast Producers Steering Committee (SPSC). The SPSC has focused its efforts on identifying ways to bolster the southeast farm milk price. On May 22nd representatives of the SPSC’s member associations presented testimony at an emergency hearing in Tampa, FL. The SPSC supported the proposal submitted by the Dairy Cooperative Marketing Association (DCMA) to change the Class 1 differentials in orders 5,6 and 7, to modify some of the pooling rules, and to refine the transportation credit system. While the proposed changes are expected to have a positive effect on the uniform prices in the three orders, SPSC strongly believes that the proposed changes are not adequate to fully address the milk marketing problems in the southeast. Therefore, the SPSC requested that further efforts be made and new initiatives be taken to enhance milk production within the southeastern states instead of focusing efforts on simply attracting supplemental milk from outside the three orders.

In addition, the SPSC stated that the situation in the southeast is serious and that an indepth study should be undertaken or sponsored by USDA as soon as practical in order that problems can be identified correctly, to identify additional measures that might be taken, and to evaluate the impact of these measures. The SPSC is concerned about the growing deficit, both in terms
of the added cost to local producers of bringing in milk from distant sources, and the possibility of supply disruptions caused by weather, animal diseases or acts of terrorism.

The NCDPA will continue its efforts to ensure the future presence of profitable and viable dairy farms in North Carolina.

**Coping with High Cost of Production**

Dr. Geoff Benson  
NCSU Extension Economist

Corn, fertilizer and energy prices have all jumped over the past couple of years, as dairy farmers well know. Milk prices were very low last year and, even thought they are on the uptick now, it will take a while before cash flow recovers from these shocks. However, the outlook is promising for the next several months, with a federal order 5 Class I price of $20.94 per 100 lb. for June, 2007. This article tries to put these cost and price changes into perspective and assess the likely effects on farm profits.

Table 1 shows how the prices of feed, fertilizer and fuel have changed for selected years since 2000. The data in the table are national prices published by the National Agricultural Statistics Service of USDA in the April issue of “Agricultural Prices.” Price increases vary from 41% for feed to 144% for diesel fuel. However, it is likely the feed price listed for 2007 does not fully reflect recent increases in corn prices.

Table 1. Selected feed, fuel and fertilizer prices from 2000 to 2007.

<table>
<thead>
<tr>
<th>Item</th>
<th>2000</th>
<th>2003</th>
<th>2005</th>
<th>2007</th>
<th>Change '00 to '07</th>
<th>Change '00 to '07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dairy Feed, 20%, ton.</td>
<td>$183</td>
<td>$201</td>
<td>$206</td>
<td>$258</td>
<td>+75</td>
<td>+41</td>
</tr>
<tr>
<td>Diesel, gal.</td>
<td>1.08</td>
<td>1.24</td>
<td>2.23</td>
<td>2.64</td>
<td>+1.56</td>
<td>+144</td>
</tr>
<tr>
<td>Ammonium Nitrate, ton</td>
<td>194</td>
<td>243</td>
<td>292</td>
<td>382</td>
<td>+188</td>
<td>+97</td>
</tr>
<tr>
<td>Muriate of Potash, ton</td>
<td>165</td>
<td>165</td>
<td>245</td>
<td>280</td>
<td>+115</td>
<td>+70</td>
</tr>
<tr>
<td>Superphosphate, ton</td>
<td>233</td>
<td>243</td>
<td>299</td>
<td>418</td>
<td>+185</td>
<td>+79</td>
</tr>
</tbody>
</table>

Although these price changes are quite dramatic, they are not equally important because there are differences in the contribution of each one to the total cost of producing milk. Table 2 shows the cost per 100 pounds of milk sold for various items from 2000 to 2004 for the farms that participate in my NC Dairy Farm Financial Performance Project. Costs are listed both in terms of dollars per 100 lb. of milk and as a percentage of total cost of production. So, for example, if we use the 5-year average cost of feed of $5.12 per 100 lb. then a 41% increase in the per ton cost of feed represents an increase in total production costs of $2.10 per 100 lb. However, a 144% increase in the cost of diesel fuel increases the total cost per 100 lb by 43 cents, from 30 cents to 73 cents. For fertilizer, a price increase of, say, 80% would add 37 cents to the per 100 lb cost. Changes in a farm’s actual feed and fertilizer costs will depend on the specific ingredients used and the composition of the blended product.

These examples illustrate the importance of knowing the cost of production for your farm, both in total and for specific items. As the example shows, this knowledge helps assess the importance of price changes for particular items used to produce milk and the effect on the farms bottom line. Perhaps more importantly, this information can help guide the search for alternatives that might help mitigate the most serious of these cost increases and help in the evaluation of the financial impact of making a particular change in the way you produce milk. Furthermore, I see a wide variation in costs of production among farms and in the relative importance of certain types of cost to the total. This
reinforces the idea that each farm family must study their own records and make their own assessments.

Table 2. Cost of Production, Selected North Carolina Dairy Farms, 2000-2004

| Item               | 2000   | 2001   | 2002   | 2003   | 2004   | Average
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bought Grain &amp; Commodities</td>
<td>$/100 lb</td>
<td>$/100 lb</td>
<td>$/100 lb</td>
<td>$/100 lb</td>
<td>$/100 lb</td>
<td>$/100 lb</td>
</tr>
<tr>
<td></td>
<td>4.53</td>
<td>4.74</td>
<td>4.65</td>
<td>5.96</td>
<td>5.71</td>
<td>5.12</td>
</tr>
<tr>
<td>Fertilizer</td>
<td>0.37</td>
<td>0.46</td>
<td>0.51</td>
<td>0.43</td>
<td>0.56</td>
<td>0.46</td>
</tr>
<tr>
<td>Fuel</td>
<td>0.28</td>
<td>0.27</td>
<td>0.26</td>
<td>0.33</td>
<td>0.35</td>
<td>0.30</td>
</tr>
<tr>
<td>Other Operating Expenses</td>
<td>8.33</td>
<td>8.48</td>
<td>8.73</td>
<td>8.56</td>
<td>8.12</td>
<td>8.44</td>
</tr>
<tr>
<td>Depreciation &amp; Interest</td>
<td>1.23</td>
<td>1.51</td>
<td>1.49</td>
<td>1.43</td>
<td>1.73</td>
<td>1.50</td>
</tr>
<tr>
<td>Total Cost*</td>
<td>14.74</td>
<td>15.55</td>
<td>15.64</td>
<td>16.71</td>
<td>16.47</td>
<td>15.82</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>% of Total</th>
<th>% of Total</th>
<th>% of Total</th>
<th>% of Total</th>
<th>% of Total</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bought Grain &amp; Commodities</td>
<td>31%</td>
<td>31%</td>
<td>30%</td>
<td>36%</td>
<td>35%</td>
<td>32%</td>
</tr>
<tr>
<td>Fertilizer</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Fuel</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Other operating expenses</td>
<td>57%</td>
<td>55%</td>
<td>56%</td>
<td>51%</td>
<td>49%</td>
<td>54%</td>
</tr>
<tr>
<td>Depreciation &amp; Interest</td>
<td>8%</td>
<td>10%</td>
<td>10%</td>
<td>9%</td>
<td>11%</td>
<td>10%</td>
</tr>
<tr>
<td>Total Cost*</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

*Column entries may not add to totals because of rounding.

A key question is whether the price of milk will increase enough to offset these cost increases and whether, if we do see better milk prices, how long they will last. As noted above, the June Class I price for order 5 is over $20.00 per 100 lb. As of late May, the Class III futures market suggests we will see prices rise even higher and that prices will be good for several months when judged by historic standards. Currently it does not seem we will break the record Class III price set in May, 2004. Based on this, it is quite possible that mailbox prices in 2007 will average $5.00 higher than in 2006, which is more than enough to offset the higher cost of feed, fertilizer, fuel and most other production items. Barring unusual events on a particular farm, dairy farmers’ margins should be significantly improved during the latter half of 2007.

However, several cautions are in order. These milk price projections are not the same as money in the bank and milk markets are fickle, as we know well. Don’t spend it ‘til you get it! Furthermore, even if these higher milk price expectations are met, I see no reason for them to stay at this level for a prolonged period. As we have seen numerous times, milk prices are highly volatile, with peaks that only last a short while. Therefore, any additional cash flow should be used wisely, in preparation for the inevitable downturn in milk prices. Current Class III futures prices suggest 2008 will see prices down $1.00 per 100 lb. or more.
Longer term, milk prices must cover the costs of production for enough producers to keep the market supplied. Economic logic says that if the recent cost increases remain at or around current levels, which seems likely, then the price of milk must be correspondingly higher ON AVERAGE. All any producer can do is make sure he or she is cost competitive and manage cash flow with a view to making it through the alternating periods of higher and lower milk prices.

**Water for Dairy Cattle**

Dr. Lon Whitlow  
NCSU Extension Dairy Specialist

Milk is 87% water. Therefore, a cow producing 100 lb of milk daily secretes 87 lb or over 10 gallons of water just as a part of the milk. Water is also needed for metabolic processes including the production of the milk and for cooling. All requirements considered, water requirements for a cow producing 100 lb of milk daily will be between 30 and 35 gallons daily, more in the summer when a larger amount of water is lost from cooling.

Some of the water requirement is provided by drinking water and some is provided as part of the feed. In North Carolina, most rations are based on corn silage and the TMR will contain around 50% water. With a TMR containing 50% moisture, a cow producing 100 lb of milk will consume about 6.5 gallons of water (50 to 60 lb) as a part of the feed. Drinking water must supply the remainder of about 25 to 30 gallons. The graph below provides an estimate of the total water consumption of cows at various levels of milk production during winter and summer. Minimum and maximum amounts provide a range to account for other factors affecting water consumption.

To determine if low water intake is affecting production, it may be helpful to monitor water intake and to have a water sample analyzed. If water consumption is low, some of the more likely problems include stray voltage on the watering system, limited trough space, low water flow rate, poor placement of watering devices and cleanliness. Consumption can be reduced by high levels of iron (above 0.3 ppm) and/or sulfur (above 1 ppm of sulfide) and manganese (above 0.05 ppm). Sometimes other minerals
can be too high, but are not common. Bacterial levels should be low with coliform counts negative. Algae should be minimal. Nitrates or nitrites occur when surface water contaminates a groundwater source. Nitrate ion levels should be below 50 to 100 ppm. If combined with high levels in feeds, nitrates can reduce reproductive performance. Although there is little information documenting pH problems, desirable pH is between 6.0 and 8.0.

Cows need and do consume large quantities of water. For best production efficiency, clean water, free of contaminants, should be made available for ready and free access.

Mycoplasma….Preparing for Battle
Dr. Mitch Hockett, Assistant Professor
NCSU Department of Animal Science

Recently an experienced dairyman told me that dairy farming is a constant battle against a monster, and you must get up and fight the monster every day to have a chance to win. Comparing a dairy farm to a monster may not appeal to many people, because it is an industry that we “love.” How quickly can a relationship turn from “love” to a “love-hate” relationship? Ask anyone who has had an outbreak of Mycoplasma mastitis, and they will probably be quick to tell you the “hate” side and about what a real monster looks like. In this article, the first in a series of three, I will discuss general information about this mostly unknown threat to the dairy industry.

"Know thy enemy and know yourself; then in a hundred battles you will never be defeated. When you are ignorant of the enemy but know yourself, your chances of winning or losing are equal. If ignorant both of your enemy and of yourself, you are sure to be defeated in every battle." This quote from the ancient Chinese general Sun Tzu can be applied to many situations, but is especially true to Mycoplasma mastitis. Just when you think you know everything there is to know about mastitis, along comes another class of pathogen to worry about. Step one: get to know your enemy.

The term mastitis comes from the Greek word mastos, meaning breast, and “-itis,” meaning inflammation. Mycoplasm mastitis is caused by one of the Mycoplasma species of pathogens. Normally one thinks about mastitis being caused by bacteria, and occasionally a fungus or virus. However, mycoplasma are different from all of these categories. These microbes have a structure that is unique but intermediate between bacteria and viruses. Mycoplasma have no wall surrounding the outside of the cell as is found in a bacterium. Dairy farmers are all too familiar with the term Gram-negative bacteria. Just hearing those words or E. coli can raise the hair on the back of your neck. Mycoplasma are neither Gram-positive nor Gram-negative. They cannot be classified by this method due to the absence of a cell wall. Why does this matter? Many of the antibiotics that have been used to successfully treat mastitis infections are able to kill bacteria by interrupting the cell’s ability to produce a cell wall, but these antibiotics are useless against mycoplasma.

Most species of mycoplasma gain entry into the body through the respiratory tract. In this location the cell membranes that surround the mycoplasma comes in contact with the membrane of another cell or tissue and adhere to it in a process called cytadhesion. There are different species of mycoplasma, and it appears that they are all different in their ability to adhere to and colonize different tissue types. Mycoplasma bovis is found in parts of Europe and North America, is quite capable of adhering to and colonizing tissues, and is responsible for diseases such as mastitis, pneumonia, and arthritis. Mycoplasma have been recovered from the trachea, respiratory tract, saliva, semen, vagina, mammary glands, ears, joint capsules, and other locations from cows, heifers and bulls. And the battle begins….

Due to their ability to colonize the respiratory tract, mycoplasma may cause pneumonia. Outbreaks of pneumonia in calves and cows have been documented to occur primarily during times of stress. In the
North these occur mostly during winter and in the South they occur mostly during the summer. Respiratory outbreaks in cows typically precede mastitis outbreaks.

**Mycoplasma in Cows:** Mycoplasma mastitis was first reported in 1960 in England and 1961 in the United States. Most reports of this type of mastitis include descriptions of cows that have swollen, hot quarters with milk that has clots, flakes or clumps and milk that becomes discolored with the progression of the infection. These infections become chronic and do not respond to treatment. Cows appear to clear the infection with treatment, but relapse repeatedly. Most cases will spread from one quarter to other quarters on the same animal. Additionally, mycoplasma is extremely contagious and will spread from animal to animal. Within an animal it may spread from the lungs to the mammary. Perhaps the most frightening thing about this monster is when an outbreak occurs on a farm it is not usually limited to one or two animals. Depending upon the size of the herd, outbreaks of mycoplasma may claim tens to hundreds of animals.

**Mycoplasma in Calves:** As stated previously, mycoplasma have been isolated in saliva, from the vagina, and from milk of infected animals. Therefore, it should come as so surprise that calves from infected cows frequently also become infected. Contamination may occur in the birth canal, from being licked by the mother after birth, or primarily from drinking infected milk. Feeding unpasteurized whole milk to calves can prove problematic. A study on one farm in Florida reported that 23 calves on the farm were negative for mycoplasma at birth, but all were positive by 23 days of age with the majority being positive by 12 days of age. One half of those calves developed clinical symptoms of mycoplasma infection. Clinical symptoms found commonly in calves include inner ear infections with head tilt, swollen joints and arthritis that may be crippling, diarrhea, and pneumonia. Mycoplasma are sensitive to temperature and may be killed by proper pasteurization; however, pasteurization failures have been reported to be followed by outbreaks of these clinical symptoms. Heifers that are infected show poor growth and must be treated with costly antibiotics. To further add to the problem, most antibiotics are not effective against *Mycoplasma bovis*.

As General Tsu pointed out, we must know our enemy. In the next issue I will discuss about knowing “yourself”, your farm, and what to do if you find yourself in the middle of this battle, or ways to prepare for war before it is brought to your farm. Prevention is the best solution, but there are ways to fight the battle when it comes.

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**Above Average Fertility in Your Dairy Herd – Is that Good Enough?**

Dr. Steve Washburn  
NCSU Extension Dairy Specialist

**Would you consider a 21-day pregnancy rate of 20% to be good for your herd?** Last fall at the first National Reproduction Council meeting and In the April 10 issue of Hoard’s Dairyman, Dr. Ellen Jordan, a dairy extension specialist at Texas A&M reported information from 8 dairy herds in 6 states that had achieved 21-day pregnancy rates of 17 to 25% which are all well above a national average of about 14%. Two of those 8 herds were local in NC or VA and both herds had freestall facilities with either 2,300 Holsteins or 900 Holsteins. Both local herds had 21-day pregnancy rates at about 19-20 percent which means that an average of 19-20% of eligible cows in the breeding herd successfully become pregnant during each 21-day period. Both herds reported first service conception rates of 31% and average conception rates of only 25 to 26% with about half (48 to 53%) of the cows conception by 150 days in milk. One of the local herds uses pedometers for detection of estrus and the other uses a tail chalking system and an aggressive program for synchronization and timed breeding.

Manipulation of the cow’s estrous cycle to induce ovulation has become common practice on many dairy farms with the advent of Ovsynch, Presynch, Cosynch, Select Synch, Modified Ovsynch, CIDR-Synch, and other synchronization programs. Some farms no longer detect estrus on a regular basis,
but rely on assessing tail chalk removal or scheduled injections followed by timed AI to produce pregnancies. In the May 25 issue of Hoard's Dairyman, Drs. Jenks Britt, Jeff Stevenson, and I reported calculated pregnancy results and costs of a 3-cycle synchronization program in a 100-cow herd using timed artificial insemination (TAI) followed by use of a clean up bull after three TAI services. The three synchronization cycles modeled were 1) Pre-Synch plus Ovsynch for the first breeding cycle; 2) GnRH injections given to all inseminated cows 7 days before pregnancy check and completing Ovsynch for all nonpregnant cows for cycle two; and 3) CIDR-Synch (CIDR inserted at the time of GnRH injection 7 days before pregnancy diagnosis) on all third cycle cows.

We examined the effect of differing conception rates on synchrony costs by using a base rate at 30% success for TAI in comparison to success rates of 20, 25, 35 and 40%. Unit prices of the products used were $2.60 for PGF, $3.30 for GnRH, and $9.50 for a CIDR.

At the 30% conception rate, 957 total injections/CIDR applications are needed per 100 cows. A conception rate of only 20% would increase total synchrony treatments to 1032, whereas improving conception rate to 40% would reduce total synchrony treatments to 888. At a 20% conception rate, it would take 21.1 doses of synchronization products per AI pregnancy, whereas only 11.4 doses are needed per AI pregnancy if TAI conception rates of 40% are achieved.

The program at 30% conception rate would result in 66 AI-sired pregnancies per 100 cows when checked at 42 to 45 days post breeding. Fetal loss would result in 59 pregnancies reaching term with 55 live births of which 27 (48%) would be female. Twenty six of those females would calve and enter the milking herd. If all injection costs were applied to the females entering the herd then the approximate cost would be $122 per cow. At the 20% conception rate, only 49 pregnancies and 19 AI-sired females per 100 cows would be expected to enter the herd at an injection cost of $184 each, whereas 78 pregnancies and 31 AI-sired females per 100 cows would enter the herd at a synchronization cost of only $93 each if the TAI conception rate reached 40%.

Exact compliance to the synchronization injection/application schedule is critical for success of any program using estrous synchronization. If herd workers do observe cows in standing estrus at times not consistent with protocols for TAI, then such cows should be inseminated accordingly rather than waiting to synchronize and use TAI. Cows conceiving to AI at observed estrus rather than being synchronized for TAI, reduce costs in the range of $37 to $71 in injections/application cost per pregnant cow compared to being synchronized.

Markedly reduced synchronization costs per cow that are demonstrated by achieving greater conception rates should be incentive for producers to try and improve conception and pregnancy rates in their herds. Such strategies would include monitoring of nutritional programs to ensure most cows are cyclic within a few weeks after calving. Although there is quality control on processing semen for AI, there can still be significant differences in fertility of individual bulls as measured by estimated relative conception rates (ERCR). Also, since 2003, the availability of daughter pregnancy rate (DPR) estimates for bulls provides a genetic basis for improving dairy cow fertility in the long run.

Back to the question: **Would you consider a 21-day pregnancy rate of 20% to be good for your herd?** If you are one of those herds near the national average of 14% or even if you were getting 17 or 18%, then 20% would look really good and 24 to 25% would be outstanding as achieved in a couple of California herds using lots of synchronization. However, if you were attempting to breed your cows seasonally so that most of the herd would calve within 60 to 90 days, then even 25% would be very poor. For such herds, optimal submission rates for insemination in the first 21 days of the breeding season would be above 90% with conception rates at about 50 to 60% resulting in a 21-day pregnancy rate in the range of 45 to 55%. There are herds in our part of the United States that are reaching such levels of reproductive efficiency without extensive use of estrous synchronization. Reproductive success certainly is a relative term!!!
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