Custom Heifer Raising: Should It Be in Your Future?

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As dairy farms grow and specialize in milking cows, one task that can be custom hired is the heifer enterprise. Custom heifer raising is increasingly common. However, this option may not be optimal for all dairy farmers. In this article, we examine heifer enterprise costs relative to potential savings if the heifers are sent to a custom raiser. We identify factors that should be considered in making the proper decision relative to the heifer enterprise.

The basic issues when considering whether an enterprise should be kept are whether the bottom line will improve and whether using outside custom service is consistent with the dairy producer’s methods and goals. Every dairy producer has made several decisions of this type. For example, the last time the chopper broke the decision may have been whether to replace it or, instead, to hire a custom chopper. The considerations that went into this decision included the cost of the chopper (both purchase and operating costs), the cost of the custom chopper, and the timing requirements (i.e., would the custom chopper show up when the silage was at the right stage for making high-quality forage.) Similarly, the heifer raising decision may be driven by the need for a new heifer facility or more room for the milking herd.

The Cost of Raising a Heifer

Budget for heifers are available from many sources and, as with any decision that has financial implications, you should use the values from your operation. An excellent MSU Extension bulletin by Dr. Sherrill Nott, George Atkeson and Janice Endsley (MSU Ag. Econ. Staff Paper 96-89) can help you develop an accurate heifer budget.

As part of the Dairy Profitability and Production Efficiency Project at MSU supported by Animal Industry Initiative funds, we collected detailed data for every enterprise on eight Michigan dairy farms in 1998. These farms were of all different sizes (40 to more than 400 cows) and geographically dispersed across lower Michigan. In this project, each enterprise was isolated and all costs allocated to specific enterprises so that the true cost of production could be determined.

In the case of heifers, this enterprise accounting meant not only keeping track of the feed and labor that the heifers used but also the time each piece of machinery was used for heifer related purposes. The milk cow enterprise sold each heifer calf to the heifer enterprise as a newborn. The heifer enterprise raised the heifers and sold late pregnant (springing) heifers back to the milking herd. Each transaction was done at the current market price and validated with the producers. Importantly, the project calculated the economic cost of production, which included unpaid labor and management as well as a charge for all capital, borrowed as well as owner equity.
used in that enterprise. Notice that this is different than cash costs. Using these procedures, a heifer budget was developed. Five of the eight dairy farms did not use a custom heifer raiser in 1998. These average costs are shown in Table 1. Because the heifers were of all different ages and the farms were followed for a single year, an inventory adjustment was made, and all expenses are expressed per heifer-month. That is, the costs and revenues were adjusted for the fact that older heifers were worth more than younger heifers at the end of the year. In order to put the comparisons on equal footing, we chose 24 months as the age at first calving.

The heifers were sold back to the milking herd at an average price of $1,292 which translates to $54 per heifer-month. The range of heifer prices was $1,100 to $1,500, which reflected what the farm operators determined their heifers were worth as they entered the milking herd. The costs of production are divided into variable and fixed costs (Table 1). The largest costs of raising heifers are the same as for the milking herd—feed and labor. The feed costs averaged about $23/heifer-month (remember, these are across all ages of heifers) while labor averaged nearly $11/heifer-month. “Calf purchases” includes purchasing the heifer calves from that farm’s milk cow herd while “outside heifer purchases” are heifers purchased from other operations. The “other” category includes various expenses such as repairs, utilities, and interest on working capital invested in heifer raising. The other expense categories are straightforward with total average variable cost equal to $51.41/month. Fixed costs include equipment, interest plus insurance, buildings and improvements, management, and overhead. The fixed expenses averaged $11.53/heifer-month for a total average cost of $62.94/heifer-month. Assuming a 24-month age at first calving, the average cost to raise a heifer for these farms was about $1,511. Note that this age assumption is perhaps a bold one because the age varied both within and across farms but is necessary for comparison.

The minimum and maximum columns in Table 1 are across all farms for that cost category. That is, the lowest average total cost to raise a heifer was $58.82/heifer-month (this is not equal to the sum of each cost category which are themselves minimums or maximums). Even with the range in farm size and location, the farms examined were remarkably consistent in almost every cost category. The net average loss per heifer across these farms was $219 ($1,511 - $1,292). This reflects the difference between what the producers felt the heifer was worth as a springing heifer and what it cost to raise the heifer to 24 months of age.

### Table 1. Heifer raising costs in five Michigan dairy farms 1998.

<table>
<thead>
<tr>
<th></th>
<th>Average ($/heifer-month)</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variable costs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feed</td>
<td>23.13</td>
<td>20.55</td>
<td>27.07</td>
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<tr>
<td>Labor</td>
<td>10.95</td>
<td>6.03</td>
<td>15.02</td>
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<tr>
<td>Breeding</td>
<td>0.81</td>
<td>0.41</td>
<td>2.08</td>
</tr>
<tr>
<td>Veterinary services + medicine</td>
<td>0.92</td>
<td>0.51</td>
<td>1.38</td>
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<tr>
<td>Supplies</td>
<td>1.64</td>
<td>0.37</td>
<td>2.56</td>
</tr>
<tr>
<td>Facilities</td>
<td>0.88</td>
<td>0.17</td>
<td>2.29</td>
</tr>
<tr>
<td>Machinery + equipment</td>
<td>1.95</td>
<td>1.19</td>
<td>2.18</td>
</tr>
<tr>
<td>Calf purchases</td>
<td>5.73</td>
<td>3.34</td>
<td>8.68</td>
</tr>
<tr>
<td>Outside heifers</td>
<td>1.09</td>
<td>0.00</td>
<td>4.32</td>
</tr>
<tr>
<td>Other</td>
<td>4.32</td>
<td>3.50</td>
<td>5.21</td>
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<tr>
<td><strong>Total variable costs</strong></td>
<td>51.41</td>
<td>43.65</td>
<td>57.89</td>
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<tr>
<td><strong>Fixed costs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equipment</td>
<td>2.36</td>
<td>0.70</td>
<td>4.14</td>
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<tr>
<td>Interest + insurance</td>
<td>4.51</td>
<td>3.18</td>
<td>5.51</td>
</tr>
<tr>
<td>Buildings and improve</td>
<td>ments</td>
<td>2.22</td>
<td>0.28</td>
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<tr>
<td>Management fee</td>
<td>0.90</td>
<td>0.71</td>
<td>1.08</td>
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<tr>
<td>Overhead</td>
<td>1.55</td>
<td>0.56</td>
<td>2.40</td>
</tr>
<tr>
<td><strong>Total fixed costs</strong></td>
<td>11.53</td>
<td>7.33</td>
<td>16.36</td>
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<tr>
<td><strong>Total costs per month</strong></td>
<td>62.94</td>
<td>58.82</td>
<td>68.34</td>
</tr>
<tr>
<td><strong>Total costs per 24 months</strong></td>
<td>1511</td>
<td>1412</td>
<td>1640</td>
</tr>
</tbody>
</table>

**Home vs. Custom Rearing**

With an increasing demand for custom heifer raising from expanding dairy farms, a number of individuals and firms have stepped up to offer this service. The exact contract stipulations, including price, vary across individuals. Charges can be on a per day basis, sell and later buy back the heifers, a charge per pound of gain, charges for feed plus yardage, a set payment for a heifer, and
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Business Management

MDR Estate Planning Series

Response to a Michigan Dairy Review (MDR) reader survey in January 2001 indicated that business management is on the minds of Michigan dairy producers. Over 70% of responses to the question, “Overall, the biggest challenge for my specific dairy business in the next 5 to 10 years will be:” included many references to business management. Many responses touched on issues surrounding exit from the dairy business or transfer to the next generation.

The 1999 Michigan Dairy Farm Survey, completed by Chris Wolf, revealed that over 50% of primary dairy operators plan to retire in the next 10 years; 28% plan to transfer the farm to the next generation.

In light of these indications, members of the Farm Information Resources Management (FIRM) Extension team will contribute estate planning articles to MDR in future issues. In this issue (next page), Roger Betz discusses intergenerational farm transfer. Another article will address various business organizational types, including sole proprietorships, partnerships, Limited Liability Companies (LLCs), and other corporation types. A third article will focus on exiting the dairy business. These issues are complex and often involve emotional decisions. However, creating a plan and making informed decisions eases the strain on both current and future generations. Get informed!
Transferring the Family Dairy Farm Business to the Next Generation

Roger Betz
MSUE Farm Management Agent
Southwest MI Region

All businesses and their owners go through a normal life cycle. Like people, a business has to have a start, go through a growth phase, a maturation and maintenance phase, and an exiting phase. A dairy farm business often can be complicated because these phases are occurring at the same time for the different generations and owners involved. The younger generation is trying to get a start, and the senior generation probably has significantly different and contrasting personal and business goals. Other siblings involved, or not involved, add complications and considerations. Obviously, this can easily lead to stressful business and family situations.

Income and estate tax consequences of various business property transfer strategies add to the complexity of achieving a successful business transfer. An advantage for the buyer may be a disadvantage to the seller or visa versa. A successful inter-generational business transfer has to meet each family member and generations’ goals while at the same time minimizing the total income and estate taxes paid for the family as a whole. As a result of the new tax law signed June 7, 2001 by President Bush, gift tax and estate tax planning became more complex and changes to many business plans should be made.

Dairy farm family members should have a basic understanding of these issues to improve the ability to communicate within the family and to outside professionals who may be providing assistance at various stages.

Talk to One Another

A first critical step for the family members, including spouses, is to have open, honest, and continual communications. Many times family members simply do not talk to one another about what their goals are and how they might be accomplished.

The following is a quote from Luke Gentz, FFA Member from St. Joseph County, Michigan, speaking at the 2001 Farm Family Enrichment Conference, sponsored by Successful Farming magazine and Bayer: “I want to share one thing I’ve learned from talking to other FFA members,” he said. “When I ask if they plan to farm, many say they don’t know if their parents want them to join the business. ‘My parents never talk about it,’ they say. I ask if they talk to their parents about it, and they say ‘No’. So, the kids don’t think their parents are interested, and the parents don’t think their kids are interested. Go home and get busy talking to each other,” he urged.

With effective communication, family members gain an understanding and appreciation for each other’s goals and possible strategies and methods. Family members may discover that the personalities and goals are different and (or) finances are such that the likelihood of continuing the business beyond the current generation is not desirable or feasible. The decision may be to maintain the existing business size with Junior having off-farm employment until “dad retires”. What are other family members’ thoughts and aspirations? Do the children who have left the farm want to come back? What are their expectations on inheritance issues? What would Mom and Dad like to have happen? Is the next generation really interested in a farming lifestyle? It certainly is useful for all involved to have some level of understanding on these and other individual family members’ goals.

Financial Involvement of Younger Generation

The junior generation should become financially involved early. There is a heightened awareness, interest, and experiential learning when your personal financial “well-being” is affected directly by management decisions, capital investments, weather, milk prices, and other factors occurring on the farm. Junior will have more enthusiasm and ambition critical to a dairy farm at a younger age, but may lose this drive, as he/she gets older and more comfortable “drawing a salary or working for wages”. Junior should be involved and make decisions while the senior generation is “still around” to minimize highly risky and wrong decisions that could destroy the business and (or) family. With profitable farms and larger estates, spreading the profit over more taxpayers and reducing the comparable size of the senior generations’ estate can reduce substantially income taxes and estate taxes. Commitments, opportunities, and expectations are more clearly defined when documents are drawn and signed indicating financial obligations and responsibilities.

Ownership of Assets

The junior generation probably does not have the financial strength to own (buy) a high percentage of all assets, but as discussed above, it is important to be significantly involved financially. The senior generation often does not want to give up control of the assets that they have spent a lifetime accumulating, particularly real estate. The future success of the business depends directly on the “working assets” including cows, heifers, crop production, feed inventories, and machinery. Therefore, these “working assets” are often the first assets to transfer to the junior generation. It is better for Junior to own (buying or lease-to-own) 100% of these “working assets”, versus 20% of all the assets including land and buildings. [If using a partnership or Limited Liability Company (LLC) transfer tool, have the partnership or LLC buy these “working assets” from Senior and then have Junior own 50% of the partnership or LLC]. This leaves the buildings, land and other real estate in full ownership and control of the senior generation. Cash or share rents can be established for the use of these assets and provide income to the senior generation. This provides flexibility, income tax savings, and future...
income for the senior generation. Over time, the real estate should be transferred to Junior depending on goals, financial situations, and income and estate tax considerations. Provisions need to be made in Wills and Trust agreements to give the junior generation an appropriate opportunity to own-ership/control of these assets, particularly for those assets that are an integral part of the operation.

Obviously, the dairy farm business must make sufficient profit to provide a reasonable family living for both the senior and junior generations and still allow for business growth. Without sufficient profit, goals are not met, people become unhappy, family structure is lost, and business succession is not achieved. Monitoring only cash flow (taxable income) most likely will be misleading. Real profit and “earned net worth change” may be much higher or lower than taxable income. Meaningful accrued income statements showing the actual profit of the businesses and balance sheets for both Junior and Senior should be maintained each year and shared with family members involved in the business. Annual adjustments to rents, leases, wages and other flexible payments can be made as feasible and appropriate. The Michigan State University Extension (MSUE) Telfarm record and business analysis system, utilizing income tax records, accrual income statements, cash flow statements, and net worth statements, is designed to help producers make and evaluate financial and management decisions on the farm.

Strategies to Reduce Taxes

Strategies to transfer business assets should first achieve family goals and second minimize the tax implications for the family as a whole. All too often, families and advisors focus strategies only on the income tax issues and perhaps estate taxes. Inventories of feed, growing crops, supplies, machinery, livestock, buildings, and land need to be considered, but probably separately. A balance sheet with both market and cost-basis values and with detailed listings of assets becomes an effective communication device for family members and professionals assisting with the transfer. It is essential in helping to understand what is being transferred and to develop the best strategies to minimize taxes. Both income taxes and estate taxes need to be considered. The MSUE Telfarm system provides this information.

Inventories and other current business assets can be sold with a bill of sale. The sale proceeds will be Schedule F income to the seller and a Schedule F expense to the buyer. This unpaid bill can be paid over time depending on cash flow and tax considerations. Depending on goals, financial situations and tax implications, often these assets are transferred using gifting strategies. A sale (by Senior) of raised dairy breeding livestock is treated as long-term capital gains [Schedule D, which has preferential tax rates of 8% or 20% (for assets purchased prior to 2001), and are not subject to Social Security and Medicare taxes (15.3%)]. The purchase (by Junior) becomes a depreciable asset with the expense taken on Schedule F. Schedule F expenses reduce ordinary taxable income (10%, 15%, 27%, 30%, 35% and 38.5% tax rates) and also reduce taxable Social Security earnings. The combinations of the 2 to 18.5-point preferential capital gains rate advantage plus the 15.3% Social Security tax savings can lead to a 17.3 to 33.8 percent financial gain for the family on every dollar worth of raised breeding livestock transferred in this manner. Since the breeding livestock sale is long-term capital gain, an installment sale method can be used to spread Senior’s gain over time. Interest income is unearned ordinary income (not subject to Social Security) but the interest expense for Junior is deducted on Schedule F, again saving significant taxes for the family as a whole.

Machinery sales are subject to depreciation recapture (ordinary income tax rates) in the year of sale, even if the money is not received. Therefore, when there is substantial recapture, a “lease to own” transfer method is often used. The rent expense is a deduction on Schedule F and the income to the parents (if the parents are not a partner or member in the LLC that rents the machinery) can be unearned ordinary income, taxed similarly as interest income, saving the Social Security tax.

Land sales are taxed as long-term capital gains (for the gain above the basis and held 5 years) and the installment sale method can be used. But, the buyer cannot deduct the purchase price, only the interest on the debt. Even though interest may be the major portion of payments during the early years, this transaction will probably lead to increased taxable income for the family. However, the strategy may help achieve family goals.

Until the year 2010, assets that are obtained through an inheritance receive a “stepped-up” basis to the value passed through the estate (usually fair market value). Depreciable assets can then be depreciated (again) from this value creating a substantial tax savings. Depreciable assets include machinery, breeding livestock, buildings, and most improvements.

Under the new law, this “stepped-up” basis would be limited once estate taxes are repealed completely in 2010. A decedent’s estate would be permitted to increase the basis of assets transferred by up to a total of $1.3 million. The basis of property transferred to a surviving spouse can be increased by an additional $3 million. Thus, the basis of property transferred to a surviving spouse could be increased by a total of $4.3 million.

Inventories of feed, calves, livestock, and crop supplies also receive an inherited “stepped-up” basis (from spouse too) and can be deducted on Schedule F. This is often missed on income tax returns.

Conclusions

There are many considerations when transferring the family business to the next generation. Successful transfers take several years to develop and successfully execute the plan.
The size of the estate affects the strategies that should be used. Families need to start early in this planning process. Usually this is only done once in a lifetime, so carefully developed strategies are important. The results of an effective transfer can be very rewarding financially and emotionally for both generations. Assistance from professionals who work in this area and understand agricultural issues are recommended to help family members have the best possible chance of reaching their goals.

**Are You READY for Dairy Futures and Options?**

Craig V. Thomas  
Extension Dairy Agent  
Sanilac and St. Clair Counties

For several years now it has been possible to trade milk futures and options contracts. Today both Class III (milk used in cheese) and Class IV (milk used in butter and non-fat dry milk powder) futures and options contracts are available. These contracts are traded on the Chicago Mercantile Exchange (CME).

Futures and options contracts are traded through an auction-type system called “open out-cry”. In this system, traders make bids and offers on each commodity on the CME “trading floor”. Trading is done every business day from approximately 10:30 a.m. – 2:00 p.m. (Eastern Time). The “auctioning” of milk futures and options contracts is a highly regulated, open and public process. The process produces a market price for each contract based on supply and demand. Class III and IV milk futures and options are “cash settled” contracts; therefore, no delivery of the physical commodity is required or allowed. For dairy farmers involved in these markets this means that where they ship their milk does not change. Dairy farmers primarily sell milk futures (hedge, “lock-in” a milk price) and buy options (price insurance) to manage milk price risk.

The milk futures and options markets are new and growing. Class III futures were the first milk futures introduced and are the most heavily traded. Currently the Class III market has over 17,000 open futures contracts. Class IV futures and options are newer and so far have less than 2,000 open futures contracts.

Milk futures markets appear to be succeeding. Futures markets normally attract two kinds of investors or traders: hedges and speculators. Hedgers (for example, dairy farmers) are those seeking to minimize and manage milk price risk and “speculators” are those willing to take on risk in the hope of making a profit. Both traders are needed by the markets to increase the number of contracts traded and provide the market with “liquidity”. As more investors and traders participate in the market the volume of contracts increases and it becomes easier to trade a contract.

The standard futures and options contracts are for 200,000 pounds of milk. Class III and IV contracts are made by month (e.g., June, July, August, etc.) and can be traded up to 18 months into the future.

**Futures Contracts and Hedging**

A Class III or IV futures contract is an obligation to buy or sell a specific quantity of milk at a certain price on a specified future date (contract month). However, remember that dairy contracts are “cash settled” so no milk actually changes hands and where you ship your milk does not change.

A dairy farmer would most likely sell milk futures contracts to “hedge” or “lock-in” a price for a portion of his or her milk production. By selling a milk futures contract dairy farmers are guaranteeing that on their futures contract they will receive at a minimum the price at which the futures contract was sold. For example, if I were to sell an August Class III contract at $13.00 I would be guaranteed $13/cwt on my 200,000 lb August Class III futures contract regardless of how low the actual Class III milk price fell.

If the actual August Class III milk price ended up at $11.00/cwt I would gain $2.00/cwt on my Class III contract ($2/cwt X 2,000 cwts = $4,000). However, depending on the Class III utilization in the Mideast Federal Milk Marketing Order (includes most of Michigan) and other factors affecting my actual mailbox milk price (e.g., quality and volume premiums offered by a cooperative), I shall see a lower mailbox milk price. In this case I have used the “hedge” to at least partially offset the drop in the actual Class III milk price and its effect on my mailbox milk price.

Conversely, if the actual August Class III milk price ended up at $15/cwt I would lose $2.00/cwt on my Class III contract ($2/cwt X 2,000 cwts = $4,000). However, because the actual Class III milk price strengthened from what was expected I would gain on my mailbox milk price. In each case I have used the futures market and hedging to “lock-in” and reduce my milk price risk.

Trading Class III or IV futures requires the maintenance of a “margin account”. If you have sold milk futures contracts you know that each day as milk futures contracts are traded a margin account is either credited (futures price drops below a contract price) or debited (futures price rises above a contract price). Hedging with futures requires the ability to cash flow potential margin calls when the market price climbs.
above the contract price.

**Put Options Contracts**

A “put option” on a futures contract allows the dairy farmer the right, but not the obligation (hence “option”), to sell a milk futures contract at a specific price (strike price) any time before the option expires. For example, if August Class III futures were trading at $13.00 I could buy an August put option to place a “floor” on my milk futures contract. The floor I choose is called the “strike price”. For example, I might choose to purchase an August Class III put option at a $12.50 strike price. Just like purchasing insurance, I have to pay a premium to buy this option. The higher the strike price, and therefore the less risk I am assuming, the higher the premium I must pay. This is especially true relative to the current futures price in a given month.

Let’s say a $12.50 strike price for an August Class III put option sells for $0.50/cwt. My total cost of placing a floor on my August Class III contract is $0.50/cwt X 2,000 cwts = $1,000. If the actual August Class III price ends up at $11.00 I would collect $1.50/cwt X 2,000 cwts = $3,000. If the actual August Class III price ended up at $15.00 I would choose not to exercise my option to sell the futures at $12.50 and simply lose the cost of my insurance premium ($1,000).

In the case where I collected on my put option, my mailbox milk price will be lower than expected because the actual Class III price fell. In the case where I lost my premium because the Class III price rose, the higher Class III price will be reflected in a higher mailbox milk price.

**Are You READY?**

I now have about 4 years of experience helping dairy farmers work with the dairy futures and options markets. Here are a few items I believe are important to consider in determining if you are ready for dairy futures and options.

- **Do you have the inclination and time to take on this intellectual challenge?** To use the dairy markets successfully you will need to learn how the markets work and understand what is happening in milk supply and demand. This involves a lot of new concepts for most people and involves tracking information on a regular basis. My experience is that it takes a person at least a year to get a good handle on the basics of marketing and how to track marketing information. Once a person goes through this learning curve it should take no more than 15-20 minutes every day to keep abreast of the markets. Fifteen or 20 minutes a day may not sound like much, but my experience has been that few people stick to this commitment. If you are not ready to dedicate yourself to these commitments you are not ready for dairy futures and options.

- **Are you a decision-maker?** Especially when it comes to money, many people have great difficulties making decisions. Dairy futures and options is part science and part “art”. Often the best decision is not “cut and dried”. If you have trouble making decisions you are not cut out for dairy futures and options.

- **Are you independent-minded, but willing to take advice?** Successful marketing requires you to develop several sources of trusted information: your broker, an extension agent, or other dairy marketers. You will need to develop the ability to seek advice from a variety of sources and then make Y-O-U-R own decision. If you do not have the ability to take information from a variety of sources and use it to make your own decision and live with the consequences, you are not ready for dairy futures and options.

- **Can you afford to take risk?** Dairy futures markets are designed to help you reduce milk price risk. However, if you hedge (e.g., sell futures) you are subject to “margin calls”. In and of themselves margin calls are not bad. You will make up your margin calls on your mailbox milk price. This is the essence of hedging. However, margin calls have the potential to stress your farm’s cash flow. If your farm consistently has cash flow problems the futures market is not for you. But, you still may want to consider purchasing put options. When you purchase a put option you know exactly what your loss will be if the option expires worthless—the cost of the premium. And if the put option expires worthless it means that the actual milk price (Class III or IV) is higher than you expected, and thus your mailbox milk price will be higher.

- **Do you know your cost of producing milk?** The purpose of using dairy futures and options is to reduce milk price risk and use the dairy futures market to help insure you receive a profitable price for your milk. This requires a complete and sound marketing plan. At the heart of a marketing plan must be a knowledge of how much it costs you to produce milk. I have met many dairy producers that thought they knew what it cost them to produce milk. But, I have met far fewer dairy farmers that really know what it costs them to produce milk. If you are not willing to extensively analyze your farm’s financial position and cost of production, dairy futures and options are not for you.

**Getting Started**

The USDA’s Risk Management Agency has been conducting a Dairy Options Pilot Program for the last 2 years. Essentially this program allows eligible dairy farmers to purchase up to three put options, and the USDA will pay 80% of the premium. Thus, the program is a low cost way for dairy farmers to get started in dairy futures and options. The program has rules and regulations beyond the scope of this article. However, in the last year I had the chance to work with the program, and the rules are relatively simple and fair. It is an excellent opportunity, and in 2001 dairy farmers in nineteen Michigan counties (Allegan, Barry, Clinton, Gratiot, Huron, Ingham, Ionia, Isabella, Kent, Lapeer, Mecosta, Missaukee, Montcalm, Newaygo, Osceola, Ottawa, Sanilac, Shiawassee, Tuscola) are eli-
gible to participate. Attendance at a 4-hour training session is required to participate. These training sessions will be held the week of July 16-20 at five sites around the state. Call your local Farm Service Agency or MSU Extension Offices for more information about future training sessions.

Another important aspect in getting started in dairy futures and options is getting set up to tap into sources of dairy market information. The two most common ways of achieving this is through the internet or a satellite-based agriculture information system (e.g., DTN). My personal favorite is the internet. I manage the Michigan State University Dairy Team’s web site, which is loaded with dairy marketing information. The url for this web site is: MSU canr.msu.edu/msue_thumb/pages/dairy_team/dairy_team.htm. If you would like more information on how to get started in dairy futures and options call me at the Sanilac County MSUE Office (810-648-2515) or send me an e-mail (thomasc@msue.msu.edu).

Kathy Lee
Extension Dairy Agent
Northwest Lower Michigan

Genetic evaluations for production, type and fitness traits are updated four times per year. For those of you who make sire selection decisions, you know that extensive data are available. Unless you have outlined your selection criteria and a semen purchasing plan, the various predicted transmitting abilities (PTAs), reliabilities and indexes provided to you after each genetic update can be overwhelming.

For most dairy producers in Michigan, sire selection based primarily on Net Merit (NMS) will allow you to meet your herd breeding goals. Following the initial selection on NMS, you can fine tune your group of service sires based on two or three additional traits/values of interest (e.g., PTA for somatic cell score, PTA udder, reliability, or calving ease for heifers).

Net Merit (NMS) is an economic index that indicates the expected lifetime profit of a cow or the daughters of a bull expressed relative to the base population of the breed.

NMS is calculated by summing three sub-indexes computed for yield, udder and other traits:

\[
\text{NMS} = \text{Yield$} + \text{Udder$} + \text{Other$}
\]

- **Yield$** is the expected milk income minus additional feed costs.
- **Udder$** includes PTA for udder (PTA Udder) and PTA for somatic cell score (PTA SCS). PTA Udder is an index that includes PTAs for the linear type traits of fore udder, rear udder height, rear udder width, udder cleft, udder depth, and teat placement.
- **Other$** was developed to account for lifetime net income (or loss) from productive life and remaining linear type traits. Other$ includes replacement rearing cost minus cull cow value, PTA for feet and legs score (PTA F&L), and PTA for body size (PTA Size). PTA Size is used to account for additional maintenance, rearing cost, and cull cow (beef) revenue. PTA F&L is comprised of PTAs for the linear type traits of legs-side view, legs-rear view, foot angle, and foot/leg score. PTA Size includes PTAs for stature, strength, body depth, and thurl width.

The relative weightings for the sub-indexes are: 67% Yield$ to 16% Udder$ to 17% Other$.

Latest Net Merit Rankings for Sires

It is recommended that your target for service sires be at or above the 80th percentile based on NMS. To simplify the selection process, a percentile ranking table based on NMS is created for each genetic update. Table 1 lists the May 2001 NMS values associated with various percentile rankings. For example, a Holstein sire that is $406 NM would be at the 80th percentile. Only 20% of the Active AI Holstein sires would have a higher NMS. Selecting among the top 20% of the bulls based on NMS is equivalent to choosing bulls at the 80th percentile or above.

Sire selection goals should be reviewed every 6 months and revised when needed. Continuous genetic improvement in a dairy herd is important to ensure future success.

**Table 1. NMS levels of top percentiles for AI sires by breed.**

<table>
<thead>
<tr>
<th>Breed</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>85</th>
<th>90</th>
<th>95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ayrshire (n=22)</td>
<td>211</td>
<td>236</td>
<td>259</td>
<td>341</td>
<td>355</td>
<td>373</td>
<td>429</td>
</tr>
<tr>
<td>Brown Swiss (n=49)</td>
<td>298</td>
<td>333</td>
<td>373</td>
<td>410</td>
<td>425</td>
<td>440</td>
<td>473</td>
</tr>
<tr>
<td>Guernsey (n=18)</td>
<td>324</td>
<td>349</td>
<td>352</td>
<td>360</td>
<td>365</td>
<td>367</td>
<td>390</td>
</tr>
<tr>
<td>Holstein (n=576)</td>
<td>305</td>
<td>335</td>
<td>364</td>
<td>406</td>
<td>425</td>
<td>451</td>
<td>506</td>
</tr>
<tr>
<td>Jersey (n=85)</td>
<td>284</td>
<td>309</td>
<td>337</td>
<td>367</td>
<td>379</td>
<td>404</td>
<td>444</td>
</tr>
</tbody>
</table>

"n=" indicates the number of bulls in the current active AI population for each breed.
MSUNM: A Management Tool Assisting State’s Crop/Livestock Producers

Lee W. Jacobs
Dept. of Crop and Soil Sciences

The MSU Nutrient Management (MSUNM) computer program has been converted to a Windows version (WinMSUNM) and was released for sale in February, 2001. This program can assist crop and livestock producers with fertilizer and manure nutrient management and pesticide application recordkeeping. WinMSUNM contains the MSU Fertilizer Recommendations computer program, which provides the user the convenience of generating his/her own MSU fertilizer recommendations, by utilizing soil fertility test results from the MSU Soil and Plant Nutrient Laboratory (SPNL) or other commercial soil testing laboratories. Soil test data from the MSU SPNL can be transferred electronically into WinMSUNM. Later this year, the capability to transfer soil test data from other selected commercial soil test laboratories into WinMSUNM will be added.

Once fertilizer recommendations are generated for individual fields and subfields, WinMSUNM allows the tracking of nutrient additions from fertilizer and manure applications. For dairy producers, WinMSUNM can calculate manure application rates for fields and subfields that are in compliance with the Right To Farm Generally Accepted Agricultural and Management Practices (GAAMPs). In addition, dairy producers can:

1) estimate quantities of manure nutrients produced on their farm(s) based on the number of animals housed now, or that would be housed if a new or expanded dairy operation was established, and then compare these nutrient quantities to crop nutrient removal on the available land base. (This “farm nutrient balance” report can be helpful for long-term planning to help keep your dairy operation sustainable.);

2) develop manure spreading guides (i.e., proper manure application rates), that will be in compliance with the GAAMPs, for different combinations of selected manure types and groups of fields and subfields that the user chooses;

3) calculate manure application rates for selected manure types and for selected individual fields using one or more of seven different manure allocation strategies;

4) have WinMSUNM determine amounts of nutrients applied by specific manure spreading rates and then subtract these nutrient credits from the fertilizer recommendation to determine additional fertilizer nutrients still required to meet crop nutrient needs on individual fields. (Taking credits for manure nutrients can significantly reduce your fertilizer bill.);

5) have WinMSUNM automatically calculate residual nitrogen (N) carry-over credits from previous manure applications or legume N, and subtract these N credits from the fertilizer N recommendations for the coming year’s crop. (This feature can reduce N fertilizer costs.);

6) use WinMSUNM to help them prepare a Manure Management System Plan, as recommended by the GAAMPs, or a Michigan Agricultural Environmental Assurance Program Comprehensive Nutrient Management Plan.

If you are interested in purchasing the WinMSUNM program, the cost is $150 for new users, or if upgrading from your DOS version of MSUNM, the cost is $100. Please obtain an order form from our web page: www.egr.msu.edu/age/msunm/, or call 517-353-7273, fax at 517-355-0270, or email at: jacobsL@msu.edu.

Come and see WinMSUNM demonstrated at the Crop and Soil Sciences tent during Ag Expo, July 16 to July 20.

Nutrition

Formulating Lactating Cow Diets For Carbohydrates: Part 2

Mike Allen
Dept. of Animal Science

The last issue of the Michigan Dairy Review contained Part 1 in this series, which discussed how carbohydrates affect feed intake, ruminal pH and microbial protein production. Part 2 presents a strategy and recommendations to formulate diets to maximize energy intake and microbial protein production to increase milk yield and decrease feed costs.

Diet Formulation for High Producing Cows

Ultimately, the usefulness of the information presented in Part 1 of the series is dependent upon how it is used to formulate diets. Although the type and characteristics of carbohydrate must be considered when formulating diets for all cows, it is especially important when formulating diets for cows with high daily milk yield because ruminal fill limits dry matter intake (DMI) of these cows to the greatest extent. Forage neutral-detergent fiber (FNDF) content should be used as the basis for diet formulation because it best represents the filling effects of diets, it is the primary source of fiber that is effective at stimulating chewing activity, and it is less fermentable than most other diet components. Therefore, as the FNDF content of the diet increases, fermentation acid production decreases (because diet fermentability decreases), fermentation acid neutralization increases (from increased chewing and secretion of salivary buffers), and DMI decreases when feed intake is limited by gut fill.
The optimum concentration of FNDF that will maximize energy intake of lactating cows ranges from about 17 to 28% of diet dry matter (DM). Many different factors affect the optimum forage NDF concentration of a diet for a particular cow or group of cows. These are factors that affect the production and removal of fermentation acids in the rumen over time and the filling effect of the diet. The goal is to minimize the filling effect of the diet to allow higher energy intake, and to maximize fermentation and microbial protein production while preventing ruminal acidosis. Figure 1 illustrates how several primary factors affect the optimal FNDF content of the diet.

The concentration of FNDF within this range is dependent on the cow or group of cows, the feeds available, and the feeding system used. Forage NDF contents at the low end of this range would be optimal in relatively few situations because of one or more limiting factors. Beginning at the minimum FNDF content, several factors will require a higher optimal FNDF content to maximize energy intake and microbial protein production (Figure 1).

**Recommendations**

- Starch sources with high ruminal digestibility can result in excess fermentation acid production, which decreases ruminal pH, efficiency of microbial protein production, and fiber digestion. Highly fermentable diets also increase ruminal propionate production, which also can limit DMI. Starch sources with high ruminal fermentability include rolled barley and wheat, ground high moisture corn, steam-flaked corn, finely rolled corn silage, bakery waste, and sugar sources such as molasses, whey, and citrus pulp. Ruminal fermentability of diets containing highly fermentable starch sources can be decreased by substituting starch sources with lower ruminal degradability for those with higher ruminal degradability. However, it is important to use starch sources with high whole tract digestibility to maximize energy intake. For instance, dry corn generally is less fermentable than high moisture corn but it should be finely ground because if it is rolled or ground coarsely it will have lower whole-tract digestibility and therefore provide less energy to the cow. Substitution of a less fermentable starch source such as dry ground corn for high moisture corn can increase microbial efficiency and increase DMI when feed intake is limited by propionate production.

- Concentrations of very rapidly degraded carbohydrates (sugars and starch sources such as wheat and barley) should be limited in the diet. Rapid fermentation of carbohydrates can reduce efficiency of microbial protein production and limit meal size. Adequate ruminally degraded protein from sources such as alfalfa silage, soybean meal, or urea should be provided to maximize microbial efficiency.

- Diet fermentability also can be reduced by substituting non-forage fiber sources (NFFS) such as beet pulp or soy hulls for starch in the diet (Figure 1). This might be a reasonable alternative to reduce fermentation acid production depending upon the relative prices of the NFFS to starch sources. Rate of fermentation of NDF from NFFS generally is slower than that of starch and sugars and less propionate is produced so feed intake might increase when it is limited by the amount of propionate absorbed. Another advantage is that rate of fermentation of NDF from NFFS will decline as pH decreases. This has the benefit of stabilizing ruminal pH by limiting its decline following meals but digestibility of the NFFS might be reduced. Substitution of NFFS for grain has little effect on the filling effect of the diet because NFFS generally are highly fermented and are not filling like forage NDF. Addition of NFFS can result in large reductions in optimal FNDF of diets. While this is desirable to minimize the filling effect of diets, it might not maximize energy intake because of possible rapid passage of NFFS from the rumen, which results in decreased digestibility.

- Rolling corn silage too finely can result in rapid and excessive ruminal starch fermentation. Therefore, rollers should be adjusted so that the cobs and most of the grain is in the middle sieve of the Penn State Particle Size Separator.

- Avoid feeding starch sources that are fermented poorly such as mature corn silage with dry, hard kernels, or coarsely rolled corn or sorghum to high producing cows. Diets that are fermented poorly decrease rumen microbial yield and fuels
for production of milk, but take up space in the diet and contribute to its filling effect. When diet fermentability is poor, feed intake often increases until it is limited by physical fill. This often results in increased passage rate from the rumen, decreasing digestibility. While higher feed intake generally is desirable, when poorly fermentable diets are fed, the energy loss from decrease in digestibility can offset the energy gained from increased feed intake, resulting in poor feed efficiency.

- Another alternative for limiting diet fermentability is to increase the diet FNDF content. However, unless the FNDF is digested and passes from the rumen quickly, this approach will increase the filling effect of the diet and reduce DMI when limited by ruminal fill (see next point below).

- Feeding forages with highly fermentable NDF with high ruminal NDF turnover will require higher FNDF in the diet but will allow greater energy intake and provide a more consistent source of energy to the cow throughout the day. Forages with high ruminal NDF turnover include alfalfa with low lignification of NDF (< 16% of total NDF), corn silage with low lignification of NDF (< 6% of total NDF). Brown midrib corn silage has a high rate of clearance from the rumen that allows higher DMI when fill limitations exist. In one recent experiment, response in milk yield to brown midrib corn silage was much higher for high producing cows than for lower producing cows.

- Variation in DM and (or) NDF content of forages will cause great variation in ration FNDF and fermentability. Cows consuming low FNDF diets are more susceptible to ruminal acidosis when forage DM and NDF is reduced unexpectedly. However, if forage NDF or DM content increases and is undetected and uncorrected, energy intake will be somewhat reduced and this is not a great problem to animal health. Therefore, when variation is expected, higher diet FNDF levels must be fed to lower the risk of acidosis (Figure 1).

- Effort should be made to reduce variation in DM and NDF when forages are harvested (or purchased) and stored. Identify individual lots of forage and have them tested. Variation in forage DM and NDF is often a problem for silage. Bunker silos have less daily variation than uprights or bags because the silo is filled in layers that tend to be mixed when removed from the silo. In contrast, abrupt shifts in DM and NDF can occur when removing silage from upright silos or silage bags. Silage DM concentration should be tested routinely. Frequency of testing depends upon the amount of variation and the type of silo. Silage DM in upright silos should be tested twice weekly and when changes are noticed, while silage in bunker silos can be tested less frequently. Mixing loads of silage from wet and dry parts of the bunker face when removed from the silo can help reduce variation, particularly after a substantial rainfall. Variation in ingredients that comprise a large fraction of the diet can have a great effect on FNDF and fermentation characteristics of the entire diet. Restrict the concentration of individual ingredients with variable quality or DM.

- Sorting can cause variation in diets consumed throughout the day. If sorting is a problem, it can be reduced by more uniform chopping of forages, processing corn silage, avoiding dry rations, and feeding more than one time per day.

- Feeding totally mixed rations (TMRs) will allow lower FNDF concentrations. TMRs have a great advantage because rapidly fermented carbohydrates are consumed along with effective fiber that limits size of meals and the decline in pH following meals. Concentrates can be fed separately but they should be fed four or more times per day, and rapidly degraded starch sources should be limited.

- Provide adequate particle length in diets. Reduction in particle length starts when forages are chopped. Further reduction occurs when corn silage is processed and when forages are ensiled in bags by augers during filling. Particle size also is reduced when diets are mixed in many TMR mixers. A constant mixing time should be used that is sufficient to adequately mix TMRs while avoiding excessive particle length reduction. Finally, particles are reduced still further when eaten by the cow. Effective fiber is needed to form the rumen mat to selectively retain small particles in the rumen and to stimulate rumination. While there is little to be gained in effectiveness of NDF by having particle length beyond a certain point, particle size in TMRs consumed by cows is sometimes too small. The Penn State Particle Size Separator is useful to monitor changes in particle size from mechanical treatment and to ensure adequate particle length in TMRs. Less than 40% of the TMR should be recovered in the bottom box following sieving to provide adequate particle length. When more than 10-15% of the TMR is recovered on the top sieve, the TMR will be more subject to sorting. This leaves over 45% on the middle sieve, which provides most of the effective NDF in the diet. Diets containing silages that are chopped too finely can benefit by including 2 to 3 lb of long-chopped hay in the diet to improve the effectiveness of NDF.

- Addition of buffers to the diet can increase the buffering capacity of rumen fluid and help attenuate the reduction in pH following a meal. Inclusion of sodium bicarbonate at 1% of diet DM can reduce the optimal FNDF concentration in the diet by about 1% of DM.

- Diets with added fat require less FNDF because fat isn’t fermented in the rumen to acids (Figure 1). Although fat can be included in diets to increase energy intake beyond what can be attained by diet formulation for carbohydrates, some fat sources reduce DMI and might not improve energy intake. In addition, highly fermentable diets containing added fat with
polyunsaturated fatty acids might reduce milk fat from production of trans fatty acids in the rumen.

- Grouping cows by milk yield will help increase energy intake because diets can be more closely formulated to meet their needs. High producing cows should be fed low fill diets to maximize energy intake. However, lower producing cows can be offered diets with higher FNDF content which provides the benefit of more consistent supply of fuels throughout the day. A more consistent supply of nutrients might help partition more fuels to milk and help prevent excessive body condition. Wide variation in DMI and milk yield of cows within groups makes it difficult to optimize FNDF concentration for all cows in the group.

Conclusions
The different factors discussed in this article are important to formulate diets to maximize energy intake and microbial protein production. The complex interactions among these factors prevent accurate prediction of optimal FNDF concentration for cows or groups of cows. Diets should be formulated by evaluating cow responses to dietary changes and adjusting the diet based on these responses. Lower FNDF contents generally will allow higher energy intake and higher milk yield. Diets with low optimal FNDF content will have starch sources that have moderate ruminal fermentation, forage particles that are sufficiently long, moderate to low forage NDF content, be fed as a TMR, and have little daily variation. Some conditions require diets with higher FNDF content, which will limit energy intake of high producing cows. Diets with higher FNDF generally will have rapidly fermented starch sources, finely chopped forages, no non-forage fiber sources, limited feed bunk space, infrequent grain feeding, and high daily variation. The exception to this is when FNDF is highly fermentable, which will allow higher FNDF contents and higher energy intakes. The information presented here can be used to develop a strategy to feed less filling diets while minimizing acidosis, which can be refined with experience. Such a strategy will allow increased energy intake and microbial protein production, increasing milk yield and decreasing feed costs.

Labor Management - Staffing

Select Employees Based on Behavior

Rebecca Mitchell
Extension Dairy Agent
Ionia, Kent and Montcalm Counties

Stop for a moment and think of your best employee, past or present. What traits characterize that person? Does he always show up for work on time? Can she be counted on to make sure all the chores get done when you are gone for the day? Does he solve day to day problems without taking up a lot of your time? There are many reasons why a manager might consider an individual his or her best employee. The most effective managers identify behaviors that characterize successful employees and select new hires who exhibit those same behaviors.

At a recent seminar on managing a dairy workforce, the audience was asked, “If you had to identify five behavioral characteristics that were critical to the success of an employee on your dairy, what would they be?” (1). Answers from the dairy producers in the audience were varied. Some indicated that to be productive and successful on their farm, employees had to be hardworking, motivated, responsible, honest, punctual, and ambitious. Others suggested that employees should be good communicators, team players, and problem solvers. Think about how you would answer that question and jot down your answers in the space that follows. You can select behaviors from the accompanying list or come up with your own. Note that these behaviors are not job specific; they are critical for everyone on the farm regardless of title or function. This includes the owner and manager as well.

For employees to be successful on my dairy farm, they must exhibit the following behaviors:

1. ____________________
2. ____________________
3. ____________________
4. ____________________
5. ____________________

You can now use this list of behaviors to develop a plan for hiring individuals who have the best chance for becoming successful employees on your dairy.

Interviewing For Behaviors

When a position opens on a dairy farm, most managers start the search for an individual to fill a particular role, such
as herdsperson, calf feeder, or milker. These titles describe the job that the person will be doing based on a set of skills. These skills are often defined in a job description. For example, a job description for a herdsperson might include duties such as treating sick animals, breeding cows, and monitoring the herd’s ration for high milk production. In a typical interview for an open herdsperson position, an interviewer asks candidates skill-related questions to assess their ability to perform those duties. For example, a candidate might be asked if he or she knows how to artificially inseminate cows. Additionally, the interviewer may ask a potential candidate to describe his or her experience in identifying and treating sick cows. While performing these tasks is an important part of a herdsperson’s job, these are skills that can be taught. In other words, you can train someone to artificially inseminate or treat a cow, even if he or she doesn’t have any previous dairy experience. On the other hand, training someone to be ambitious, honest, persistent or team-oriented is much more difficult. Such behavioral characteristics are more important than skills or knowledge, and many of these attributes are learned at a young age and are harder to change later in life (2). As a result, during the interview process, it is very important to identify those individuals that already exhibit those behavioral attributes.

Let’s take a specific example. Suppose Brad, the owner of a dairy farm, identified ambition as one of five key behavioral attributes for successful employees on his farm. Most would agree that trying to train someone to be ambitious is a difficult task. Consequently, when looking to hire someone to fill a position on Brad’s farm, he should be sure to ask questions during the interview to gauge a candidate’s ambition before hiring him or her. Brad develops two open-ended interview questions to draw out this behavioral characteristic.

**Ambition**

1. Describe a time when you did beyond what was asked of you.

2. Tell me about a situation when you took the initiative to make a change at work.

While listening to a candidate’s response to these questions, Brad is able to assess whether the candidate meets his requirement for ambition. In addition to ambition, Brad also identified communication, teamwork, responsibility and problem solving as critical characteristics of new hires. Brad completes a similar process for the remaining four behaviors, writing one or two interview questions to draw out each behavior.

**Communication**

1. Tell me about a time when you “put your foot in your mouth” and what happened (3)?
2. Describe a problem person you have had to deal with at work. What did you say to resolve the problem?

**Teamwork**

1. Have you ever had to work with a team of people who did not work well together or did not like each other? Tell me what happened and how you reacted.
2. Tell me about a time when you were part of a successful team. What was your role in its success?

**Responsibility**

Describe a time when you made a mistake. What did you do to correct it?

**Problem solving**

Give me an example of a problem you have faced and how you solved it.

By asking the questions for each behavior, Brad can get a feel for a candidate’s strength or weakness in each area and can base part of his selection decision on behaviors. Like the example, you can now take the list you created earlier and develop your own behavior-related questions to be used when interviewing for positions on your dairy. Once developed, these questions should be asked of all candidates who interview for jobs on your farm, regardless of the position for which they are interviewing. This provides consistency when interviewing and reinforces the significance of the identified behaviors across all jobs. Using the previous example on Brad’s farm, it is just as important for a herdsman to be ambitious as it is for a milker to be ambitious.

While it is important to include behavior-related questions in the interview process, they are not meant to replace questions that help an interviewer learn about a candidate’s skills. As mentioned earlier, skill-related questions are helpful in determining an individual’s ability to perform specific tasks. In addition, while behavior-related questions should be the same for all candidates regardless of position, skill-related questions should be customized for the particular position being offered. Combine both behavior and skill questions during an interview for success in hiring the person who will best fit your business.

**Summary**

Farm managers must be able to identify those behaviors that are critically important for every employee on their farm. Once identified, managers must work to ensure that individuals at all levels of the business exemplify those behaviors, including themselves. To be
If someone were to ask you what the most valuable resource is in the Michigan dairy industry how would you respond? I think the answer is simple—our young people. The Michigan dairy industry is blessed with a plethora of talented, energetic, and enthusiastic youth. Because youth are our most valuable resource we need to do all we can to protect this resource. In 1991, approximately 1.3 million youth lived on U.S. farms and ranches (1). It is inevitable that youth living on a farm will somehow participate in daily operations. Many families rely on early adolescent and teenage children for labor, and they employ young workers after school and during the summer to support their dairy operations. The use of youth as labor is a great way to allow them to gain experience and knowledge about the dairy industry and learn responsibilities.

What is the Risk of Injury?

In a tight job market, young people are an excellent source of energetic and cost-effective employees for dairy managers. Utilizing youth as a means to get the job done can be a win-win situation for both young employees and managers. Farm managers win with a valuable labor source. Over 155,000 non-family 15- to 17-year olds were hired to work on farming operations in 1997 (2). Teens who are employed benefit as they have greater self-esteem and are less likely to get into trouble with authorities (7). A potential negative of youthful employees on farms is injury. About 100 youth die each year from injuries related to agriculture, accounting for a quarter of all childhood worker deaths (3). Yet only 4 percent of the childhood work force is employed in agriculture (4). Serious injury also is likely to happen to youth working on the farm. Serious injuries occur at a rate of 18.3 per every 1000 youth living on a farm (5). Therefore, about one out of every 50 youth who reside on a farm will encounter some serious injury before the age of 18. These deaths and injuries cost our society 3 billion dollars annually (6). This total includes direct medical costs, value of lost future earnings, and reduced quality of life.

The above statistics prove that having young working on a farming operation requires some special attention. As one might expect, tractors are associated with half of the fatalities involving children, but injuries and fatalities also are associated with livestock, falls, small tools, building structures, and moving machinery parts (6). Adolescents are more at risk for injury and death because they engage in rebellious, risk taking behaviors more often than adults (7). In addition, adolescents carry a perception of immortality, invincibility, and the attitude that accidents will not happen to them (7).

Conduct “Safe” Demonstrations

As a dairy manager what can you do to realize the advantages but minimize the risks associated with youth as employees? Firstly, remember everyone learns (but especially youth) best by “show and tell”. Take time to demonstrate how to safely perform the task you want the employee to complete, and then have the employee perform the task to demonstrate the proper procedure. This insures mutual understanding of how a task is to be completed and how to minimize risks while performing the task. As an added bonus, using the show and tell method also insures the task is completed at the level of quality that you expect.

Secondly, you should always match a child’s developmental capabilities with the task assigned. Remember that all children are not at the same developmental level. Just because one 16-year old can safely complete a task does not mean all 16-year old employees can competently and safely complete the same task. Also, a child’s developmental capabilities are constantly changing so it is necessary to reassess and monitor youthful employees frequently. An example of changing abilities is a rapidly growing adolescent. During rapid growth an adolescent may become clumsy and lose coordination. A task that was once easy may become more difficult and more dangerous.

Thirdly, remember 7- to 9-year old children have a short attention span (12 to 15 minutes) (8). This short attention span, impulsive behavior, and a tendency to become easily distracted puts 7- to 9-year olds at high risk for injury. All tasks delegated to 7- to 9-year old children should not require intense concentration for extended periods of time.

Another important issue to keep children safe is to prevent riding on a tractor as a passenger. Children always should be transported to and from fields in a motorized vehicle with appropriate restraint. Additionally, parents or farm managers should ensure that all equipment meets all safety standards for laws

References

and “common sense.” All safety shields should be in place to reduce risk of accidents. It also is recommended that if a child will be out of visual or auditory contact from an adult for more than five minutes you should establish an alternate communication link such as a cellular phone, a pager, or a two-way radio. These tools allow the supervisory adult to contact the young worker on a frequent basis to make sure everything is fine. Childhood injuries occur frequently when equipment is being repaired. All employees should be instructed that if a breakdown occurs they should shut off the machine immediately, and then notify an adult to help them assess the situation and solve the problem.

Finally, adults should remember that children practice what they see. It is important for adults always to be a role model for safe practices. Thus, supervisors must practice what they preach. Not only will this keep adults at low risk for injury, but it also sets an excellent example for all employees.

In dairy operations additional risks include working around large animals, which pose a risk for crushing and kicking injuries. Managers should ensure all young employees are oriented properly as to how to handle large animals. Take time to observe a new employee with the cattle and make sure all safe handling techniques are adhered to. If your dairy operation utilizes bulls for breeding, youth should never be expected to handle the bull. Take time to explain to all employees the unpredictable nature of bulls. Finally, explain to all youth the danger of closed spaces such as silos and grain bins. Inform youth that they should never enter a closed space without first insuring the environment is safe.

**Summary**

Youth can be an excellent source of labor for farming operation. For the youth who work in a farming operation there can be many benefits. However, it is important to realize that when you use youth as labor you must make special efforts in training, assigning appropriate responsibilities, and taking necessary precautions. If you follow the suggestions above, you can help keep our most precious resource safe and enthusiastic about the dairy industry.

**References**


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**Dairy Foods**

**Listeria and the Dairy Industry: Where Have We Been and Where Are We Going?**

Elliot T. Ryser
Dept. of Food Science and Human Nutrition

First described in 1924, *Listeria monocytogenes* has been recognized as a sporadic cause of bovine mastitis and abortion for more than 50 years. This pathogen is reportedly present in 3 to 4% of the raw milk supply. Although *L. monocytogenes* was confirmed as a human pathogen in 1929, evidence for foodborne transmission of *L. monocytogenes* remained scant for more than 50 years with only a few anecdotal reports of stillbirths in post WWII Germany being related to raw milk consumption. Foodborne transmission of *L. monocytogenes* was not proven until 1981 when consumption of contaminated coleslaw linked directly to 34 adult and seven perinatal cases of listeriosis in the Maritime Provinces of Canada. However, given that the cabbage grower used manure from an infected herd of sheep to fertilize the cabbage, the likelihood of such an outbreak recurring was deemed remote with this report receiving minimal attention from the scientific community. Two years later, the dairy industry received its first scare when 49 cases of listeriosis (including 14 fatalities) in Massachusetts were epidemiologically linked to consumption of one particular brand of whole and 2% pasteurized milk (4). However, despite extensive investigations, the exact role of milk in this outbreak was never established.

**Listeriosis Cases Cited**

In the summer of 1985, *L. monocytogenes* made the front page of many national newspapers when consumption of Jalisco-brand, Mexican-style cheese was linked directly to over 300 cases of listeriosis, including 85 fatalities, in California. Final reports indicated that *L. monocytogenes* most likely entered the cheese through direct addition of raw milk. The fact that this outbreak involved an ethnic cheese that was primarily consumed by Hispanics who sought treatment at a limited number of medical facilities in the Los Angeles area proved instrumental to its discovery. The United States dairy industry has thus far experienced only one additional outbreak - a non-fatal 1994 incident in which 54 previously...
healthy individuals attending a summer picnic in Illinois developed a mild form of gastroenteritis after consuming temperature abused chocolate milk that contained extremely high levels of L. monocytogenes. However, the European dairy industry has not been as fortunate with nearly 200 cases including 32 deaths/stillbirths from listeriosis traced to consumption of Vacherin Mont d’Or cheese (Switzerland: 1983-1987), blue cheese (Denmark: 1989-1990), Brie de Meaux cheese (France: 1995) and Pont l’Eveque cheese (France: 1997), most of which are classified as soft surface-ripened varieties (4).

‘Zero Tolerance’ Policy Feasible?

In response to the 1985 outbreak in California, the current “zero tolerance” for L. monocytogenes in all ready-to-eat foods, including dairy products, was adopted by the United States government. The subsequent finding of L. monocytogenes in some European varieties of soft and semi-soft cheese during a Food and Drug Administration (FDA)-initiated soft cheese surveillance program in March 1986, and prompted the first removal of imported cheeses from the market. The dairy industry has been heavily impacted by the current “zero tolerance” policy with 49 Class I recalls issued during the late 1980’s for Listeria-contaminated dairy products, principally ice cream and soft/semi-soft domestic and imported surface ripened cheeses such as brie. During the last 10 years, L. monocytogenes was responsible for 71% of all microbiologically related Class I recalls involving dairy products with 38, 23, 4 and 1 recalls issued for Listeria-contaminated cheese, ice cream/frozen desserts, butter, and fluid milk/cream, respectively (3).

After learning that the number of listeriosis cases in the United States declined 44% between 1989 and 1993 to about 1100 cases (including 250 fatalities) annually, some regulatory officials and food commodity groups began claiming partial victory over Listeria and began refocusing their attention on more immediate food safety concerns such as Escherichia coli O157:H7. Extensive mass media coverage was given to other non-Listeria outbreaks including those involving E. coli O157 H:7 in undercooked ground beef, unpasteurized apple cider and fresh produce. The absence of any major dairy-related listeriosis outbreaks in the United States since 1985 (other than the mild outbreak of listerial gastroenteritis traced to temperature-abused chocolate milk in Illinois) was again partially responsible for this shift away from Listeria.

In December of 1998, the processed meat industry in the United States received a rude awakening with the report of at least 100 cases of listeriosis (including 21 fatalities - 15 deaths and 6 miscarriages) in 22 states that were traced to turkey hot dogs and luncheon meats manufactured in Michigan by Bil Mar Foods. In addition, a second possible nationwide outbreak was reported in December of 2000 in which 29 cases (including 1 fatality and 3 miscarriages) were epidemiologically linked to one Texas manufacturer of ready-to-eat turkey products (1). As a result of enhanced surveillance, the Centers for Disease Control and Prevention (CDC) now estimates that approximately 2500 listeriosis cases (including 500 fatalities) occur each year in the United States from food and other sources.

Despite the 1998 outbreak just described, growing numbers of individuals in the food industry are continuing to question the usefulness and feasibility of maintaining the current “zero tolerance” policy for L. monocytogenes in all cooked/ready-to-eat foods, including many dairy products. These concerns stem from the fact that the number of listeriosis cases in the United States has more than doubled since 1993 despite hundreds of Class I recalls and countless instances in which Listeria-contaminated products were recalled internally by the manufacturer. Consequently, human exposure to Listeria is likely a common occurrence, particularly when additional products such as fresh fruits and vegetables are included, with the average individual likely ingesting very low levels of L. monocytogenes on a weekly basis.

Public Risk Assessed

In January of 2001, FDA’s Center for Food Safety and Applied Nutrition in collaboration with the United States Department of Agriculture’s Food Safety and Inspection Service and CDC published their long awaited document entitled “Draft Assessment of the Relative Risk to Public Health from Foodborne Listeria monocytogenes Among Selected Categories of Ready-to-Eat Foods” (2). This risk assessment utilizes mathematical modeling to (i) estimate the potential level of exposure of three age-based population groups [perinatal, the elderly, and the remaining population] of U.S. consumers to L. monocytogenes-contaminated foods in 20 categories, and (ii) relate exposure to public health consequences. When the 20 food categories were ranked, pate and meat spreads had the highest relative risk (~19 cases/10^6 servings) followed by smoked seafood (~16 cases/10^6 servings), fresh soft cheese [e.g., Queso fresco] (~14 cases/10^6 servings) and deli meats (~7 cases/10^6 servings). All remaining product categories had relative risks of less than 5 cases/10^6 servings with the remaining dairy product categories (soft mold-ripened and blue-veined cheeses; pasteurized fluid milk; unpasteurized fluid milk; miscellaneous dairy products; heat-treated natural and processed cheese; goat, sheep and feta cheese; aged cheese; ice cream and frozen dairy products) all having relative risks of less than 1 case/10^6 servings. Heat-treated natural and processed cheese; goat, sheep and feta cheese; aged cheese; and ice cream and frozen dairy products ranked 15th, 16th, 19th and 20th among the 20 food product categories, respectively, making these among the least likely products to elicit cases of foodborne listeriosis. Based on these findings, it was concluded that new approaches for reducing potential Listeria...
contamination in fresh soft cheese [e.g., Queso fresco] and unpasteurized milk are warranted given their previous association with listeriosis cases in humans. Assuming adequate pasteurization and continued vigilance during all facets of production, storage and distribution, heat-treated natural and processed cheese, pasteurized milk and blue-veined cheeses were deemed to be of potentially low relative risk. Of the remaining dairy products, goat, sheep and feta cheese; aged cheese; ice cream and frozen dairy products had low predicted relative risks due to their inherent characteristics, storage methods and current lack of involvement in outbreaks of foodborne listeriosis.

Some Modifications Necessary

Over 50 Class I recalls have been issued since 1986 for frozen ice cream (> 2.6 million gallons), with these recalled products most likely containing extremely low levels of *L. monocytogenes*. Given the inability of *Listeria* to grow in such frozen products and a worldwide absence of listeriosis cases traced to commercially produced ice cream, the present “zero tolerance” policy appears to be over restrictive for such products as frozen desserts and aged cheeses. Canada, Australia, and many European countries have taken a somewhat more lenient approach allowing up to 1000 *L. monocytogenes* colony forming units/gram or milliliter in certain ready-to-eat foods, such as ice cream, that will not support growth of *Listeria*. While these same countries along with the United States recognize the increased danger associated with Mexican-style and soft, surface-ripened cheese, a clear need exists to modify the current “zero tolerance” policy for low risk food categories such as ice cream and aged cheeses as demonstrated by the recently published risk assessment document, which is open for public comment(2).

References


**Milk Market**

**Milk Prices: Impact of Policy Changes?**

Christopher Wolf
Dept. of Agricultural Economics

Two recent or forthcoming policy changes have or may affect milk prices. One is the change in the “butter/non-fat dry milk tilt.” The tilt is the relative support prices of butter and non-fat dry milk. Ed Jesse and Bob Cropp, dairy economists at the University of Wisconsin analyzed the consequences of the tilt, which can be summarized briefly as follows. Butter prices have been relatively high so far in 2001. The price support for butter prior to May 31, 2001 was $0.65/lb. Subsequently, the butter support price was raised 20 cents to $0.85/lb as part of the change in tilt. The butter price has been in the $1.50 to 1.95/lb range in recent months so butter will not reach support level anytime soon, even with the price support increase.

Non-fat dry milk is the other product in Class IV, which may result from the remaining milk components after butter making (although in reality much of the butter production actually comes from excess cream skimmed from fluid milk processing and low-fat cheese manufacturing). The non-fat dry milk support price previously was $1.003/lb and was dropped to $0.90/lb. Both before and after the change in butter/non-fat dry milk tilt, the weighted total hundredweight support price was $9.90 for 3.7% butterfat milk ($9.80/cwt with 3.5% butterfat). This change in price tilt was instituted because the Commodity Credit Corporation was purchasing large amounts of non-fat dry milk (668 million pounds through March 2001, which amounts to more than 40 percent of the production). USDA has authority to make two price changes annually but had not previously changed the tilt under the 1996 Farm Bill.

Even though the hundredweight support price remains constant, milk prices are affected by change in the butter/non-fat dry milk tilt because Class IV prices are connected directly to Class II (e.g., ice cream) prices and Class IV prices have been driving Class I (fluid milk) prices since January 2000. The effect of this price tilt change depends on the fluid utilization, the relative importance of ice cream, and utilization of butter and non-fat dry milk. In areas with high Class III (cheese) utilization this change will have little effect. In areas with more Class I, II or IV, the price effect will be noticed. The Mideast Order, to which Michigan belongs, had 40% of milk production going in Class I, 7% to Class II, and 4% to Class IV in May 2001.

Another policy situation is the potential for the upcoming hearings on “pool riding”. Pool riding refers to milk moving into an order from another area to take advantage of the higher prices—usually due to higher fluid utilization. Often this milk is used in Class III for cheese, but it is still eligible to receive the blend price. In the case of the Mideast Order, the milk moving in comes from the Upper Midwest Order (Wisconsin and Minnesota). This pool riding at least partially explains why fluid utilization in the Mideast Order has been lower than forecasted since the Order Reform in January 2000. The Upper Midwest Order claims to be receiving milk pooled in California and the Upper Midwest order simultaneously. (A
United States Department of Agriculture hearing to sort through the issues with pool riding in the Upper Midwest region is scheduled for the end of June. The hearing in the Upper Midwest Marketing Order regarding California pool riding will likely set the stage for action in the Mideast Order regarding Wisconsin pool riding.

US and Michigan Dairy Market

Some of the fundamentals and what they might indicate for the milk market in the next few months is discussed below. Michigan has been one of the few states to consistently increase milk production over 2000 levels (up more than 1% through April). Other states in the top 10 that increased milk production are California, Idaho, and New Mexico. Some states have had large production declines relative to last year. One example is Texas, which is off more than 10 percent largely because of bad weather. The top 20 milk producing states are below the milk production level of last year (Figure 1). After large increases from 1998 to 1999 and again in 2000, the production in 2001 is closer to 1999 levels. Milk cow numbers returned to the long-term trend of declining over time after about 2 years of holding steady to slightly increasing (Figure 2). The pattern from 1998 is more typical of the long-term trend. Higher milk prices in 1998 and 1999 encouraged expansion in many areas. Milk cow numbers for 2001 may indicate that the expansions are mostly complete and a return to the earlier trend is likely, unless product inventories maintain the higher recent milk prices. Michigan milk cow numbers have held steady at 301,000 to 303,000 in 2001. The milk-to-feed price ratio for Michigan has remained high (Figure 3). Corn and soybean prices remain quite low and the recent increase in the milk price is not incorporated because the data were only available through March at press time. Still, the impetus to maintain or even increase milk production is evident in the general increase in the milk-to-feed price ratio since 1998.
Meet Your Future Dairy Leaders at Work

Miriam Weber
Dept. of Animal Science

Undergraduates in dairy programs at MSU participated enthusiastically in research programs of our faculty again this year. **Jeremy Arend, Rebecca Darch, Sarah Krippes and Kasey Moyes** conducted experiments related to custom raising of heifers, mastitis, bone development in cattle, and conception rate through the G.C. and Gwendolyn Graf Memorial Student Enhancement Program in the Department of Animal Science.

A commonly overlooked enterprise on a dairy farm is the replacement heifers, the focus of **Jeremy Arend’s research project**. Dr. Chris Wolf in Agricultural Economics directed Jeremy’s project entitled “Raising Heifers versus Custom Raising Heifers in Michigan”. Jeremy wrote a survey to examine heifer-raising practices of U.S. producers. The survey was sent to over 200 members of the Professional Dairy Heifer Growers’ Association (PDHGA) to gather information on profitable heifer management practices. He evaluated and presented the results of his survey, before graduating in fall of 2001. Jeremy will intern with Monsanto Dairy Business in Washington State this summer. A recipient of multiple Michigan Dairy Memorial Scholarships, Jeremy plans to work in the dairy industry.

Determining the best form of anti-E. coli antibodies for immunizing dairy cows against mastitis is the objective of **Rebecca Darch’s research** with Dr. Jeanne Burton in Animal Science. Last spring, Rebecca developed strains of *E. coli* bacteria that produced a fluorescent green protein. Using antibodies to mastitis-causing JS *E. coli*, produced in a previous student’s Graf project with Dr. Burton, Rebecca evaluated the effectiveness of two types of antibodies to bind the *E. coli* bacteria and for the complex to then be ingested and killed by white blood cells. The overall goal of her research is to improve the effectiveness of passive immunization of dairy cows in preventing and treating coliform mastitis. Rebecca completed her research in the summer of 2000 and presented her results at the 2000 Conference of Research Workers in Animal Diseases. Rebecca began a Master’s program in Animal Science in the Fall of 2000.

**Sarah Krippes**, a senior in Animal Science and a recipient of a Michigan Dairy Memorial Scholarship, worked with Dr. Richard Pursley to investigate the reasons that conception rates are lower in cows than in heifers. Last spring, Sarah traveled to Washington State University in Pullman, Washington to work with a collaborator of Dr. Pursley and learn techniques needed for her research. Upon her return, she began working with Dr. Pursley to synchronize estrus of cows and heifers and breed them by artificial insemination. Samples of mucus from reproductive tracts of inseminated animals were collected to determine if the number of sperm lost after artificial insemination differed between cows and heifers or was influenced by site of semen deposition. Sarah plans to attend graduate school in physiology.

Finding a method for early detection of skeletal and lameness problems is the goal of the research project of **Kasey Moyes**, a senior in Animal Science. These problems are a significant and costly concern to livestock producers. With direction from Dr. Dave Beede, Meadows Chair Professor, and Dr. Michael Orth in Animal Science, Kasey helped determine if blood serum biochemical markers of bone development are regulated by age and physiological state of dairy cattle. Specifically, she evaluated the effect of age, exercise, lactation, and exercise during pregnancy on serum bone markers. Early detection of animals that are highly susceptible to skeletal problems could decrease financial losses and improve overall health of animals. Kasey worked to collect blood samples from dairy cattle and measured the concentrations of biochemical bone markers in serum. Kasey graduated in May of 2001 and plans to begin a Master’s program in dairy nutrition in the Fall.

The Dairy Associates Program

The Graf program for undergraduate research will be one element in the Dairy Associates Program starting this fall in the Department of Animal Science. Through the generosity of Dr. G.C. Graf, an alumnus of MSU (’34, Agriculture), Dairy Associates was created to encourage students to pursue dairy-related careers by becoming active partners with producers, industry representatives, and faculty. Students will have the option to participate in dairy farm analysis and decision-making opportunities at MSU and other universities and (or) to participate in undergraduate research in dairy, agribusiness settings. Recognizing the need for students in the Dairy Associates Program to gain a global perspective on the dairy industry, Remus and Ruth Rigg generously established an endowment to support future international travel of the Dairy Associates to study current issues in the dairy industry in other countries. Participation in these undergraduate experiences will allow tomorrow’s leaders to develop an integrated perspective of the dairy industry.

Additional opportunities in the Dairy Associates Program are provided through support from the Roger and Marjorie Mellenberger Dairy Associates Program Enhancement Fund, the Frederick Pierce Halbert Dairy Memorial Endowed Scholarship Fund, the MSU College of Agriculture and Natural Resources, the Michigan Agricultural Experiment Station, and the Department of Animal Science.
Animal Science Education Proves Valuable for MSU Graduates - Part 2

Pam Jahnke
Dept. of Animal Science

There is no lack of job opportunities for former dairy students who have gone through the animal science curricula at Michigan State University. That’s true for graduates of the specialized 2-year Ag Tech program, the 4-year B.S. program, and graduate school.

While some of the students’ career paths changed unexpectedly, they all say they were well prepared for the change due to the education they received when they were students in MSU’s Animal Science Department. (For more information, see articles, “Dairy Science - Education and Career Options,” in the Michigan Dairy Review, April 2000, and “MSU Animal Science Graduates Working in Variety of Occupations,” in January 2001.)

This is the second article introducing some of MSU’s animal science alumni and how they are contributing to the state’s dairy industry.

Craig Endres grew up on a small 65-cow family farm in Clarksville, although his family no longer lives there. Still, he hopes to own a farm someday - maybe in 10 to 15 years. Endres, who completed the 2-year Ag Tech Dairy Management Program in ’95, currently is a herdsman at a large Michigan dairy, and appears to be well on his way to achieving his goal.

“I’ve always been around dairy, I wanted to be involved in it and figured this would be a good program to go through if I ever owned my own farm,” he said.

He went to work as a herdsman at the Maple Row Dairy, a 1,400-cow facility nestled in Saranac, shortly after completing the Ag Tech Dairy Program. One of five herdsmen at Maple Row Dairy, his responsibilities include giving vaccinations, blood testing, cow sorting, treating sick cows and fresh cows. He puts in 12-hour shifts, but the long hours are worth it just to be outside and working with the animals. Endres said the Ag Tech Dairy Program helped prepare him for the farm’s future expansion and taught him different dairying techniques ranging from cow comfort to feeding to housing - stanchion vs. free stall barns - and body condition scoring (BCS). Now he uses BCS frequently, especially when assessing whether an animal can be moved from one management group to another.

When Endres’ employer decided to increase the herd from 350 to 1,400 cows, build a new milking parlor and construct four new free stall barns 3 years ago, the herdsmen helped with planning. As a result, some of the changes they suggested - including the installation of “head locks” to help with sorting - were done and proved helpful for restraining animals for breeding and (or) treatment.

Expanding to a larger farm was a learning experience. “It was a lot more to take care of and get straight. The larger farm is nice because there are more people and you can get more done, but on the smaller farm you can work at your own pace,” Endres said.

This herdsman encourages today’s animal science students going through the 2-year program to pay attention and learn as much as possible so when they land their first job, they will possess the necessary skills. Endres sees students, when his former professors bring out groups for tours. “I wish I could do it again. It was a lot of fun. I learned a lot and I met a lot of different people,” he said.

Most people are surprised upon learning that Gretchen (Maletzke) Sanford grew up in the urban town of Boca Raton in south Florida, the daughter of a residential contractor. “My parents are shocked when we talk about artificial insemination at the dinner table,” she said.

After all, she has been the coordinator of Agricultural Industries, a program within the Institute of Agricultural Technology at MSU, since December of ‘99 and is a former high school agricultural science teacher and pharmaceutical representative. She earned her B.S. degree in ’93 in animal science (with an emphasis in dairy physiology) and in ’97 received another B.S. in agricultural science and a M.S. in agricultural education.

Gretchen is married to Pete Sanford, who graduated from MSU with his B.S. in animal science in ’92. The two met in a mutual animal science class. Since his graduation, Pete has worked as a herdsman at various Michigan dairies, including an 1,800-cow dairy near St. Johns. Currently, Pete is a herdsman at Matt Arends’ farm in Ionia, and is considering attending graduate school to further his education in dairy management.

Pete, who began farming at age 14, has helped Gretchen...
play “catch-up” on the ins and outs of farming. Over the years, he has patiently answered her questions “ad nauseam,” she laughed. “A lot of what I know I learned from him.” His tutoring has given her the “credibility” she needs when dealing with farmers.

As coordinator of the Agricultural Industries program, she manages and recruits students for a 3-semester, 48-credit program that provides practical information and leadership skills necessary for the agricultural sector. Students are required to do an internship and receive a certificate of completion upon finishing the program. Most of the students that complete the program obtain jobs managing cooperative elevators, with feed or fertilizer companies, or return to the family farm in hopes of forming a partnership. Some go through the 4-year undergraduate program. She also teaches and advises students in the undergraduate program and works with recently hired high school teachers.

“I’m so passionate about the agricultural industry, because it’s such a challenge. There is such a large portion of the population that doesn’t understand where their food comes from,” she said.

Gretchen initially attended MSU to become a veterinarian, but eventually changed her mind and declared animal science as a major. Given her urban roots, she found herself attracted to the idea of the family farm and lifestyle and to teaching the “science aspect” of dairy farming. “There’s such an opportunity for education.” She enjoys explaining to farmers topics ranging from management practices to cow behavior.

While she was satisfied with her course offerings when she graduated with her B.S. in animal science, she wishes she would have focused more on the “business side of farming” instead of only on the practical aspects. She instructs agricultural students to use their animal science degree as a springboard for their future, review all of their options, and listen to their advisers before choosing a specific career path. “We’re all here to see that they succeed,” she said.

Some acquaintances told Aaron Gasper, a graduate of the 2-year program, that he was crazy when he left California to return home to his family farm located in the west Michigan town of Belding. Following the completion of the Ag Tech Dairy program on campus in 1995, he earned his B.S. degree in dairy science in 1998 from the California Polytechnic State University in San Luis Obispo, located between Los Angeles and San Francisco.

“I graduated and drove back to Michigan and am now working with my father on our dairy,” he said. It was family and friends that convinced him to return home to the fifth-generation dairy farm. Had Gasper not gone on to earn his B.S., he still would have been well-prepared to return to the family farm because of the 2-year program. “The highlight of my whole ag tech (experience) was the internship.” He did his internship in Chino, Calif., on a 2,800-cow dairy farm.

He urges students interested in the 2-year program to live on campus and to do their required internship away from the family farm. “I think it’s good to get away from the farm and make sure it’s something you want to do,” he said.

Aaron pursued his B.S. degree in California for several reasons. His internship employer, Sean Tollenaar, and many of the industry leaders he met in California graduated from Cal Poly. Cal Poly offered a very practical education in dairy management, including a minor in agricultural business management. Most of the Ag Tech courses he took at MSU provided an excellent foundation of knowledge and transferred to Cal Poly. The opportunity to learn about large dairy herd management also was intriguing. In retrospect, he said the only thing he would do differently is to change his ag business minor to a major.

One of his goals for the future is forming a partnership with his father. “I see a future at home with my dad. He’s a very progressive person. He’s really up on new things and wants to try new things.”

The family farm now includes 160 cows and 900 acres for corn, alfalfa and soybeans. Gasper and the farm’s herdsman take care of the cows. He oversees the overall health of the herd, nutrition, BCS, semen purchasing, and farm evaluation while his father coordinates the fieldwork and equipment maintenance. Father and son are developing plans for expansion and hope to build a new barn and an addition to the milking parlor. “We’re just trying to make the dairy as efficient as we can in the most profitable way,” he explained.

Gasper said the best part of his day is when he walks through the stalls at night for a final check on the cows. He said it’s satisfying to know that they have both put in a good day’s work and that they get to do it all over again tomorrow.

“I love those cows,” he smiled.

Brian Troyer’s career has taken a few twists and turns in the dairy industry since he received his B.S. in dairy science in ’81. A dairy business specialist for Land O’ Lakes, Inc., Troyer did return home to the family farm in Centreville after graduation to work with his father and brother for 3 years.

From there, he managed a MSU teaching farm, became a county extension agent and a dairy technical specialist with Countrymark Cooperative, which was comprised of cooperatives in Michigan, Indiana and Ohio, and later merged with Land O’ Lakes. He has spent the better part of his career assisting farmers in their decision-making skills ranging from selecting feed to managing their farms and cattle.

“I really am doing what I enjoy,” said Troyer, who also received his M.S. in animal science in ‘90.

In the past 2 years, Troyer’s job has changed from working in dairy nutrition to management economics, which is more in tune with his background. His M.S. is in breeding and management. He said the “total farm” is driven by economics and management. Working as a consultant out of his Coldwater home, Troyer assists farmers with their accounting, financial analysis and expansion plans.

“I am trying to help farmers discover ways to become more
efficient and profitable," he said.

There are many farmers adept at managing the production end of things from running an efficient milking parlor to maintaining healthy herds to growing the right crops, but they fall short on the financial side of farm management, Troyer noted. Some farmers are not aware of where they are making the money - or losing it.

“If you have to wait until you do your taxes to know if you made money - then it’s probably too late,” he said.

Troyer began managing farm records for his father when he was in high school. He became involved with FFA and bought some of his own livestock, an action that motivated him to pursue a career in the dairy industry. “Once I owned cattle, it changed my outlook on things,” he recalled.

He witnessed the expansion of his father’s farm from about 40 to 120 cows, new free stalls and a milking parlor during the 60s - as well as the devastation when a herd of 120-cows became tainted with polybrominated biphenyl (PBB) and had to be destroyed in 1975. (PBB is a compound used as a fire retardant that was accidentally mixed with livestock feed in 1973 and later distributed to many farms in west-central Michigan.)

As someone who has worked both on and off the farm, Troyer recommends that animal science students get as much hands-on experience as possible, combined with a “core education” in nutrition, reproduction, milk quality, management and economic courses. He tells students to work for someone else before returning home, so they know what it’s like to be an employee and therefore become a better farm manager. “Don’t be afraid to get your boots dirty,” he said. The 4-year program should tie the production and management aspects close together because today’s dairy producers, employees and dairy support personnel need a higher skill level to cope with the business side of farming.

Troyer encourages involvement with extra-curricular activities. He was a member of the MSU Dairy Club and Judging Teams and presented papers for the undergraduate division of the American Dairy Science Association (ADSA) conference. Through those activities, he had the opportunities to visit farms throughout the country, judge cattle and establish life-long friends and contacts in the dairy industry.

For more information on undergraduate dairy programs at MSU, contact Joe Domecq at (517) 353-7855 or at domecqjo@msu.edu, or Miriam Weber at (517) 432-5443, or at msw@msu.edu. Both are available to visit high schools or meet with student groups to discuss MSU’s dairy programs.

MSU Dairy Judging Team Competes in Utah

Joe Domecq  
Dept. of Animal Science

The MSU Collegiate Dairy Judging Team participated in the Western Spring National Dairy Judging Contest held in Richmond, Utah on May 16. Team members included Emily Green (Elsie), Attie Hardy (North Adams), Betty Meyer (Caledonia), and Ann Munsell (Fowlerville). The team was 1st in placings, 3rd in reasons, and 2nd overall in the contest, losing by only one point in the team competition. Individually, Emily was 1st in placings, 4th in reasons, and 1st overall. Attie was 6th in placings, 3rd in reasons, and 5th overall. This team will represent Michigan State this fall at World Dairy Expo, the Pennsylvania All-American Dairy Show, and the North American International Livestock Exposition.

A highlight of the trip included a tour of the Elberta Dairy and Custom Heifer Center, located in Elberta, Utah, which is about 90 miles south of Salt Lake. This 1000-cow operation has a rolling herd average of over 30,000 lb of milk. Cows are housed in eight different groups in dry lots. Averages for first lactation cows include: 20.5 months of age at calving, weigh 1400 lb after calving, and over 115 lb milk at peak lactation. All forages, mostly alfalfa, are raised by the operation. Barley is the primary concentrate source. The dairy managers pride themselves on their attention to detail, cow comfort, and labor management. Elberta Dairy is one of five dairies owned and operated by the Mormon church in Utah and Colorado.

While in Utah, the team also visited sites in Salt Lake City including the Mormon Tabernacle and Temple and the Utah State Capital. The team toured Utah State University and the Caine Dairy Teaching Center. This 250-cow dairy is used primarily for teaching and research, and has classrooms and a computer laboratory located right on the dairy, which students use to learn about dairy herd management.

The MSU Dairy Judging Program, extends appreciation to all of the individuals, farms, and agricultural businesses that provide financial support to travel to contests throughout the year. ABS Global, United Dairy Industry of Michigan, NorthStar Cooperative, Inc. and Michigan Holstein Association provide major financial support for the MSU Dairy Judging Program, which includes 4-H, FFA, Ag Tech, and collegiate members from throughout Michigan. The program also is supported by the Institute of Agricultural Technology and the Department of Animal Science at MSU. Team members also participate in fund raisers throughout the year, including the Spartan Spectacular Calf Sale. The MSU Dairy Judging Program is coordinated by Joe Domecq.
Charities.

Manure handling and agitation assurance program, and manure testing, starter fertilizer, and sidedress nitrate test, to work as farm veterinarians. Their volunteer visit is part of the United States Department of Agriculture’s campaign to eradicate the disease in the UK, which first broke out in February of this year. Since, then there have been a reported 256 infected areas.

Two MSU professors volunteer to help fight FMD overseas

In an effort to gather more information on the outbreak of foot-and-mouth (FMD) disease in Great Britain and surrounding countries, two Michigan State University professors/veterinarians have traveled to the United Kingdom to assist in the fight against the disease.

The two faculty members, both of whom are veterinarians, include professors Dan Grooms and Michelle Kopcha, of the Department of Large Animal Clinical Sciences. The two left in June to work as farm veterinarians. Their volunteer visit is part of the United States Department of Agriculture’s campaign to eradicate the disease in the UK, which first broke out in February of this year. Since, then there have been a reported 256 infected areas.

Russel W. Erickson Scholarship

The Michigan Dairy Memorial and Scholarship Foundation (MDMSF) is pleased to announce the establishment of the Russel W. Erickson Endowment Scholarship. The announcement was made in March during the annual MSU Dairy Club Banquet.

The stand-alone endowed scholarship will be presented annually to a deserving student in recognition of Dr. Erickson’s continued dedication to the dairy industry, Michigan State University, and for his 17 years of service to the Michigan Dairy Memorial and Scholarship Foundation. Dr. Erickson retired from the MSU Department of Animal Science in July, 2001. He plans to continue his involvement with the MSU Draft Horse program after retirement.

During the presentation, Dr. Erickson was honored for his many accomplishments during his 30 year career at MSU including faculty member, academic advisor, MSU Dairy Club advisor, involvement in international programs, MDMSF Secretary and participation with industry organizations including Michigan Milk Producers Association Outstanding Young Dairy Cooperator program.

Many organizations and individuals who have worked with Dr. Erickson in some capacity over the years have contributed generously to the scholarship fund in order to establish the endowment foundation. A five-year building effort for the endowment is ongoing. If anyone is interested in contributing to the Erickson scholarship fund, please send your pledge and/or check payable to Michigan State University to University Development, 4700 S. Hagadorn, Suite 220, East Lansing, MI 48823-5399. Indicate on your check that the funds are to be directed to the MDMSF Russ Erickson Scholarship.

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Calendar of Events

July 16 to July 20 - The 2001 Michigan Dairy Expo and 4-H Dairy Days will take place at the Pavilion for Agriculture and Livestock Education on the campus of Michigan State University. As in previous years the main events for the Dairy Expo are Michigan 4-H Dairy Youth activities and the open shows for Michigan’s dairy breed associations. Some of the youth events scheduled for the week include the state 4-H Dairy Show, the state 4-H and FFA dairy cattle judging contest, the state 4-H quiz bowl competition, and a dairy management contest. For further information on Michigan Dairy Expo events contact Mike Peters at (517) 355-8319.

August 16, 1-4 p.m. Stafford Beef Farm, Richland, MI; Kalamazoo County. Contact Maury Kaercher at 616-383-8830. This will include topics on starter fertilizer, Pre-sidedress Nitrate Test, Michigan Agricultural Environment Assurance Program, and manure sampling. Manure handling and agitation equipment will be on display, including Global Positioning System technologies.

August 21-24. The Babcock Institute, University of Wisconsin-Madison is holding a conference on Nutrient Management Challenges in Madison. Contact: 608-262-4621.

August 22, The Wisconsin Custom Manure Applicators Assoc. will be holding a Technology Field Day in Baraboo, WI. This will showcase the latest technology in manure application and agitation equipment. Contact Charles Gould at 616-846-8250.

August 30, 9 a.m. to 3 p.m. Ottawa County. Contact Charles Gould at 616-846-8250. Topics will include manure management plans, Michigan State University Nutrient Management (computer program), the Siting and Odor Generally Accepted Agricultural and Management Practices, manure application equipment, conservation practices and composting mortalities.

FMD is a highly contagious and economically devastating disease of ruminants and swine. The United States has been free of FMD since 1929. FMD is one of the animal diseases that livestock owners dread most because it spreads widely and rapidly, resulting in grave economic consequences. Humans are not susceptible to the disease. The disease is characterized by fever and blister-like lesions on the tongue and lips, in the mouth, on the teats, and between the hooves preventing the consumption and production of quality byproducts, such as milk and meat.

Current information on FMD is available on the Internet at www.usda.gov.
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