Opinion: Sustainable Michigan Dairying

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Sustainable agriculture is a phrase that recently has received extraordinary attention and public discussion. Doubtless, the phrase takes on different meanings depending upon who is speaking and their particular agenda. The result has been an unfortunate polarization around this topic.

This article is the first in a series in the Michigan Dairy Review (MDR) to address various viewpoints and the sometimes conflicting perceptions and opinions about sustainable agriculture. We believe that an objective discourse will be useful for long-term sustainable dairying.

What is Sustainability?

The Leopold Center for Sustainable Agriculture at Iowa State University, created by Iowa state law, defines sustainable agriculture as one that “maintains economic and social viability while preserving the high productivity and quality of Iowa’s land.” Furthermore, the Center expands its definition to indicate that sustainable agriculture must be ecologically sound, economically viable, and socially responsible, and that all three must be in harmony (1).

In 1987, the United Nations Commission on Environment and Development (the Bruntland Commission) called for “a form of sustainable development which meets the needs of the present without compromising the ability of future generations to meet their own needs” (2). In essence, the Commission called for development that makes life better for everyone and does not destroy or recklessly use our natural resources or pollute the environment.

Can Dairy Farming Be Sustainable?

Dairy farms use cows and other resources and manage processes to transform feed into milk. Dairy farmers are the stewards of these resources for the benefit of society and themselves. Society confers social, environmental and economic value to various aspects of
Herd size and management practices vary considerably among dairy farms, ranging from a small herd that practices intensive grazing and seasonal calving to a very large herd in total confinement, intensively managed for high milk production. Most farms, however, are somewhere between these two ends of a continuum. Some people argue that one end is more sustainable than the other, but we believe that every dairy farm, including those at the two ends, has the potential to be sustainable. There is not one “best” farming system. Sustainability is like a three-legged stool; to stand, a farm must be economically, environmentally, and socially sustainable.

In fact, we believe that debating which is “best” or “better” in terms of sustainability is the wrong discussion. Long-term sustainable Michigan dairying demands that everyone including university folks, farmers, and those interested in social, economic and environmental viability of farms and communities stop advocating and defending one dairy system over the other. It is fine to promote certain management practices within a system, but one size and shape is not best and does not fit all farms. Consider statements such as “big units are more efficient” or “pasture dairying is more profitable” or “large dairies get more milk per cow” or “foods from pasture-raised animals are more nutritious” or “CAFOs (Concentrated Animal Feeding Operations) are bad” or “pastures prevent erosion” or “organic products are safer and more healthful” or “multi-functionality is bad”, or “confinement dairying causes more antibiotic resistance”. These statements are not useful or instructive for discussion purposes. Moreover, a supposed “fact” can be spun for just about any of these “sound bites” if one selectively chooses information from published literature, anecdotes, and written opinions.

The goal of most dairy farmers always has been sustainability. Unfortunately, a small proportion of farms does not meet acceptable standards for sustainability, and these farms capture the lion’s share of the publicity. However, these farms are not sustainable and should not be the basis for arguing that one system is better than another. Rather we must constructively examine possible management practices for sustainable Michigan dairying along the entire continuum of dairy farm systems.

In this and future issues of MDR, we shall provide articles that contribute information to strengthen sustainable dairying. These articles will be marked with the symbol shown below.

We welcome your thoughts. We hope to hear objective and substantive discussion about sustainable dairying in Michigan.

Open Letter to Michigan’s Animal Agriculture Industries

This letter is written to address reactions of many in Michigan’s animal agriculture to the Forum Editorial by D. Conner and M. Hamm that appeared in the Lansing State Journal (LSJ) on October 3, 2004: “Pasture farming beats industrial alternative” (1). The faculty of the Department of Animal Science has been asked by representatives of Michigan’s animal agricultural industries about where Michigan State University, the College of Agriculture and Natural Resources, and the Department of Animal Science stand on points raised in the editorial. This letter to you and your constituency serves to reinforce and confirm the Department’s commitment to help solve current and future challenges in production animal agriculture.

The Department of Animal Science has enjoyed a long tradition of working closely with Michigan’s animal agriculture. This relationship has been built on trust, mutual respect, and mutual benefits for both our Department and your industries. We desire and expect this relationship to continue. We hope that the recent editorial will not diminish your trust in the faculty of this Department. The editorial comments and opinions (expressed or implied) do not represent the position of our Department.

The Department of Animal Science’s stated mission is “To advance agriculture using multidisciplinary approaches to generate, teach, disseminate and apply knowledge in animal biology and management”. To us this means we shall continue to address the challenges and opportunities of our diverse animal industries. We have never in the past nor do we intend...
in the future to pit one segment of our industry against another. Whether this is large scale or small scale, intensive production or extensive production, commodity marketing or niche marketing, or one species or another – we strongly value diverse production and management opportunities for all Michigan livestock producers. Our fundamental goal is to assist you in making animal agriculture sustainable in our ever changing culture to ensure economic, environmental, and social viability. If we are to supply a growing population with safe, high quality, and affordable animal products, we must embrace a range of production systems and recognize that large scale production will continue to provide the majority of the meat, eggs, and milk consumed in this country. Therefore, while pasture-based production may be the option of choice for some, especially with ruminants for at least a portion of the year, it is not and should not be categorically considered a “better” system or alternative than some more intensive production systems.

The Department recognizes that we should do a better job of identifying and comparing the characteristics of alternate systems that are often debated and championed in the public media without adequate, objective, and scientifically based evaluation. However, our position continues to be that the “best” production systems vary depending upon many personal, social, economic, and environmental factors, and among individual livestock producers depending upon goals and objectives for their specific farming businesses. We also fully understand that all production systems in the future must be environmentally and economically sound, and harmonize with societal expectations. We shall continue to commit research, teaching, and extension resources to facilitate and support the sustainability of all animal agriculture.

Continued support of Michigan’s animal agriculture industries remains essential to the Department of Animal Science to discover and provide new knowledge and technologies for the benefit of the public at-large and animal agriculture. As a part of our present and future goals and objectives, we shall continue to work in advancing and positioning Michigan’s animal agriculture for a successful future.

Sincerely yours,

Faculty of the Department of Animal Science
Michigan State University

References

Dairy Business

2004 Income Tax Planning – See Your MSUE Agent

Larry Borton
Dept. of Agricultural Economics

Farm incomes vary due to yield risks, price risks, and fluctuating farm input costs. Because of this variation in net farm income, agricultural producers have specific tax planning advantages written into tax laws, rules, and regulations. For example, most qualified farmers use the cash accounting method rather than accrual, and do not necessarily have to file estimated taxes quarterly if they file income taxes by March 1 (*Farmer’s Tax Guide, IRS Publication 225*). These farmer-friendly tax rules, along with standard tax regulations, make it worthwhile for producers to invest time in year-end tax planning. Farmers may employ several strategies in effective year-end tax planning.

Maintain Good Records

Keep good records so information is available for tax planning. Records will not only help comply with tax requirements, but also can help with monitoring the business, preparing financial statements, and substantiating items in case of an Internal Revenue Service (IRS) audit. All farm incomes, expenses, potential sales, and purchases can be considered in tax planning. Some actions, such as paying bills, making sales, and placing equipment into service, must be taken prior to the end of the tax year, which is the calendar year for most farmers. Other decisions, such as depreciation adjustments and retirement contributions, have some flexibility and can be finalized after December 31.
Maximize Use of Lower Tax Brackets

Maximize the benefit of the lowest applicable tax brackets. Ordinary income bracket rates for 2004 are 10, 15, 25, 28, 33 and 35%. The top of the lower two brackets of taxable income are $7,150 (10%) and $29,050 (15%) for single (S), and $14,300 (10%) and $58,100 (15%) for married, filing jointly (MFJ). Short-term capital gains rates are the same as ordinary rates, while long-term capital gains rates are less than ordinary rates. Long-term rates are 5% for taxable income in the 10 and 15% ordinary brackets, and 15% in the 25% and higher ordinary brackets. Because these long-term capital gains rates are less than ordinary rates, ensure that eligible capital gains are taxed at long-term rates. A multiple-year approach is to maximize use of the lower tax brackets (10 and 15%) each year, if possible. This strategy is preferable to having income fall into the 25% bracket one year and falling short of the dollar limit of the 15% bracket another year.

Don’t Pay Maximum SE Tax Every Year

Plan net farm profit so that the Self Employment (SE) tax is not paid on the maximum every year. For the average American worker, the social security tax may be their highest tax expense when both the employer’s and the employee’s shares are considered. For business owners, the SE tax can be substantial since it is paid at the rate of 15.3% on 92.35% of net farm profit up to $87,900 and 2.9% of net farm profit above $87,900. Therefore, rather than pay SE tax on $85,000 two years in a row, pay SE tax on $60,000 one year and $110,000 the next year. The SE wage base projection for 2005 is $89,400, so the remaining $20,600 ($110,000 - $89,400) would be subject to the 2.9% rate rather than the 15.3% rate. Be aware that there are many credits and deductions with phase-out limits that may complicate your planning when using this approach.

Maximize Your Adjustments to Income

Maximize contributions to retirement accounts and other adjustments to income. The bottom of the front page of Form 1040 lists items subtracted from total income resulting in an adjusted gross income (AGI). The AGI is often used to determine whether deductions and credits are available or reduced. Farmers typically might subtract self-employed health insurance, contributions to traditional Individual Retirement Accounts (IRAs), Simplified Employee Pension (SEP), Savings Incentive Matched Plans for Employees (SIMPLE) or other qualified retirement plans, and one-half of SE tax. Increasing deductible retirement plan contributions will reduce taxable income. For traditional IRAs, the maximum contribution for a married couple is $3,000 each or $6,000 ($3,500 each or $7,000 if both husband and wife are 50 years or older). SIMPLEs and SEPs have higher contribution limits.

Plan For Using All Deductions, Exemptions

Plan taxable income so that all deductions and exemptions are used each year. Many farmers use the standard deduction: $9,700 for MFJ, $7,150 for head of household, or $4,850 for S or married, filing separately. Note that the MFJ is currently twice the single amount. If itemized deductions are higher than the standard deduction, a phase-out occurs for up to 80% of those deductions at the rate of 3% of AGI in excess of $142,700. The exemptions are $3,100 for each, with phase-out beginning at $214,050 for MFJ and $142,700 for S. Even though SE tax may be owed on Schedule F net farm profit, income taxes are reduced in the long run if the deductions and exemptions are fully used each year.

Use All of Your Available Tax Credits

Use all available tax credits. Credits are dollar-for-dollar reductions in the amount of tax owed. Some credits are refundable, which means the taxpayer gets credit for them even if they owe no income tax for the year. Others are nonrefundable, which means you only get the tax credit if you have an income tax liability for the year. Phase-outs of credits can occur; for example, the Hope and Lifetime Learning Credits begin phasing out at $85,000 modified AGI for MFJ and $42,000 modified AGI for S. The child tax credit of $1,000 for each child under age 17 begins to phase out at $110,000 (MFJ) and $75,000(S). The strategy in these cases is to reduce income to become eligible for the credits.

Delay or Accelerate Sales to Shift Income

Delay or accelerate sales to shift income from one tax year to another. Stored crops are most suitable to deferred receipts from sales, although some farmers have been successful with milk receipts. You cannot delay income by holding a check until after January 1st or asking the buyer to wait and pay you next year. This violates the concept of constructive receipt. If you have a right to the funds this year, then the funds generally count as income unless a contract prevents payment until the next year. Producers may elect to have Commodity Credit Corporation (CCC) loans treated as either income or loans; this designation can change from year to year if the appropriate forms are filed with the IRS. If property is sold on an installment basis (at least one payment in another tax year), then the taxable gains are spread over multiple years in proportion to the payment each year. Note that recapture of depreciation may all occur in the year of sale and is usually taxed at ordinary rates.

Delay or Accelerate Feed Purchases

Delay or accelerate purchase of supplies and feed. If farming inputs are paid for in one year but won’t be used until the next year, those inputs do not have to be stored on the farm, but there should be a specified quantity and description of the purchases. Quantity and description are necessary because a deposit on account does not meet IRS requirements for prepaid expenses. Taking advantage of early discounts and locking in prices demonstrate valid business purposes, which meet the IRS requirements; however, the IRS does not consider
Reducing income taxes a valid business purpose. Payment must actually occur; a note promising to pay is not a payment. If cash is tight, consider borrowing money from a third party to make these purchases. Similar to borrowing for prepaid expenses, credit card purchases for your business are an expense when the transactions occur because the money is borrowed from a third party.

Choose the Amount of Depreciation Expenses
Choose the amount of depreciation expenses. Purchasing capital items such as machinery, equipment, or trucks with a Gross Vehicle Weight Rating (GVW) of more than 6,000 pounds allows tremendous flexibility in choosing the amount of depreciation and expensing during the year that items are placed in service. The 2004 Section 179 direct expensing limit for qualifying items is $102,000, with a phase-out beginning at $410,000 of property placed in service. The amount of direct expensing is selected by the taxpayer for any qualifying items in any amount up to the limit. A new law limits large SUVs to $25,000 of direct expensing.

Taxpayers are required to take the 50% bonus depreciation on eligible property unless an election is made to use the 30% bonus depreciation or to use no bonus depreciation. Note that bonus depreciation applies to all items within a property class, not by individual item. Most original-use farm property is eligible for bonus depreciation. Automobiles and smaller trucks may also be eligible for bonus depreciation if used more than 50% for business. Further, producers may use either 150% declining balance or straight line for regular depreciation and often can choose between a shorter and longer time period to fully depreciate capital purchases.

Pay Your Family Members
Pay family members for farm labor. Farm families can pay their children for work actually performed on the farm. Keep records of the hours worked and pay children with a check so there is a paper trail. In some situations, no social security tax or income tax will be due on their income.

Consider Farm Income Averaging
Consider Farm Income Averaging. There are three completely different methods for farmers to calculate the amount of income taxes due, and our strategies concentrate on the standard method. Another method is Farm Income Averaging (Schedule J), which may reduce taxes for some farm businesses. A portion of ordinary farm income and/or capital gains from 2004 (called elected farm income) is equally split into thirds and applied to the three previous years: 2001, 2002, and 2003. Income tax brackets are “borrowed” from those years and may make a difference in tax liability if lower brackets from previous years are available compared to current tax rates. The elected farm income to choose for income averaging may require trial and error, so a computer program is helpful when using this strategy.

Be Aware of the Alternative Minimum Tax
Be aware of the Alternative Minimum Tax (AMT). The AMT is the third method to calculate income taxes due. It is affecting more middle-income taxpayers each year because it is not indexed to inflation. If AMT is greater than the standard method, then AMT is due. A new law coordinates AMT with farm income averaging so that income averaging will not increase AMT beginning in 2004. The AMT has a $58,000 exemption for MFJ ($40,250 S) and a tax rate of 26% on the first $175,000 of income in excess of the exemption amount and 28% above that. Most computer programs calculate AMT and will alert you when it begins to affect your tax calculation.

These are a few techniques farm businesses may wish to consider when implementing year-end tax planning. Tax calculations are complicated by many limits, phase-outs and interactions. Consider scheduling a tax planning session with your tax preparer, District Farm Management Extension Agent, or Extension Dairy Agent before the end of the year to address your specific situation.

Michigan Milk Market Update

Several factors came together to push milk prices to all time highs in spring and early summer. The Class III price for milk used in cheese production, that drives milk prices, hit $19.66/cwt in April, $20.58/cwt in May, and $17.68/cwt in June. All of these prices exceeded the previous high price — not adjusted for inflation — of $17.34/cwt in December 1998. Following 2 years of very low milk prices these high prices were a welcome sight. Declining cow numbers in late 2003, closed borders from the Canadian BSE case, and a 50% decline in BSE usage contributed to higher prices as processors scrambled to build cheese inventories.

So, how have these factors evolved, and what do they mean for upcoming milk prices? Cow numbers in Michigan have essentially held at right around 300,000 since late 1997. In the top 20 milk producing states, there currently are slightly fewer milk cows than a year ago, but cow numbers have been growing since spring (up 49,000 cows from April through August). The border closing has had a relatively small effect on total replacement supplies because Canadian heifers usually accounted for only 1 to 2 percent of the replacement herd. The decline in BSE supplies had little effect on farms.
that had considerable inventory from previous purchases. However, these farms spent perhaps more time and consideration in determining which specific animals were to be injected. Even without bST, milk per cow was up 3.4 percent in Michigan through the first 7 months of 2004 compared with 2003. For the US as a whole, milk per cow grew but not as much as in previous years. Perhaps due to the cool summer, production per cow has continued to grow in spite of any detrimental effects from lack of bST. Even with all of these factors, milk price forecasts remain reasonably optimistic if only in comparison to recent lows.

CWT Accepting Bids for Herd Buyout

National Milk Producers Federation has announced that the Cooperatives Working Together program (CWT) will accept bids for another herd buyout in October. Last year the program removed 32,000 cows nationwide. The goal this year is to remove 49,000 cows. The program also is accepting bids greater than 49,000 cows.

You Can Participate: Dairy Marketing 101

Craig Thomas
Extension Dairy Agent
Sanilac, St. Clair, Huron, Lapeer and Tuscola Counties

Over the past winter the MSU Extension Dairy Team conducted a series of 2-day short-courses called *Dairy Marketing 101*. The purpose of this program was to provide dairy producers with the fundamental knowledge needed to understand dairy markets and marketing, plus introduce them to the use of futures, options, and forward contracting to control milk price risk. Use of these tools has become increasingly important as more volatility exists in the dairy market. Every producer is keenly aware of the unprecedented and extended period of low prices over the past couple of years. And, fortunately now, producers are experiencing the other end of the volatility spectrum with record high prices. The volatility of the milk market is both maddening and frustrating. However, the proper use of milk marketing tools is now aiding many Michigan dairy producers in controlling the effect of these wild price swings on cash flow and profitability.

Our Experiences

In 1997, a group of MSU Extension Agents in the Thumb, at the request of producers, conducted a general ag marketing workshop for all ag producers (dairy, cash grain, and other livestock). At the end of that program, the producers requested we meet on a regular monthly basis to discuss the “markets”. As a result, Fred Hinkley, MSU Extension Director in Ogemaw County and a licensed commodity broker, and Craig Thomas, MSU Extension Dairy Agent in the Thumb, began hosting a monthly *Ag Marketing Update* meeting for farmers in Sandusky. This group is made up of about 60% dairy producers and 40% cash grain and other livestock producers. Most producers are “regular” attendees. The group has steadily grown over the years, primarily as a result of more producers attending programs like *Dairy Marketing 101*. Regular attendance now is about 20 to 30 each month.

This meeting is not merely a “lecture” where the presenters give information to producers. The most important feature of this monthly meeting is not necessarily the exchange among the presenters and producers, but among agriculture producers. A great deal of good discussion is generated and producers learn a great deal from one another as they share information and discuss their marketing experiences. Developing expertise and confidence in marketing is an ongoing process for producers and presenters alike.

As a result of the *Dairy Marketing 101* programs in the winter of 2004 another group of producers is now meeting monthly in St. Johns. Fred Hinkley and Craig Thomas are assisting local MSU Extension Dairy Agent Dann Bolinger in this effort. This group is quite similar in make-up and attendance as the Sandusky group.

Our Offer

MSU Extension would like to invite every farmer (dairy, grain, and other livestock) interested in marketing to attend one of the regular monthly meetings in St. Johns or Sandusky (Table 1). It makes no difference if you are an experienced marketer or a newcomer. Everyone, producers and agribusiness personnel alike, are welcome to attend. If you would like to receive a postcard reminding you of the meetings call Craig Thomas (Sandusky, 810-648-2515) or Dann Bolinger (St. Johns, 989-224-5240).

The meeting at each location runs from 10 a.m. until noon. If these locations are not convenient, contact your local MSU Extension Dairy Agent and explore the possibility of starting a marketing group in your area. Also, the Dairy Team web site (see web address below) contains a wealth of dairy marketing...
information. On a regular basis, the pertinent dairy marketing information from key USDA reports is tabulated and also presented in graphical form. Producers can use this information to understand the current supply and demand situation, and to make informed marketing decisions. Additionally, a monthly commentary summarizing key dairy market factors is available.

**MSU Extension Personnel**

If you have any questions about the meetings, or dairy marketing, contact one of the MSU Extension personnel listed below. We hope to see you at the next Ag Marketing Update!

- Fred Hinkley, MSU Extension, Ogemaw County (989-345-0692)
- Craig Thomas, MSU Extension, Sanilac County (810-648-2515)
- Dann Bolinger, MSU Extension, Clinton County (989-224-5240)
- Chris Wolf, MSU Dept. Agricultural Economics (517-432-5443)

**Dairy Team Web Site:**

[www.canr.msu.edu/msue_thumb/pages/dairy_team/dairy_team.htm](http://www.canr.msu.edu/msue_thumb/pages/dairy_team/dairy_team.htm)

### Herd Management

**Shortened Dry Periods: Good or Bad**

**Roy Fogwell**  
Dept. of Animal Science

The obvious advantage of shorter time that cows do not lactate is that more time will be spent lactating with consequent increase in milk per day of calving interval. The idea of shorter “dry periods” has generated much interest. The objective of this discussion is to pose the questions that you should ask yourself before shortening dry periods. Note that this discussion is about shortening the dry period from 60 to 30 days. Based upon research, elimination of the dry period is not recommended.

**Potential Advantages**

In addition to more milk, other advantages of shorter dry periods are: fewer nonproductive days, the possibility to not change diets, avoiding crowding of facilities for dry cows, and reducing the need to move cows among farms. There is also evidence that cows that are dry for only 30 days have higher conception rates and have metabolic changes that keep them healthier. Clearly several strong reasons exist to consider this strategy.

**Potential Negatives**

What are the negatives of shorter dry periods? An average of all of the studies indicates that milk yield in the next lactation is reduced about 5%. In addition, immunoglobulin concentrations in colostrum are reduced. Managers also need to be very vigilant regarding antibiotic residues in milk from dry cow therapy, especially if cows calve early.

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**Table 1. Future Ag Marketing Update meetings.**

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<thead>
<tr>
<th>Sandusky</th>
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<tr>
<td>Tuesday, November 16</td>
<td>Thursday, November 18</td>
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<tr>
<td>Tuesday, December 21</td>
<td>Thursday, December 23</td>
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1A $10/person fee is charged at each location to cover expenses.  
2Location: MSU Extension Office, 37 Austin St., Sandusky (810-648-2515).  
3Location: MSU Extension Office, 100 E. State St. (County Courthouse) G100, St. Johns (989-224-5240).
Seven Surefire Ways to Improve Fertility of Dairy Cows

Richard Pursley  
Dept. of Animal Science

Poor fertility of lactating dairy cows significantly challenges most dairy producers. In most herds conception rates of cows are at best about ½ that of heifers. It is not clear what culprits are primarily responsible for this problem. But, what is clear is that whatever factors are responsible for this decreased performance likely has an effect on one of three reproductive parameters: the sperm, the egg, and (or) the uterine/oviductal environment. Until solutions to this problem are found, there are a number of time-tested methods to help maintain optimal reproductive success. This article outlines seven surefire ways to get the most from one unit of semen.

1) **Thaw straws properly!** It is imperative that semen is thawed according to the recommendations of the AI organization that processed the semen. Most AI organizations recommend thawing ½ cc straws for approximately 45 seconds in a 95 to 98°F water bath. The percentage of motile sperm in a straw slowly decreases with time spent in the water bath and from loading to deposition in the cow. Do not thaw more straws of semen than you can deposit into cows in a 15 minute period (from the time the straw is loaded into the AI gun until deposited into the uterus). If thawing multiple units of semen, be sure that straws stay separated in the thaw bath. Be sure to keep the straw “thermal neutral” from the time it is removed from the thaw bath until placed into the cow. Cold shock can reduce dramatically the percentage of live motile sperm deposited into the uterus.

2) **Is she or isn’t she ready to breed?** Cows that are not in heat (if using daily heat detection) or did not synchronize (if using Ovsynch) have no chance to become pregnant. To improve heat detection, use heat detection aids such as tail paint, chalk, or devices that change color when mounted (1). Using aids in addition to keen observation increases the chances of a pregnancy.

To maximize synchronization rates with Ovsynch (2) give the injections of both PGF, and GnRH deep intramuscularly.

References
In nearly all the research trials with Ovsynch, our experience indicates that injecting in the semitendinosus muscle (back of rear legs below the pin bones) with a 1 ½ inch, 20-gauge needle minimizes injection error. Be sure cows are restrained when giving injections. Needless to say, be sure the injections are given at the proper times: Inject GnRH, then 7 days later inject PGF$_{2α}$ then 36 to 48 hours later inject the final GnRH. Do not extend the time between PGF$_{2α}$ and GnRH to 72 hours. In certain situations, this extended time may result in decreased fertility.

3) **Inseminate cows at the optimal time prior to ovulation.** Insemination of cows approximately 12 hours prior to ovulation results in the greatest conception rates. Cows ovulate approximately 28 hours after either first standing estrus or the final GnRH of Ovsynch. This means that cows detected in estrus by visual observation should still be inseminated by the AM-PM rule. In cows that are synchronized with Ovsynch (GnRH, 7 d later PGF$_{2α}$, then 48 h later GnRH), inseminate 16 hours following the final GnRH for maximal fertility.

4) **AI technique.** Site of sperm deposition has an effect on fertility of lactating dairy cows. Semen should be deposited either in the uterine body or divided between uterine horns. Data from Dr. Ray Nebel’s laboratory at Virginia Tech (3) indicates that depositing semen in the cervix reduces fertility by approximately 20%. We have generated data from several farms in Michigan that would indicate deep uterine horn AI increases fertility. In a collaborative study with Dr. Michael Diskin in Ireland, deep uterine horn AI increased fertility in lactating Holstein dairy cows. Interestingly, there was an effect of inseminator. Some professional inseminators consistently increased fertility, some had no effect, and one actually decreased fertility with deep uterine horn AI. This study had sufficient numbers of cows to interpret the impact of each inseminator on fertility. We initially thought that depositing the sperm into the most anterior part of the uterine horns would provide the best results. To achieve this, however, the uterine horns would have to be manipulated quite extensively. We now caution against using too much manipulation. Instead, deposit the semen as deep as possible with minimal manipulation. Simply lifting underneath the tract to straighten the horns may be enough to reach the greater curvature of both horns (splitting the unit of semen between horns).

5) If possible, incorporate high fertility bulls into your mating program. It is important to note that selection of high fertility bulls should be secondary to selecting bulls based on Net Merit $ (see Dr. Kathy Lee’s article in the July, 2004 MDR). To have an impact on fertility, we recommend using bulls with +2 or higher estimated relative conception rate (ERCR) value with repeatability > 90%. Finding ERCR values on bulls is easy. Go to: http://www.drms.org/sire.htm.

6) **Reduce summer heat stress.** Summer heat stress clearly lowers conception rates, even in the northern tier of states (well, maybe not this year). Fans are a must in free-stall barns. Sprinkler systems should be considered in cases of extremely hot weather. Misters are not recommended for climates like Michigan where humidity can be a problem.

7) **Use CIDRs in non-cycling cows in the breeding group that are being timed-inseminated with Ovsynch.** CIDRs are progesterone releasing devices that are inserted into the vagina of cows to help induce non-cycling cows to cycle. CIDRs appear to improve fertility in non-cycling cows that are timed-inseminated using Ovsynch. One of the primary reasons for low herd fertility when using Ovsynch is that too many non-cycling cows are in the breeding group. Non-cycling cows have lower conception rates on Ovsynch compared with cyclic cows. To identify non-cycling cows we recommend that the herd veterinarian routinely check Ovsynch groups within 2 weeks prior to starting Ovsynch. If cows are not diagnosed with a functional or regressed corpus luteum (CL), they should receive a CIDR at the time of the first GnRH of Ovsynch. The CIDR should then be removed 7 days later at the time of the PGF$_{2α}$ injection. In non-cycling cows placed on Ovsynch, an improvement of 10 to 15% in conception rates can be expected when using CIDRs.

Our reproductive physiology laboratory currently is working on two different hypothetical questions to better understand the fertility problem of dairy cows. First, do dairy cows retain sufficient number of sperm following artificial insemination (AI) to allow for normal fertility? Many cows struggle to have normal uterine involution following calving. A healthy uterine and oviductal environment maximizes sperm transport, and thus optimizes the chance that the ovulated egg is fertilized. Poor uterine health is likely a “road block” that minimizes the number of sperm that make it to the uteroutubal junction prior to the time of ovulation, which may minimize fertilization success. Secondly, is fertility of the egg compromised in lactating dairy cows compared with that in heifers? The egg is housed in a follicle until ovulation. We now know that follicle growth and the hormonal environment of the egg are different in cows compared with heifers, these could be key limiting factors in dairy cow fertility (4).

These questions and many more by other researchers will someday lead to ways to improve conception rates in lactating dairy cows. Even though the scientific community has not yet found the silver bullet to cure the fertility woes of dairy cows, a number of proven strategies still can help maintain maximal fertility of dairy cows.

**References**

Forage Management

A Statewide Program: Focusing on Forages for Dairy Cattle

The MSU Extension Dairy Team is presenting a series of six meetings throughout Michigan to focus on forages for dairy cattle. The day-long meetings will be held in late January and early February (see schedule below). The material covered will be intended for persons on dairy farms responsible for the production, storage, and feeding of high quality forages to dairy animals, particularly high producing cows. Topics for discussion will include:

- Application of Dairy Manure to Alfalfa
- Utilization of Forages by Dairy Cattle
  - NDF and NDF Digestibility
- Making Sense of Forage Indexes
  - RFV vs RFQ; Milk 2000
- Climatic & Management Affects On Forage Quality
  - Hay Crops
  - Corn Silage
- Forage Harvest and Storage Management
- Economic Ramifications of Forage Management
  - Improving profit
  - Reducing feed costs

Please mark your 2005 calendar now with the meeting dates and locations. Questions relating to meeting locations should be addressed to local contacts.

- **Ithaca.** January 25. Gratiot-Isabella RESD. Contact Dan Rossman, Gratiot Co. MSU Extension 989-875-5233.
- **Escanaba.** February 3. The Great Northern Buffet. Contact Dr. Doo Hong Min, Upper Peninsula Experiment Station, 906-439-5188.
- **Brooklyn.** February 8. Jerry’s Pub and Restaurant. Contact Dean Ross, Livingston Co. MSU Extension 517-546-3950.

Questions about the program can be directed to Phil Taylor, Eaton Co. MSU Extension at 517-543-2310.

Late Summer and Fall Harvest Management of Alfalfa

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Depts. of Crop and Soil Sciences¹, and Geography²

The difficult weather conditions in the spring during first cutting causes many farmers to get off schedule for harvesting alfalfa. This raises the question of best management for alfalfa harvest as the end of summer and fall approaches. Farmers have to balance the need for tonnage, forage quality, and winter survival.

**Fall Harvest**

In the late summer and early fall, alfalfa must either be cut early enough so it can regrow and then replenish root carbohydrates and proteins or so late that the alfalfa does not regrow less than 8 inches and does not deplete root carbohydrates and proteins. This has resulted in the recommendation of a ‘no-cut’ window from September to killing frost in Michigan. However, recent research in Quebec, Canada (1,2) has helped to redefine this window by assuming that if 500 growing degree days (GDD) accumulate after the last cutting there will still be enough regrowth of alfalfa for good carbohydrate accumulation in the crown and roots before a killing frost, and good winter survival and yield the following year. So a producer can cut in September as long as there is enough warm weather remaining in the growing season (accumulation of 500 GDD) before a killing frost without hurting the stand. These GDDs are calculated as the average of the daily minimum and maximum temperatures above 41°F until a killing frost (25°F).

The Quebec research also showed that cutting later in the fall was acceptable as long as there was less than 200 GDDs accumulated after cutting. When less than 200 GDDs are accumulated after a late fall cutting, there is little regrowth to use up valuable stored carbohydrates and proteins in the alfalfa crowns and roots. This results in good winter survival of the alfalfa plants.

**Michigan Climate Data**

Using climatological statistics as a guide for the future in a given growing season, one can then calculate the sum of these two probabilities of reaching 500 GDDs after cutting in late summer or 200 GDDs after cutting in late fall to estimate the risk of winter injury or kill due to harvesting at different dates during this time period. These probabilities were calculated with 30 years of daily climatological data, 1971-2000 for 30 sites across Michigan. Graphs of the resulting daily probabilities of five selected geographical sites are listed from north to south (Figure 1). In each graph the top line of the graph represents the probability of accumulating either 500 GDD (dark area) or less than 200 GDD (lighter area) after
Figure I. Daily probabilities of greater than 500 growing degree days or less than 200 growing degree days for late season alfalfa from north (Stephenson) to south (Coldwater) Michigan.
the indicated date and shows the probability of injury or kill to alfalfa stands harvested on that date.

For example, the graph for Alma, Michigan indicates an 85% probability of reaching 500 GDD before a killing frost if cutting alfalfa on September 15 and a 20% probability of reaching 500 GDD if cutting on September 29. Waiting to cut until October 27 shows an 80% probability of reaching less than 200 GDD before a killing frost. In contrast, the graph indicates the worst probabilities of achieving either condition at approximately the 3rd of October, which occurs outside of the traditional ‘no-cut’ period. In general, one can see a geographical shift of the center of the adjusted no-cut period from early in the September-October period in northern areas of the state (especially those in interior sections away from the lakes) to later in the period across southern sections.

**References**


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**Spreading Manure on Frozen, Snow Covered Fields**

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One bad apple does spoil the whole bunch. Every incident of winter manure application that causes a runoff to surface water during spring thaw is one more reason for the public and the regulators to consider restricting this practice. Maine and Vermont already have banned all manure applications between December and April. In Michigan, restrictions on winter spreading for Concentrated Animal Feeding Operations (CAFO) (greater than 1000 animal units) farms are imminent. Some CAFOs may see these restrictions this winter, others within the next year or two, depending when coverage under a National Pollutant Discharge Elimination System permit begins. As CAFOs experience greater regulation, smaller producers should be alert to a likely trickle down of the rules to smaller farms and take the initiative to be excellent stewards of the land and to avert further regulation.

Being proactive with regard to winter spreading sounds like a cliché but needs to be seriously heeded. Preplanning to designate which fields will be utilized for winter spreading will avoid being the bad apple that brings attention to manure applications on frozen and snow covered fields in Michigan. For many dairy producers and other livestock farmers, surface-spreading manure during the winter is necessary. In some dairy producing areas of the state, it is estimated that up to 90% of producers have some manure to be spread during the winter. There are still many producers in Michigan that do not have 6 months of manure storage for the milking herd. Winter surface spreading of manure comes with inherent risks of variable weather conditions, and ultimately the snow will melt, and the ground will thaw. The timing of all these weather factors is unpredictable, and the environmental consequences are potentially significant.

The risks of winter surface application can be averted. There are times and locations in the state where producers have knifed in manure all winter. Many producers report that they can inject manure through up to 4 inches of upper layer soil frost. So do not rule out injecting or incorporating manure during the winter. Although unreliable, some winter weather conditions facilitate lower risk. When winter temperatures fluctuate gradually allowing the soil to thaw briefly, manure can soak into the soil, which prevents its runoff to surface waters.

In this instance, the snow turns to water and has two options before it can infiltrate into the soil—either runoff or pond. These situations need to be prevented. A discharge of manure nutrients to surface waters is a violation that can be enforced by the Department of Environmental Quality (DEQ) and a circumstance, that all producers want to avoid.

The best plan of action regarding runoff and ponding from winter manure application is prevention. Winter application management begins before cold weather even arrives. Utilize the fall to consider options to minimize, prioritize, and strategize for manure applications that will occur on frozen and snow covered fields.

**Minimize**

Minimize the amount of manure and wastewater that needs to be hauled and spread during the winter. This can begin by assessing the farmstead and decreasing or eliminating clean water that ends up in storage or otherwise needs to be hauled. Barn roofs collect a tremendous amount of rain and snow, which is clean until it lands on a barnyard or otherwise ends up in storage or surface water.
up in manure storage. Guttering roofs to divert clean water to grass areas will reduce this problem.

Reducing the outside lot area for livestock also will minimize the amount of rain and snow that becomes contaminated and ends up being hauled as manure.

Increasing storage capacity is also an option. Additional storage will not only reduce the amount of manure to handle in the winter but it will also allow more storage during the summer time when crops are growing. Additional storage provides more options for hauling when soil and weather conditions are favorable.

Maintaining freeboard is important to prevent storage systems from overflowing or breaching. Freeboard is the amount of storage that is never intended to be utilized. In general, a minimum of six inches of freeboard is required for straight-sided pits (concrete) and 12 inches is needed for sloped side-walled systems such as earthen storage structures. This freeboard PLUS the amount of a 25-year, 24-hour storm event is required at all times. The 25-year, 24-hour rain event ranges from 3.5 to 4.5 inches across Michigan. This means that the unused portion of a manure storage system should be somewhere between 9.5 to 16.5 inches, depending on circumstances, to allow for the storm event and still maintain freeboard. This freeboard should be maintained year-round, which may dictate when and how often the storage should be emptied.

Prioritize

By prioritizing fields based on level of risk associated with runoff from frozen and snow covered soil, winter spreading can be limited to fields with the least risk. Begin by figuring out how many acres are needed for wintertime spreading. This should be based on calibrated rates that deliver the appropriate nutrients per acre.

Fall is an ideal time of year to drive the perimeters of ALL fields and assess the risks each field has for wintertime spreading. First of all, know where any surface waters are and what they connect to. This can be done by drawing on your own knowledge, using soil survey maps (available free from the County Soil Conservation District) or Farm Service Agency aerial maps. These maps will be especially important when dealing with land you rent or have less knowledge of. As you drive each field, ask yourself, what would happen if manure were applied to this field and there was a rapid spring snow melt? Then ask, what could be done ahead of time to prevent or minimize risk in this situation.

Two of the most important factors in prioritizing fields for winter-time spreading are slope of the field and if there are surface waters adjacent or close enough that runoff would reach them. There is an Excel program in Michigan called the Manure Application Risk Index (MARI) that producers can utilize with or without assistance of their county Conservation District. MARI evaluates each field individually, assesses the risks, and determines a relative risk ranking for all fields. More information on MARI can be found at http://www.maeap.org/resources.htm.

There are some basic principles to follow when considering fields for winter manure application. Portions of fields that slope (especially more than 6 percent) directly to surface waters should not receive manure during the winter. Fields with slopes greater than 3 percent should receive only solid manures. Even fields with less than 3 percent slope may carry nutrient-laden water off site, potentially reaching surface waters. Surface drainage inlets represent another sensitive characteristic of some fields. Surface inlets are designed to drain water from the surface of the soil. If the water contains manure, the inlet will carry the manure to the surface water outlet. These areas of fields should be avoided during surface applications regardless of the time of year.

Strategize

Even with low risk fields, strategies need to be developed and implemented through field practices you have control over to further reduce the risk of spring-time runoff. There are several conservation and other management practices that can be part of a strategy to keep winter applied manure in the field where it belongs.

- Observe setbacks from surface waters and surface water inlets.
- Vegetated or tillage buffer strips along water courses will slow and disperse overland water flow.
- Fall tillage that leaves soils rough and better able to soak in manure may be an option for certain fields.
- Seeding a cover crop and (or) maintaining significant crop residue on the entire field will help keep the manure in place.
- Inject or incorporate manure whenever soil conditions allow.
- Reduce the rate per acre of manure applications.

As a farmer, your own knowledge of the fields and common sense are your greatest assets in identifying what fields need the most attention and in developing a plan.

Plans are of no use unless they are implemented. A key to implementing your plan for managing environmental risk associated with winter manure application is communicated with all family and farm operators. Once you have prioritized and strategized which fields will be utilized for winter spreading, be sure that the person hauling the manure is informed and aware of any areas where setbacks are needed or portions of fields that should not be spread upon at all.

Record Keeping

Another consideration is record keeping. Keeping records of field applications is not only a good idea, but necessary to receive Right to Farm Nuisance Protection and to show that you are following a Comprehensive Nutrient Management Plan – if you have one for your farm. Records also are valuable to help evaluate the effectiveness of your management practices.
Managing to prevent runoff from winter-applied manure is complicated. No single factor causes runoff and generally no set of circumstances guarantees manure won’t reach surface waters. Weather changes day to day and so does the risk; reduce your risk by having a plan in place and being prepared to make day-to-day decisions on winter spreading.

Always have an emergency plan in place, for the unfortunate event of a manure release to surface waters. In such an instance, cease spreading immediately, contain the discharge if possible and report the incident to DEQ. The Michigan Department of Environmental Quality’s Pollution Control hotline is: 800-292-4706 and the Michigan Department of Agriculture’s spill response is 800-405-0101.

**According to GAAMP**

Michigan Department of Agriculture, Generally Accepted Agricultural and Management Practices (GAAMP) for Manure Management and Utilization states:

“Manures should not be applied to soils within 150 ft of surface waters or areas subject to flooding unless:

a) manures are injected or surface-applied with immediate incorporation (within 48 hr)

b) conservation practices are used to protect against runoff and erosion losses to surface waters”

“As land slopes increase from zero percent, the risk of runoff and erosion also increases, particularly for liquid manure. Adequate soil and water conservation practices should be used, which will control runoff and erosion for a particular site, taking into consideration such factors as type of manure, bedding material used, surface residue or vegetative conditions, soil type, slope, etc.”

“Application of manure to frozen or snow-covered soils should be avoided, but where necessary, a) solid manures should only be applied to areas where slopes are 6% or less

b) liquid manures should only be applied to soils where slopes are 3% or less.

In either situation, provisions must be made to control runoff and erosion with soil and water conservation practices such as vegetative buffer strips between surface waters and soils where manure is applied.”

For all of the manure management GAAMPs, visit: www.michigan.gov/MDA

**Carbon Sequestration, What Is It in Dairy-Forage Systems?**

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Carbon sequestration is critically important to maintain tilth, enrich soils, and reduce carbon dioxide in the earth’s atmosphere and is becoming a hot topic in sustainable agriculture.

1. **What Is Carbon Sequestration?**

Carbon sequestration is defined as a tool of storing carbon into the plants and the soil from the atmosphere. Agriculture can be a sink by sequestering carbon because crops and trees use a lot of carbon dioxide in the process of photosynthesis and store carbon in the soil over time. Carbon dioxide (CO₂) in the air is taken up by plants and incorporated into living plant matter. As the plants die or are harvested, some of the carbon-based leaves, stems, and roots decay in the soil and become a valuable organic carbon source such as humus.

2. **Why Should Carbon Sequestration Be Increased?**

Sequestering carbon in the soil provides for an opportunity to reduce the amount of CO₂ in the atmosphere. For example, the absence of tillage slows down the oxidation of organic matter both on the soil and in the root zone, therefore slowing the release of CO₂ back into the atmosphere. Also, no-tillage practices provide significant savings of fuel and hence lower CO₂ emissions (about 20% less carbon emissions) compared with conventional practices, because of the need for fewer field passes and lower traction requirements.

3. **What Can Agricultural Producers Do to Increase Carbon Sequestration?**

Reducing atmospheric CO₂ or increasing carbon sequestration can be achieved by: 1) increasing organic carbon production (trapping carbon within plants by photosynthesis); 2) decreasing organic carbon mineralization (managing crops and soil to reduce the conditions that break down plant residues); and, 3) reducing soil erosion, thereby keeping carbon trapped in the soil. One of the key concepts to increase carbon sequestration is to retain the soil organic matter as much as possible. Several agricultural practices increase carbon sequestration: no-till or reduced tillage, growing cover crops, applying manure or compost, effective pasture management, buffer strips, and crop rotation.

4. **What Is the Role of Soil Organic Matter in Carbon Sequestration?**

Soil organic matter consists of decomposed plant and animal matter. It helps bind soil mineral particles together into clumps, called soil aggregates. Higher levels of soil organic matter leads to more stable soil aggregates, better soil infiltration capability and aeration, better water holding capacity, more resistance to wind erosion, reduced potential for soil compaction, and overall better soil fertility. Organic matter also helps hold soil nutrients in place so that they are not lost by erosion, surface runoff, or leaching. If left undisturbed, soil organic matter eventually can be transformed into long-lasting humus. However, if the soil is tilled, soil
organic matter will be oxidized and the carbon will be lost to the atmosphere as CO₂. If the soil erodes, the organic matter will be removed in runoff water.

5. No-till as a Key Role in Carbon Sequestration

How can we sequester more soil carbon in crop production? One of the key roles in sequestering carbon in the soil will be tillage management. Several methods of tillage in crop farming are conventional till (moldboard plow), minimum till, ridge till, and no-till. Among these tillage practices, no-till has a greater potential to store more carbon in the soil than other tillage methods.

6. What Are the Advantages of No-till in Crop Production?

First, no-till keeps a lot of crop residues that provide a good amount of organic matter in the soil. Crop residues on the soil surface will reduce topsoil degradation and surface runoff including soil erosion. Second, no-till makes more stable soil aggregates that increase water and nutrient holding capacity resulting in potentially better crop production. In particular, no-till increases more micro-aggregate stability that contributes to the higher biological activity in the soil than conventional tillage. Third, no-till will increase significantly earthworm and biological populations (particularly fungi) that contribute to better soil physical properties.

Further, there will be an additional economic benefit combined with less disturbance of soil by reducing fossil fuel energy costs by not tilling.


Development of Non-antibiotic Tactics to Control Mastitis

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Bovine mastitis is the most important infectious disease affecting both the quality and quantity of milk produced in the nation. On average, losses associated with mastitis will cost US dairy producers about $185 per cow each year. Mastitis will cost Michigan dairy producers approximately $50 million in lost revenues annually. Some obvious costs associated with mastitis control include medications, labor, and veterinary services. However, most of the economic losses due to mastitis are attributed to reduced milk production, discarded antibiotic-treated milk, and increased need for replacement animals.

Over the past several decades, procedures that improve milking time hygiene and reduce the exposure of udders to infectious pathogens have proven to be highly effective in reducing the incidence of some forms of mastitis. For example, prevalence of contagious pathogens such as *Staphylococcus aureus* and *Streptococcus agalactiae* has decreased considerably with the application of these good management practices. Unfortunately, the etiology (cause or origin) of mastitis has shifted over the years from contagious organisms to more environmental pathogens, even in well-managed herds. The environmental pathogens, such as *Escherichia coli* and *Klebsiella pneumoniae*, are often associated with more frequent episodes of clinical mastitis that can pose some unique challenges for eliminating existing intramammary infections (1).

Antibiotic therapy as a means to treat infections is an important part of current mastitis control programs. Historically, formulations of both lactating and dry-cow intramammary products were directed primarily against the gram-positive organisms, particularly staphylococci and streptococci. Indeed, most over-the-counter infusion products are highly effective in treating many forms of streptococcal mastitis. However, the therapeutic success rates with antibiotic therapy can vary considerably depending on the duration of infection and the specific organisms causing the infection. Chronic *Staph. aureus* mastitis has proven to be very difficult to eliminate during lactation using currently available intramammary treatment products due to buildup of scar tissue.
and abscess formation. In recent years, there also has been an emergence of mastitis-causing pathogens that have a greater resistance to antibiotic therapies, including coliforms and *Mycoplasma bovis* (2).

Despite the dire economic impact of this disease on the dairy industry, the most widely accepted method of mastitis therapy remains intramammary antibiotic treatment. In reality, the efficacy (effectiveness) of such treatments is low during the lactation period, especially against major mastitis-causing pathogens. This method of treatment is not always cost-effective either due to discarded antibiotic-contaminated milk during and after treatment. Estimates suggest that antibiotic contaminated milk will cost the US dairy industry $50 million annually. Antibiotic residues are an undesirable consequence of controlling mastitis, and there is a growing concern from consumers over the potential presence of drug residues in the food supply. In a survey conducted by the National Dairy Board, consumers listed antibiotics as a serious health hazard in the food supply. When questioned about milk, the majority of the respondents listed chemical residues as a problem and wanted the Federal government to increase antibiotic regulation to ensure food safety (3). While the vast majority of dairy farmers use antibiotics in a responsible fashion, there are some groups who blame antibiotic usage on dairy farms for the emergence of antibiotic resistant human pathogens. It is obvious that new approaches are needed to reduce the dairy industry’s dependence on chemotherapy as its major means for reducing or eliminating existing intramammary infections.

**Non-antiobiotic Approaches**

It is well established that the changes in incidence and severity of mastitis are related directly to changes in the composition, magnitude, and efficiency of the udder’s immune system. In order to address the future needs of the dairy industry, researchers are investigating ways to enhance the natural defense mechanisms of the udder to prevent and effectively eliminate mastitis. For example, certain immune cells (lymphocytes) in the cow’s udder are capable of secreting natural antibacterial proteins that can kill a spectrum of common mastitis-causing bacteria including coliforms, *Strep. uberis*, and *Staph. aureus* (4). Initial safety studies showed that this antibacterial protein does not adversely affect the udder, but still has potent activity against bacteria present in the milk. Further characterization of this antibacterial protein suggested that it may belong to a family of proteins that also are found in human lymphocytes called saposin-like proteins (SAPLIP). Indeed, through the use of gene databases and molecular techniques it was confirmed that a bovine homologue of SAPLIP exists in udder lymphocytes that is very similar in structure and function with human SAPLIP. Studies currently are underway at MSU’s College of Veterinary Medicine to purify large quantities of the bovine SAPLIP in order to explore ways that it could be used to control bacterial infections in dairy cattle. It is possible that this factor could be used as a natural antimicrobial agent for the therapeutic treatment of mastitis-causing pathogens. Bovine SAPLIP may also be useful in teat dip formulations for both the pre- and post-milking applications. The successful development of this new technology may have several advantages over conventional chemotherapies in eliminating mastitis, including: 1) a broad spectrum of activity to kill different bacterial species (*Staph. aureus, E. coli, streptococci*) without causing damage to host cells; 2) minimal contribution to the emerging resistance of bacterial pathogens to antibacterial drugs; and, 3) the elimination of undesirable residues from contaminating animal products destined for human consumption. Results from these studies may lead to development of new strategies to control mastitis and provide a viable alternative to less effective mastitis control procedures based on traditional chemotherapy.

**References**


**Law Requires Farms to Report Water Use**

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Sanilac, St. Clair, Huron, Tuscola, and Lapeer Counties

Recently the State of Michigan enacted Public Act 148 that will require reporting of water use by many Michigan dairy operations. The act specifies that agricultural water users with the total capacity to withdraw surface or groundwater exceeding 100,000 gallons per day (70 gallons per minute) are required annually to report actual monthly water withdrawals. Noncompliance will result in penalties of $1,000 for each violation. All agricultural water uses (such as irrigation, animal cooling, animal drinking water, and milking parlor cleaning water) will be monitored under this Act. Annual reports will be made either to the MDA or MDEQ. Deadline for the 2004 report is January 31, 2005. Farms subject to the Act should have designated the agency (MDA or MDEQ) to which they will report by October 1, 2004. To read the rest of this article go to the web site, http://www.msu.edu/user/mdr/, click on the left button, New Reports, then click on the title of this article posted under the heading “New Reports.”
Good time management is a major component of business success. It affects productivity and employee morale. Good time management requires knowing useful time management skills and making them a habit. Managers and employees can benefit in business and personally from improving time-management skills. This is the second of a three article series. In the first article I discussed the relationship among time management or event control, productivity and self-esteem (Figure 1). This article covers some methods that can improve control of your time.

**Improving Event Control- Setting Goals**

Event Control is influenced by goals and time management skills and habits. Tracy (4) names four areas for goals; family, business, personal, and self-improvement. Others include recreation and spiritual matters. Establishing goals in each of these areas will help you balance your life. In Hyrum Smith’s book (3) the first of his 10 Natural Laws of Time and Life Management is “You control your life by controlling your time.” To control how your time is spent there are six basic steps, offered by Tracy. These include: 1) clearly define goals; 2) create a detailed plan; 3) use daily or weekly “To Do” lists, 4) set priorities; 5) concentrate on one thing at a time; and, 6) develop a sense of urgency for important goals.

1) **Clearly define goals.** The first step to controlling time is to set direction by setting goals in business, family, and recreation. Goals help focus how your time is spent and create a purpose for those involved. Clear, specific goals give you and your staff targets on which to focus, help clarify roles and responsibilities, and give purpose to employees. Unfortunately, there are few people working for companies that can state clearly the goals of the company. Tracy (4) suggests writing out the benefits and reasons for achieving your goals. This provides some understanding of why tasks are important and may create incentive and passion toward achieving the goals. Involving others in setting goals gives them ownership in the results.

Goals help us program our thoughts. Some athletes use photographs on their walls to envision themselves achieving a specific goal. Without goals, it is easy to focus on non-productive tasks, obstacles and roadblocks, which may result in can’t-do or negative thinking. Negative thinking may result in becoming stuck. Goal setting with a “can-do” attitude puts the focus on developing solutions to problems or obstacles.

Goals can be classified as short or long-term. Long-term goals set direction and short-term goals identify tactical tasks that help obtain long-term goals. Short-term goals have five characteristics. They are SMART; i.e., Specific, Measurable, Attainable, Rewarding, and Timed with a completion date.

Long-term goals are DRIVE; i.e., Directional, Reasonable, Inspiring, Visible, and Eventual. Short-term goals need to be specific and lead toward long-term goals, either established or perceived. If they are not, you will not be pleased with the progress you make, and stress will likely occur.

2) **Create a detailed plan.** For a contractor to build a house, there needs to be a plan, a blueprint. The more detailed the blueprint the easier it is for the contractor, and the more likely it will be built correctly. Good plans don’t leave much guesswork. For example, for employees to improve somatic cell counts, goals and methods need to be established. This involves setting long- and short-term goals. Long-term, a producer would like to lower the herd somatic cell count from 375,000 to 120,000. Short term, the decision was for employees to collect bulk tank samples every 2 weeks starting on November 1, start pre-dipping on November 1 and monitor monthly DHI cell counts starting with the September DHI report.

3) **Use daily or weekly “To Do” lists.** Organizing, a skill mentioned in the first article, refers to taking a plan, a set of short-term goals, or a set of tasks to be done and mapping out the who, what, when, where, and how. It also involves following up to make sure assignments are understood and tasks are completed. These are tactical activities and are part of a good plan. Covey (1) suggests that we begin with the end in mind. Knowing where we want to be, we can establish the necessary sequential steps to get there.

Most of us mentally know or think about what we want to accomplish. You increase your chance of getting it done if you write it down on a “To Do” list. All good time managers...
work from lists. You also have a greater chance of accomplishing tasks if you assign a specific block of time to work on the task. Otherwise, you may not find time to do it. Without a list you may respond to the urgent and spend much of your time on unimportant tasks.

A week is a good time unit to plan, and doing this on Saturday or Sunday is useful. This allows you to look ahead for 7 days and determine what important items need to be accomplished. You can then plan the next day, the night before, or early in the morning. Doing this daily gives you a chance to adjust your list and ponder the day ahead of time. Two benefits of using a list include staying organized all day, and there is a sense of accomplishment (productivity) when you check off the items. In contrast, when you work on unimportant items all day you will feel frustrated and unproductive. Take 15 minutes to do a daily plan.

Anything you do today must be on your “To Do” List. To control your time, Tracy says we must resist adding things to our daily list that were not planned ahead of time. You should put the new item on the list for the future and do your best to stay on task. Obviously, emergencies arise; when they do, evaluate when to handle them. Planning a tight schedule makes dealing with emergencies more difficult. Try developing blocks of time to work on projects, read, do paperwork, and other management tasks. If necessary, schedule an appointment with yourself; i.e., put it on the calendar and don’t let the seemingly urgent items control your time.

4) Set priorities. Setting priorities is simply choosing which tasks to do first. An unknown professor was teaching a course on time management. He placed a large jar on a desk and filled it to the top with rocks. He asked the class, “is the jar full?” The class replied, yes. He then took out a bag of gravel and poured it into the jar filling the spaces between the rocks. Asking again, “is the jar full?” The class, now a bit cautious, replied “probably not.” He then poured a bag of sand and then water into the jar. At this point the class agreed the jar was full. When the professor asked what this meant, one student replied, “you can always squeeze more into your schedule!” The professor replied, “no, it means you need to put the big rocks in FIRST!!"

Stephen Covey (1) divides tasks into four categories; 1) Important and Urgent; 2) Important and Not Urgent; 3) Not Important and Urgent; and, 4) Not Important and Not Urgent. For example, breeding a heifer might be considered urgent but not highly important. It needs to be done now but has only a small impact on profit. Balancing the milking herd ration may be considered important but not urgent because it impacts the entire herd but could be done tomorrow. Covey says, “put first things first.” The big rocks in Covey’s categories are Important and Urgent and Important and Not Urgent.

The “To Do” List in Figure 2 demonstrates the use of two categories; importance with three levels, (A, B, C) and urgency with five levels (1,2,3,4,5) (2). Therefore, A1 items are both most important and most urgent. Other priority systems use only letters: A, B, C, etc. or numbers, 1, 2, 3, etc.

In setting priorities, one test that Tracy (4) suggests is to ask yourselves “what is the most valuable use of my time right now?” The 80-20 rule suggests that 80% of your impact comes from 20% of the things we do (4). So, you need to plan your day around getting the “big rocks” done. Methods of making a list and ranking items may differ. However, the important point is to learn to make a list, prioritize it and stick to it as best you can.

5) Concentrate on one thing at a time. This is a good habit but hard for most of us to do. We have a tendency to get involved in many projects, activities, and events, which not only require time but make it difficult to focus on a single task or project for long periods.

Working on several projects at once is similar to selecting for a number of genetic traits to improve a dairy herd. With more traits we slow progress in the most important trait! A problem with working on many projects is that you stop one to work on another. This is similar to unloading a truck load of fertilizer bags by carrying each bag half way to the place you want to pile it, putting the bag down and retrieving another bag and carrying it half way, putting it down and picking up the previous bag to carry it the rest of the way. We put projects or tasks down to work on something else, then return to pick up where we left off. Restarting each project often takes time because it may require rethinking what is next or even redoing part of a task. Keep in mind that each time you start something new before you finish what you were working on you are adding to the number of projects. Picking one goal to complete before starting something new requires self-discipline, but working on many items can be a major stressor.

6) Develop a sense of urgency for important goals. This means overcome procrastination and get to the important things, now. You need to tackle the important things today and not put them on the list with the hope that you will find time to do them next week. You need to be a dependable, responsible manager of your time. In many businesses, the employees who are dependable and manage their time will get the opportunities to advance.

Summary

Successful people use their time to obtain their goals. As a result, they are more productive and have higher self-esteem. Six habits can help you improve your time management.

1) Specify clearly defined goals that set direction in business, family, recreation, and other matters. Goals help focus how your time is spent and create a purpose for those involved.

2) Create a detailed plan. Good plans don’t leave much guesswork. A detailed blueprint helps a contractor to build a house while a set of long and short-term goals helps employees reduce somatic cells counts in a dairy herd. Everyone should know the plan.

3) Use daily or weekly “To Do” lists. Most of us mentally
know or think about what we want to accomplish. You increase your chance of getting it done if you write it down on a “To Do” list. All good time managers work from lists. With a good “To Do” list everyone knows what to do and when.

4) Set priorities, which is simply choosing which tasks to do first. This requires some thought about what things are important and what items are urgent but not important. Making sure the important items get done requires prioritizing them and scheduling time to accomplish them while not allowing your time to be consumed by less important matters.

5) Concentrate on one thing at a time. This is difficult to do, but you will use your time more efficiently if you do not jump from project to project.

6) Develop a sense of urgency for important goals. This means overcoming procrastination and getting on with the important things, now.

References

Industry and University

Scholarships Awarded to Students With Dairy Interest

Miriam Weber Nielsen
Dept. of Animal Science

Scholarship support for students with a dairy interest at Michigan State University is higher than any other similar dairy program across the nation. In 2003-2004, over $63,000 was awarded to incoming and current students planning to pursue careers related to the dairy industry. Scholarships are provided by the Michigan Dairy Memorial and Scholarship Foundation, Inc. and the Howard Cowles estate.

The Michigan Dairy Memorial and Scholarship Foundation has honored 139 dairy leaders in Michigan since its founding in 1955. Individuals honored during the last year include G.C. Graf, Irene Warren Graf, Max Graybiel, Maynard Hogberg, Lon McGilliard, Noel “Pat” Ralston, Alvin Rippen and J. Gordon Topping. To date, over 350 MSU students have received scholarships from the Foundation. In the past academic year, scholarships were awarded on the basis of academic merit, extracurricular activities, and professional goals to the 29 individuals listed below.

**Freshman Scholarships ($1,000)**

Krystal Allen from Fowler was a freshman in the Ag Tech Dairy Management program. She is in charge of the calf operation on her family’s dairy farm and plans to return to the farm following graduation. Krystal was active in FFA and 4-H...
and participates at MSU in the Dairy Club.

**Mitch Fabus** from St. Johns was a freshman in the Ag Tech Agricultural Industries program. Mitch grew up on a dairy farm and worked after high school on a custom harvesting crew in the West. Mitch works at MSU Crop & Soil Sciences farm and plans to return to his family’s farm after graduation.

**Joann Greenfield** from Annapolis, MD was a freshman in Animal Science. Joann worked as a veterinary technician in preparation for her future career as a veterinarian. She participated in the Maryland Junior Holstein Association and 4-H and is currently a member of the MSU Dairy Club and the Collegiate Jazz Choir.

**Steven Herr** was a freshman in the Ag Tech Dairy Management program from Kendallville, IN. He grew up on his family’s dairy farm, where he continues to work. Steven also works in his family’s custom chopping operation. Steve participated in National Honor Society and has received his State FFA Degree.

**Katy McCracken** grew up on her family’s dairy farm in Carson City, where she continues to work. Katy was a freshman in Animal Science. During high school, she was active in the National Honor Society, Student Council, and athletics. She participates in the MSU Dairy Club.

**Ag Tech Scholarships ($1,250)**

**Jarrod Aldrich** grew up on a family dairy farm in Corunna, IN and has worked on his home farm as well as other area dairy farms. In addition, Jarrod participated extensively in FFA and in high school athletics. He was a freshman in the Dairy Management program and plans to return to the farm after graduation.

**Joshua Gamble**, a sophomore in the Dairy Management program, grew up on a dairy farm in New Carlisle, IN. He participated in 4-H, MSU Dairy Cattle Judging, the MSU Dairy Challenge, and is an officer in the MSU Dairy Club. Joshua plans to return to the family farm after graduation.

**James Nienhuis** from Zeeland was a sophomore in the Dairy Management program. He works on his family’s dairy farm and is also involved in the MSU Dairy Club, MSU Dairy Cattle Judging, and in intramural athletics. James plans to own and manage a dairy farm after graduation.

**Pieter Serne** from Lowell gained experience with dairy cattle through employment on two farms. Pieter was a freshman in the Ag Tech Dairy Management program and plans to manage a dairy farm after graduation. He participated extensively in FFA, 4-H, church, and in high school athletics.

**Molly Yonkman** from McBain was a freshman in the Dairy Management program. She grew up on her family’s dairy farm and plans to return there after graduation. Molly was active in athletics and her church during high school and participates in the MSU Dairy Club.

**Dairy Memorial Scholarships ($2,500)**

**Julie Braid** from Durand was a senior in ANR Communications and plans a career in agricultural law. She grew up on a family dairy farm where she continues to be actively involved. Julie is a member of Agricultural Communicators of Tomorrow and works at the State 4-H Youth Development Office.

**Mary Daniels** from Whittemore was a junior in Animal Science and plans a career in veterinary medicine. Mary has been actively involved on her family’s dairy farm and as a volunteer at a local veterinary clinic. Mary is a member of the Sigma Alpha agricultural and natural resources sorority, the MSU Pre-Vet Club, and the Honors College.

**Calby Garrison** was a senior in Agribusiness Management from Onsted. Calby was active in CANR Student Senate, Alpha Gamma Rho agricultural fraternity, the MSU Dairy Club, and the MSU Young Spartan Program. Calby continues to be actively involved on his family’s farm and plans a career working with dairy producers.

**Megghan Honke** from Byron was a senior in Agriculture and Natural Resources Communications. She participates in Agricultural Communicators of Tomorrow and Shiawassee County Farm Bureau activities and is a student employee at MSU in Agriscience Education. Megghan plans a career in communications with an emphasis on agriculture.

**Katie Hyde** from Morley was a junior in Animal Science. Katie is active in the Michigan Junior Holstein Association and the MSU Dairy Club and works as a student employee in a dairy nutritional physiology laboratory. She grew up on a family dairy farm and plans a career working with dairy cattle.

**Lindsay Kirk** was a senior in Animal Science from St. Johns. She works on her family’s dairy farm and plans a career involving nutrient management on dairy farms. Lindsay has been active in the MSU Dairy Club, 4-H and Collegiate Dairy Cattle Judging, CANR Student Senate, and Michigan Junior Holstein Association.

**Melissa Koebel** from Three Oaks was a senior in Agribusiness Management. Melissa grew up on a dairy farm and is planning a career in the dairy industry working directly with farmers. Melissa participates in the National Agri-Marketing Association and Sigma Alpha sorority, and is a CANR Ambassador.

**Garrett Landel** was a sophomore in Animal Science from Waldron. Garrett grew up on a farm and plans to work as a state dairy inspector after graduation. He works on his family’s farm in addition to operating a lawn service and working at the MSU Dairy Plant. Garrett participated in the MSU Dairy Challenge and is Treasurer of the MSU Dairy Club.

**Calvin Lindberg** was a junior in Animal Science from Coopersville. He is active in his church youth group and worked at MSU Farms. Calvin grew up on his family’s dairy farm, where he continues to work on all aspects of the operation and plans to return to the dairy farm after graduation.

**Travis Marshall** grew up on a dairy farm near Stockbridge. Travis participates in the National Agri-Marketing Association, Alpha Zeta honorary agricultural fraternity and
has completed internships with AntelBio and Archer Daniels Midland-Alliance Nutrition. Travis was a senior in Agribusiness Management.

Beth Munsell grew up on a family farm near Fowlerville. She was a senior in Animal Science and plans a career in consulting in the dairy industry. Beth works as a laboratory assistant in the MSU Animal Behavior Laboratory. In addition, Beth is active in the MSU Dairy Club, Dairy Cattle Judging, and the Michigan Junior Holstein Association.

Cortney Peissig grew up on a family dairy farm in Dorchester, WI. Cortney was active in the National Agri-Marketing Association, FFA, and her church. Cortney is a junior in Agriculture and Natural Resources Communication and plans a career in education and promotion in the dairy industry.

Bryce Slavik was a sophomore in Animal Science from Ashley. Bryce grew up on a dairy farm where he developed his career plans of becoming a veterinarian. He works on his family's farm and in a laboratory in the Department of Animal Science. Bryce is currently an officer in the MSU Dairy Club and participated in the Little International.

Rebel Smith grew up on a dairy farm near Fremont and has gained additional experience working on other farms. Rebel has been active in FFA, as a resident mentor at MSU and as a teaching assistant in an agriscience education class. Rebel was a senior in Agriscience Education and plans to teach agriscience at the high school level.

Joseph Tarkowski was a junior in Animal Science from Belding. Joseph is actively involved in the FarmHouse fraternity and is employed at MSU Farms. He currently works as a manager on a dairy farm and plans to return to the farm following graduation.

Robert West, Jr. was a junior in Agriscience Education from Onsted. Robert works at the MSU Dairy Teaching and Research Center with responsibilities in milking, animal care, and maintenance. He is a member of Alpha Gamma Rho and the Agricultural Education Club. After graduation, Robert plans to teach agriscience at the high school level.

Holli Wittenbach was a senior in Animal Science from Ionia. Holli graduated from the Ag Tech Dairy Management program and is currently working with ABS Global while attending college. She represented MSU in the North American Intercollegiate Dairy Challenge and participated in the MSU Dairy Club. She plans to work as a consultant for dairy farmers after graduation.

**Glenn and Anne Lake Scholarship**

The Glenn and Anne Lake Scholarship covers all tuition and fees for an academic year. The recipient is Ashley Liddy, who was a senior majoring in Animal Science from Gladwin. Ashley works at the MSU Dairy Farm and the Purebred Beef Farm. She is active in the MSU Dairy Club as chair of the annual recognition banquet and in the Block and Bridle Club, helping with the annual MSU Beef Expo and the Northern Exposure Lamb Show. Ashley also participated on the collegiate dairy cattle judging team. Ashley is planning a career in the dairy industry.

**Russel Erickson Scholarship**

The Russel Erickson Scholarship of $4,000 is awarded to Emily Sneller, who was a junior in Crop and Soil Sciences. She plans to specialize in crop biotechnology while continuing to be involved in dairy. Emily works in the agronomy research lab and is a member of the MSU Agronomy Club and the MSU Dairy Club. In addition, Emily is the president of the Michigan Junior Holstein Association.

**Jack & Betty Barnes International Michigan Dairy Memorial Endowed Scholarship ($1,000)**

The Barnes scholarship is given annually to a student interested in a dairy industry career who is participating in an international experience to enhance his or her education. This year’s recipient was Mary Daniels, who is mentioned above. Mary participated in a study abroad program on Food, Agriculture and Natural Resources in South Africa and Swaziland in summer 2003.

**Howard Cowles Dairy Scholarships**

The Howard Cowles Dairy Scholarships are given annually to students in Animal Science who have attained junior status and demonstrated a strong interest in dairy. Academic achievement and participation in extracurricular dairy activities such as the MSU Dairy Club or MSU Dairy Judging are given strong consideration. The scholarships are provided by revenue from a gift from the estate of Howard E. Cowles, who was a long-time employee of Sealtest Dairy. This year’s recipients were Katherine Shuster and Holli Wittenbach. Katherine Shuster was a junior in Animal Science from Belmont. She works at the MSU Dairy Farm and is a member of the Honors College. Katherine participates in the MSU Dairy Associates Program and is completing an undergraduate research project involving dairy cattle to enhance her preparation for a career as a veterinarian. Holli Wittenbach was mentioned above.

For information on making contributions to honor members of the dairy industry or to support student scholarships, contact College of Agriculture and Natural Resources External Relations at (517) 355-0284. To learn more about the Michigan Dairy Memorial and Scholarship Foundation, contact Dr. Miriam Weber Nielsen in the Department of Animal Science (517-432-5443; msw@msu.edu).

**Calendar of Events**

Monday, Dec. 20 - Dairy Nutrition Update, 10 a.m. to 3 p.m. in Fremont. For more information, contact Ira Krupp, Extension Dairy Agent at 616-846-8250 or email at kruppi@msu.edu.
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Editor ................................................................................. Dr. H. Allen Tucker
Final Copy Editor ................................................................. Dr. Kathy Lee
Publisher and Webmaster .................................................. Pam Jahnke
Managing Publisher ......................................................... Dr. David K. Beede
Circulation ............................................................................... 6,900

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