Are Wages You Pay Competitive? Does It Matter?

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You don’t need someone from Michigan State University to tell you that good help is hard to find. The labor market in Michigan is particularly tight. The Governor’s office recently announced that the average unemployment rate in Michigan has been lower than the national average for 64 consecutive months – more than 5 years in a row – and July’s statewide unemployment rate was 3.5% (1). There is a level of unemployment that occurs as workers change jobs or because the skills of workers don’t match the skills needed in the available jobs. This is called the natural rate of unemployment or full employment and is estimated to occur at an unemployment rate of 5 to 7% in the United States (2). As Figure 1 indicates (page 2), in July nearly all Michigan counties were at or below full employment.

Where Are the Cows, Employees?

If we compare the Michigan counties that have the most cows (see Figure 2) with the county unemployment rates, it is noted that “full employment” occurs where cows are located. In Allegan County, the March unemployment rate was only 2.7%, in Clinton County 2.6%, in Huron County 6.5% and in Sanilac County 6.6%.

Clearly, the pool of workers available to dairies is broader than just those that are currently unemployed. However, the biggest source of specialized agricultural workers is NOT the unemployment office, but other agricultural operations. When recruiting, producers may not obviously target neighbors’ star employees. However, in tight labor markets, producers must often compete with other agricultural employers for quality employees.

Is Your Farm Appealing?

In 1998, Kurt Anderson, MSU Extension Dairy Agent, found that 88% of the Michigan dairy producers surveyed recruited potential employees through word of mouth (3). To compete against other dairy farms and other employers, your farm must have the reputation of being a great place to work. Dr. Bernie Erven of The Ohio State University is an agricultural economist who specializes in human resource management. He asks, “Why should employees be pleased to work for a dairy farmer if the dairy farmer is not proud of what he or she has to offer?” (4).

Dr. Erven outlines several strategies that dairy managers can use in building a reputation as an outstanding employer and to build a better workplace. Wage rate is one of the factors, however, he also notes that non-monetary benefits are important in attracting and keeping employees. In the July 2000 Michigan Dairy Review, Dann Bolinger, MSU Extension Dairy Agent, outlined other factors that motivate employees (5).

What Do Your Competitors Pay?

Not the least of Dr. Erven’s suggestions is to be sure that you offer fair compensation. Research conducted in 1997...
on a sample of 93 progressive New York dairy farms (average herd size: 537 cows; average pounds of milk sold per cow: 22,545) indicated that employees rated good working conditions, good wages, and job security as the three most important job attributes (6). To compare your wage rates to those of other dairy producers and to rates paid to livestock and poultry workers in Michigan, Wisconsin, and Minnesota, see Tables 1 and 2.

A Non-agricultural Pay Scale

Between October 1996 and July 1998, the U.S. Bureau of Labor Statistics conducted the National Compensation Survey. This survey generated wage rate information for hundreds of non-agricultural occupations in private industry and state and local governments across the contiguous 48 states. To quantify work levels, the Bureau used 10 factors (including knowledge, supervision received, complexity, personal contacts, work environment, physical demands, and others) to classify jobs (7). The levels of each factor totaled to classify a job into a level from 1 to 15. Examples of a level 1 job might be a fast-food worker or a ditch digger. Level 15 jobs may include senior researchers or high-level managers.

These work levels can be calculated for other occupations. The level of a particular job on a dairy farm, for example, might then be compared to a job of a similar level in a different occupation. After assigning values to each of the 10 factors, work levels were determined for the following dairy farm jobs: milker (level 4), cow feeder (level 4), calf raiser (level 3), and herd manager (level 10).

The data collected in New York was used to classify dairy workers into five levels (6). Approximating those five levels to the 15 levels used by the Bureau of Labor Statistics allows wage comparisons between the New York dairy workers and non-agricultural workers at similar levels. Wage rates for dairy and non-agricultural jobs of similar levels are found in Table 3 (page 3).

Why the Differences?

Part of the discrepancy between wages paid to dairy and non-agricultural workers is likely due to the generally lower cost of living found in rural areas as compared with urban areas. In addition, people that choose agricultural work may place a high value on working outdoors and with animals and may be willing to accept lower pay in exchange for these opportunities. These explanations could account for the $1 to $5 wage differences found between level 3 and 4 dairy versus non-agricultural workers (Table 3). It is more difficult to explain why herd managers seem to earn less than half of what similarly skilled non-agricultural workers do. Perhaps the estimation of herd manager skills was too high – maybe they should...
be level 8, for example. However, this would lower comparable non-agricultural hourly wages to only $18 to $22, still much higher than herd managers earned (Table 3). It is also possible that a typical herd manager skill set is quite narrow and very specific to dairying. Though herd managers may be at a level 10 or above, it may not be fair to compare this profession to other occupations.

Another explanation for the discrepancy may be that the New York data were not representative of the rest of the country. Perhaps herdsmen are compensated more like their non-agricultural counterparts in other parts of the country. A quick check of the August 10, 2000 Hoard’s Dairyman revealed 16 ads for herdsmen. The average salary offered was $37,000. Dividing this by the 3,200 hours per year that Fogelman found herdsmen worked translates to an hourly wage of about $11.50. It is unclear why herdsmen seem to receive wages that are much lower than non-agricultural workers with similar skill levels.

Fogleman (6) found that as the skill or competency level of dairy worker jobs increased, more of the total compensation package was made up by non-monetary benefits (e.g., health insurance, housing). It was clear that the dairies in Fogelman’s study offered these benefits to remain competitive in a tight labor market. However, many of the employees surveyed did not recognize the monetary value of these benefits. Dairies offering these benefits need to ensure that they communicate the value of these perks to their employees. For example, Michigan State University provides an annual statement to each employee that details the monetary value of the health coverage, retirement, and other benefits. Total compensation is calculated and can often be substantially higher than cash wages.

What If Farms Can’t Pay More?

It appears that dairy workers generally earn less than their non-agricultural counterparts. And in a year when margins may be tighter than the past couple, higher pay for dairy employees may not be in the cards. Recall, however, that the New York dairy employees rated good working conditions just as highly as wages. In Fogelman’s conversations with employees, she found that their definition of good working conditions included things like, “This is a nice place to work,” “I like coming to work,” “People here are friendly,” and “I can talk to my boss.” More than a comfortable physical environment, these employees wanted emotional comfort—they wanted to enjoy their work. This is not a surprising conclusion, but one often overlooked during the hectic day-to-day operations of a dairy. Higher pay may not always be possible, but every farm could improve their working environment. And more highly satisfied employees will not only turn over less often, they also will spread the word about their great employer, boosting the farm’s community reputation and potential hiring power.

References


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Table 2. Average wages paid to agricultural workers in Michigan, Wisconsin, and Minnesota (Lake Region). Source: National Agricultural Statistics Service.

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<td>$40,000 - 99,000</td>
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Health

Why Antibiotic Therapy Fails

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Antibiotics are a class of drugs that have widespread use throughout human and veterinary medicine. Antibiotics are also the class of drugs used most frequently on dairy farms. There are numerous types and formulations of antibiotics, as well as methods of action, but all inhibit bacterial growth. Thus, they are useful in controlling bacterial infections or, in some cases, reducing the severity of infection. Common diseases in dairy cattle that are treated with antibiotics include pneumonia, foot rot, and mastitis. As all of these and other bacterial infections can detrimentally affect dairy cattle health and productivity, effective use of properly administered antibiotics can be useful tools in herd management programs. Conversely, if improperly administered or misused, antibiotic therapy can result in poor therapeutic results, wasted labor and drug costs, and increased discarded milk and meat costs. Improper use can increase risk of antibiotic residues in marketed milk, or create an environment that can lead to resistance of bacteria to antibiotics. Treatment protocols, a residue avoidance plan, and employee training are fundamental to proper antibiotic use on a dairy farm.

How to Avoid Some Common Pitfalls

Many variables can affect the outcome of antibiotic therapy, and it is unreasonable to expect successful results for every case. The trend in many dairies is to rely on farm personnel to make decisions about when therapy should be given, as well as how it should be administered. Nonetheless, with proper training and a basic understanding of how antibiotics work, some of the most common pitfalls of antibiotic therapy can be avoided, which would improve the probability for success, or at the very least allow for a more accurate evaluation of expectations. In this article, some of the frequent causes for failure of antibiotic therapy are reviewed.

Immune System Plus Antibiotic

Complete elimination of an infectious agent is accomplished by the immune system. Antibiotics can help weaken and slow the growth of bacteria to help the immune system, but no antibiotic can eliminate an infection by itself. Thus, it is critical that the immune system of the host be at an optimum state of readiness should an infection occur. Well balanced rations, and clean, dry, well-ventilated housing are the foundations for good health. While some bacterial-related diseases occur from primary bacterial infections (mastitis, foot rot), many are secondary infections resulting from impaired immune function caused by some other agent or health problem. Thus, it is typical for bacterial pneumonia to occur after initial viral infections, especially when air quality is poor, where the bacteria act as an opportunist taking advantage of a viral-damaged respiratory tract. Enteric (intestinal) viruses, parasitism, surgery, dystocias (difficult calvings), and metabolic diseases can all serve as preliminary insults for secondary bacterial infections. Both the frequency and severity of infections can increase as a result of immune impairment.

Not a Bacterial Infection

A proper diagnosis is needed for successful therapy. If the disease being treated is not bacterial related, it will not respond to antibiotic therapy. While mastitis is usually a bacterial infection, other microorganisms such as fungal organisms can cause infections. Similarly, viral agents are often the primary cause of respiratory and enteric (intestinal) infections. Chronic diarrhea in a cow could be Johne’s disease. While this is a bacterial disease (Mycobacterium paratuberculosis), it is unresponsive to any antibiotic available for use in cattle. Antibiotics may be helpful in some cases to resolve secondary infections, but the primary agent must be cleared by the immune system without antibiotic help. If poor therapeutic results for a given disease symptom are being experienced, supportive diagnostic laboratory work or necropsies may be needed.


Volume at Injection Site?
Following injection, a drug is absorbed from the injection site into the blood, and then distributed to the rest of the body. Following intravenous (IV) injection, the distribution process begins immediately. However, after intramuscular (IM) or subcutaneous (SC) injection, a lag period occurs before maximum blood concentrations are achieved. Peak blood concentrations affect the amount of drug distributed to the tissue, including the infection site. Thus, it is desirable for the drug to be absorbed into the blood rapidly to achieve the highest blood concentration possible from the dose that was administered. To attain this, no more than 12 ml (cc) of any drug should be injected at any one site. Perhaps most importantly, if a drug is not labeled for a particular route of administration, don’t give it there.

Follow Label Instructions
The fundamental pharmacological principle of antibiotic therapy is to get as much active drug to the site of infection as possible. Thus, the first step is to insure that the product was maintained according to the manufacturer’s instructions. Expiration dates, proper storage conditions, and as previously mentioned, proper route of administration are critical. Care must be taken to insure proper shaking as is typical with most penicillin-type products.

Inadequate Dose/Weight
This is likely to be one of the most frequent problems in drug administration. Antibiotics, like any drug, need to be dosed on a body weight basis to achieve optimal distribution in the body. Too often, we administer therapy to cattle on a generic basis. We treat a pneumonia outbreak in heifers with the same dose of antibiotic per animal, despite body weights varying by as much as 200 to 300 lb. Similarly, lactating cows are treated systemically for mastitis, metritis, and foot rot for example, where body weights can vary from 1,100 to 1,800 lb. One cannot expect the same concentration of antibiotic at the site of infection for cattle dosed at a lower drug/body weight level. A weigh tape is an accurate and simple means to insure body weight of the treated animal. It is helpful to have a chart created on the farm with doses per body weight for the most commonly used drugs.

Wrong Drug For the Bug
Penicillin can be very effective against bacterial agents such as streptococci and staphylococci. However, this antibiotic has little or no activity against Gram-negative bacteria such as E. coli. This is partly due to the differences in the cell wall, but most bacteria have a genetic potential for resistance to many antibiotics. Thus, the minimum concentration needed at the site of infection (often termed the minimum inhibitory concentration, or MIC) for an antibiotic to be effective varies with the drug and the bacteria being treated. Just because a certain antibiotic was effective against one infection and one type of bacteria, does not mean it will be effective at the same dose against another bacteria. The most effective therapy can be achieved following culture and susceptibility testing arranged by your veterinarian. In some instances, previous culture and susceptibility results can be used to select a drug when treating subsequent cases. Based on the pharmacology of prospective successful antibiotics, doses and intervals between doses can then be calculated. This is how you pick the best drug for the bug.

Inadequate Duration of Therapy
This is another common problem of antibiotic therapy. Virtually all antibiotics that are used in cattle help the immune system eliminate bacteria on a time-dependent, not concentration-dependent basis. Thus, the longer that the MIC can be maintained at the site of infection, the better chance for therapeutic success. In order to best calculate doses and dose intervals, your veterinarian can use pharmacokinetic principles such as volume of distribution, bioavailability, serum half-life, and peak serum concentration. It is usually better to decrease the interval between doses and extend the duration of therapy then to double the amount of each dose. This can lead to extra-label use, especially for mastitis therapy. If the desired result is to eliminate the infection, this concept may have to be considered. However, extra-label use should only be considered in consultation with a veterinarian.

This relies on the pharmacology of a drug, but certain antibiotics do not distribute well to some infected tissues. Achieving effective drug distribution in the udder, central nervous system, eyes, and bone can be particularly difficult.

Don’t Mix Drugs
There are instances when combinations of antibiotics can offer better therapeutic success than one drug alone. These instances are rare. However, if single antibiotic therapy is insufficient, combination therapy should only be made with the advice of a veterinarian. Two drugs should not be mixed in the same vial/syringe; one formulation could inactivate another, or cause a reaction that creates an undesirable metabolite in the cow.

To summarize, the immune system of cattle is constantly exposed to bacteria that attempt to invade body tissue. A vast majority of the time, the immune system can clear potential invaders quickly and with few health problems for the host. However, serious bacterial infections will continue to occur, and for these infections, antibiotics can play a vital role in restoring the health and well-being of the affected animal. The key is to use antibiotics in a judicious and proper manner to insure their effectiveness and to reduce the risk of possible side effects of their use. Fundamentally, a complete herd health program that decreases the incidence of infections where antibiotics would be needed is the best plan for a responsible antibiotic use program.
USDA Lowers Michigan’s Bovine TB Status

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Michigan Dept. of Agriculture

Michigan’s Bovine Tuberculosis (TB) status was officially lowered by the United States Department of Agriculture (USDA) statewide on June 22, 2000. Michigan is now nonmodified accredited for bovine TB statewide. This change was expected for several months due to the number of livestock herds found to be TB positive within a short period of time. The nonmodified accredited status represents the highest tuberculosis risk. Prior to June 22, 2000 only Northeast Michigan, east of I-75 and north of M-55, was nonmodified accredited. That area’s status was changed on October 20, 1999.

The federal Pasteurized Milk Ordinance (PMO) requires that dairy farms in nonmodified accredited states must have an annual whole herd TB test in order to market milk. Since the status of Northeast Michigan, east of I-75 and north of M-55, was changed to nonmodified accredited on October 20, 1999, all dairy herds in that specific area must receive an annual whole herd TB test prior to October 20, 2000 to continue marketing milk based on the requirements of the PMO. All other dairy herds in Michigan must receive an annual whole herd TB test prior to June 22, 2001, to continue marketing milk based on the requirements of the PMO. In preparation for the lowering of the state status, the Michigan Department of Agriculture’s (MDA) Animal Industry Division conducted 18 Fee Basis Veterinarian training sessions this past spring. Over 300 veterinarians attended these sessions so as to be under contract with and paid by the MDA for TB testing. The Department will be paying the cost for all whole herd testing. Since the training sessions were completed in mid-June, veterinarians throughout Michigan have begun TB testing.

Local veterinarians conduct the initial caudal fold test on most herds; however, a small number of herds may be done by either MDA or USDA field veterinarians. Most often the MDA or USDA field veterinarians are conducting the second test called the comparative cervical test (CCT). The CCT is required if there is a suspect on the caudal fold test and can only be administered by MDA or USDA veterinarians. Dairy producers should not be surprised if they have one or more suspects on the caudal fold test. There usually are about 3-7% suspects on the caudal fold test. During the CCT testing process the farm is quarantined, which means no animals are allowed on or off the farm. The quarantine period varies depending on the lab results. The goal is to get the farm tested and off quarantine as quickly as possible. Just prior to having your herd tested remove any bull calves or culled animals. The TB testing process is much smoother when people work together and communicate.

Restriction on the interstate (between states) movement of live cattle, bison, goats and cervidae are based on a state’s freedom of evidence of tuberculosis. The USDA has set minimum standards for the interstate movement of cattle; however, individual states may place more stringent import requirements than required by USDA. Listed below are the USDA criteria for interstate movement:

**USDA Criteria Listed**

Cattle and bison that originate in a nonmodified accredited State or zone and that are not known to be infected with or exposed to tuberculosis may be moved interstate only if they meet one of the following conditions.

1. The cattle or bison are breeding animals from an accredited herd and are accompanied by a certificate showing that they have tested negative to two official tuberculin tests conducted at least 60 days apart and no more than 6 months apart, with the second test conducted within 30 days prior to the date of movement. If the cattle or bison moved under this condition are not individually identified by a registration name and number, they must be identified officially.

Even though these minimum USDA standards exist, it is important to realize that individual states can place more stringent requirements on interstate movement. Anyone planning to move livestock out of Michigan should check with the State Veterinarian Office in the state of destination for its specific importation requirements.

**Animal Industry Act**

The Michigan Department of Agriculture is working to regain the TB free status. Unfortunately, this will take time, and it will not happen anytime soon. The Department is in the process of amending the Animal Industry Act (P.A. 466). These proposed amendments are necessary for the statewide TB testing program to move forward. With the proposed amendments the livestock industry will also be required to meet new
intrastate movement requirements. The ultimate goal is to test all livestock herds to find out where the disease is and where it is not. Once this is accomplished, then the Department will be better suited to pursue TB free status both by zones, as well as the entire state. The legislature will be reviewing the proposed amendments and hopefully will push for swift passage.

Please, by all means, schedule your testing early rather than later. Also recognize that your veterinarian may not have crops to harvest or plant, but also has other busy clients. Producers and veterinarians have to work together so all herds are to be tested by their appropriate deadlines.

BovineTB.com

Bovine tuberculosis (TB) is a major threat to several aspects of the economy in Michigan. Informational resources are essential in educating stakeholders so that they can be informed partners in the cooperative effort necessary to eradicate bovine TB from Michigan. Michigan State University, Michigan Department of Agriculture, Michigan Department of Natural Resources (MDNR), Michigan Department of Community Health and the United States Department of Agriculture are jointly developing a web-based information site that will provide a large amount of accurate, up-to-date information concerning bovine TB and the efforts to eradicate it. Information available at this site will be focused on the current problem in Michigan but will be useful in regional, national and international efforts to control and eradicate this disease.

Currently, the web site is under development but should be available Fall 2000. The web address is BovineTB.com. Access to the MDNR web page on bovine TB currently can be accessed through this address.

Dairy Food Processing

Safety of Raw Milk Cheese - Is 60 Days of Aging Really Enough?

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Present-day laws regarding use of pasteurized, heat-treated (sub-pasteurized), and raw milk for cheesemaking date back to World War II when two options were provided to manufacturers of 39 varieties of natural cheeses, including Cheddar: (1) pasteurize [71.6°C (161°F)/15 sec] or alternatively (2) hold the cheese at a temperature of 2°C (35°F) or greater for a minimum of 60 days before being released to the market. The 60-day aging rule was based on the elimination of Brucella abortus (the causative agent of undulant fever in humans) from Cheddar cheese within 60 days and the fact that no outbreaks of illness were then traceable to cheeses that underwent 60 days or more of aging (2).

Last year about 7.5 billion pounds of cheese were produced in the United States with approximately 10% or 750 million pounds legally prepared from raw or heat-treated [lower than 71.6°C (161°F) and/or less than 15 sec] milk. Assuming an average wholesale price of about $1.80/pound for Cheddar and other farmstead cheeses, manufacturers of raw milk cheese would boast sales of approximately $1.35 billion annually. However under current rules, any of these 39 natural cheeses prepared from heat-treated milk must still be held at least 60 days before they can be legally marketed.

In response to growing food safety concerns over Listeria monocytogenes and other emerging foodborne pathogens, the Clinton Administration has greatly increased the federal budget for modernizing this nation’s food safety programs. To safeguard the continued production of Cheddar cheese from raw and heat-treated milk, this half century-old regulation regarding cheeses made from such milk needs to be reviewed in a timely manner since numerous studies have shown that Salmonella typhimurium, Escherichia coli O157:H7 and L. monocytogenes, as well as Mycobacterium bovis, can survive well beyond 60 days in Cheddar cheese prepared from artificially contaminated pasteurized milk (4). Two of these foodborne pathogens, namely L. monocytogenes and E. coli O157:H7, have recently moved to the forefront of food safety concerns and were unrecognized when the original 60-day holding period was established over 50 years ago.

Listeria monocytogenes

During the last 15 years, L. monocytogenes was responsible for two major dairy-related outbreaks in the United States, one of which occurred in 1985 and was traced to Mexican-style cheese that was illegally prepared from unpasteurized milk. This outbreak, which marked the emergence of L. monocytogenes as a serious foodborne pathogen, was responsible for over 300 cases of listeriosis, including 85 fatalities in California (6). In subsequent surveys, raw milk was identified as a particularly significant source of L. monocytogenes with 1.6 to 7.0% of such samples in the United States testing positive for the pathogen. Incidence rates outside the United States are generally similar with 1.3 to 5.4% of Canadian and 2.5 to 6.0% of Western European raw milk yielding L. monocytogenes (6). This pathogen thus far has been responsible for four major soft cheese-related outbreaks worldwide, which included over 100 deaths (6). Owing to the current United States policy of “zero tolerance” for L. monocytogenes in cooked / ready-to-eat foods (including all dairy products),
this pathogen has extracted a heavy toll on the industry with over 26 Class I recalls issued since 1985 for Listeria-contaminated cheeses (6), several of which involved cheeses such as Cheddar that were legally prepared from raw or heat-treated milk and then subjected to the minimum 60-day ripening period.

Two additional pathogens found in raw milk, namely *S. typhimurium* and *E. coli* O157:H7, have been directly linked to dairy-related outbreaks involving raw milk and raw milk cheese (4). In a 1987 FDA survey, *Salmonella* was recovered from 32 of 678 (4.7%) raw milk samples taken from bulk tank trucks in Wisconsin, Michigan and Illinois with 10 of 16 (62.5%) collection sites also testing positive. Five years later, *Salmonella* species were isolated from 26 of 292 (8.9%) farm bulk tank samples collected in eastern Tennessee and southwest Virginia. Between 1976 and 1984, three major outbreaks of salmonellosis in the United States and Canada were traced to Cheddar cheese, two of which involved cheese prepared from raw or improperly pasteurized milk (3). In the 1984 outbreak, consumption of Cheddar cheese that was prepared from heat-treated milk [66.7°C (152°F)/16 sec] and aged a minimum of 60 days was linked to over 2700 salmonellosis cases in five eastern Canadian provinces (1). The implicated cheese contained *S. typhimurium* with the pathogen still detectable in the cheese after 8 months of curing at 5°C. Several raw milk-associated outbreaks involving *S. typhimurium* DT104, a rapidly emerging multiple antibiotic-resistant strain of international concern, also have been reported. Two of these outbreaks occurred in Nebraska and Vermont. Such antibiotic-resistant strains of *S. Typhimurium* are an emerging problem on Michigan dairy farms with increasing numbers of *Salmonella* isolates collected during a 1997 - 1998 survey reportedly resistant to four or more antibiotics.

*E. coli* O157:H7 can also readily contaminate raw milk on the farm with contamination rates of 4.2 to 10.0% and 2.0% reported in the United States and Canada, respectively (4). Furthermore, over 70 cases of *E. coli* infection characterized by bloody diarrhea, hemolytic uremic syndrome and kidney failure have been traced to consumption of raw milk with a few additional cases in England linked to yogurt. The unusual acid tolerance of *E. coli* O157:H7 clearly makes this organism a potential threat to the dairy industry.

While all three of these pathogens should be of concern to the dairy industry, *L. monocytogenes* is particularly well known for its unusual heat resistance and tolerance to both acid and salt (NaCl). For example, this pathogen will grow in the presence of up to 10% NaCl and survive in saturated 23% brine solutions (6). Reports have shown that *L. monocytogenes* is the hardest of these pathogens, surviving up to 434 days in Cheddar cheese (pH 5.0 - 5.2) prepared from pasteurized milk inoculated with the pathogen (5). Other milkborne pathogens including *E. coli* O157:H7 and *S. typhimurium*, can survive up to 138 and 210 days, respectively, in similarly prepared Cheddar cheese.

Given that the aforementioned cheese studies were conducted using pasteurized milk (rather than raw or heat-treated milk) and that the growth rate for *Listeria* (and presumably other pathogens) is related directly to the severity of the heat treatment applied to milk during processing - i.e. fastest growth in ultra high temperature pasteurized milk followed by pasteurized, heat-treated and raw milk, the adequacy of the 60-day hold at 2°C or greater still remains very much in question. In fact, safety concerns regarding such cheeses were recently voiced by the United States Food and Drug Administration (FDA) as well as the Australian Dairy Industry, the Government of Canada, and the International Dairy Federation. At FDA’s request, the Cheese Subcommittee of the National Advisory Committee for the Microbiological Criteria of Foods reviewed the current data and concluded that the 60-day holding period at > 2°C may be insufficient to eliminate all foodborne pathogens. Consequently, this subcommittee recommended that the FDA re-examine its current policy regarding the 60-day aging period for hard cheeses prepared from raw and heat-treated milk.

Regarding cheese, Codex Alimentarius is presently calling for a “combination of control measures” (including pasteurization) to achieve the appropriate level of public health protection. However, given the potential for the superior flavor characteristics of Cheddar Cheese prepared from raw and heat-treated milk, cheesemakers are reluctant to change the current aging policy with the later view supported by the American Cheese Society and the American Dairy Products Institute. A political battle is presently looming between these organizations and the National Cheese Institute which opposes the production of Cheddar cheese from raw milk. Heightened food safety concerns in other areas, particularly the pending calls for mandatory pasteurization of fresh apple cider in response to recent outbreaks involving *E. coli* O157:H7, may lead to permanent changes in food production methods. Without scientific evidence supporting the safety of raw milk cheese, the manufacture of such cheese is also in jeopardy.

References
Effective Cattle Handling Facilities

Dean Ross
Extension Dairy Agent
Southeast Michigan

With the tuberculosis testing plan comes an opportunity and in some cases a need for Michigan dairy producers to improve their animal handling facilities. Dairy producers know the advantages of well planned and well constructed handling facilities. Unfortunately many producers have settled for less than ideal handling facilities. However, many reasons exist to develop a better plan and facilities.

Presently, many dairy operators utilize whatever space they can for working and restraining cattle. A variety of pens, stalls, lock-ups, and stanchions are installed as the primary animal restraint system. Even though most dairy producers realize that the milking parlor is perhaps the least ideal location for restraining cattle, it is most commonly used for restraint. The main drawback for many has been a lack of planning and design of facilities. Handling cattle was an afterthought or worse yet, there was no conscious thought put into it. Consequently, the words safe, fast, efficient, and low stress don’t apply to cattle handling for either the cattle or the operator(s).

Let’s consider how funds might be spent to their best advantage on your farm. Prior to investing in new facilities an assessment of the current facility and its capabilities are in order. Consider the animal handling needs of your operation. This would be an excellent time and place to include your veterinarian and MSU Extension Dairy Agent in the conversation. Not only will an updated handling and restraint facility be useful for the required TB testing, it will be a management tool in the future. To help determine the usefulness or adaptability of the current animal handling facilities, a number of questions should be asked.

What level of restraint do you currently have?
• Can you securely hold cattle by the neck in some sort of head restraint?
• What sort of lateral movement is available to animals while restrained?
• When restrained, what sort of access is available to the cow’s body for injections, surgical procedures, inspections, or palpation?
• Can the current restraint unit handle an unhappy 1500 lb animal without damage or danger to the facilities, animal or operators?
• Do you need a complete squeeze chute, or can a simple head gate system work for your farm?
• How often will you utilize this equipment? Is it just when your veterinarian comes or is it on a daily basis?
• Could you rent or borrow a chute when needed, leaving funds to develop other portions of the system more fully with the same investment?

To perform the initial Caudal Fold Tuberculin Test, each animal must be held such that the veterinarian can safely stand behind the animal and inject a very small amount of Tuberculin cutaneously (into the skin) at the base of the tail. This type of injection is done with a great deal of care, and if not placed correctly, the test will not be performed properly. The cow must stand relatively still during the injection and subsequent reading. She cannot be tap dancing about nervously or lunging back and forth in the restraint. The equipment needed for this test can be as simple as a locking head gate with some sort of working chute or as complex as a full sized cattle squeeze chute with cutting gates, a tilt table, and scale. The overriding consideration is keeping the animal relatively immobile and calm during the testing period. Another consideration will be the subsequent use of these facilities beyond TB testing. Management rails and locking head gates at the feed bunk may work well as a management tool for “production line” types of work such as bST injections or rectal palpations. But if you plan to use the holding facility for more intensive management activities, more complete restraint capabilities will be needed.

Many Options Exist for Handling Cattle

Many alternatives are available for handling and restraining cattle. Owning and utilizing a portable chute is one possibility. Another might be a head gate with removable sides on a narrow alley. A handling system without a permanent chute may work well in locales where veterinarians have a chute available to their clients. Veterinarians will have an opportunity to purchase chutes as part of a cost-share program associated with Bovine Tuberculosis testing. Regardless of how it is achieved, your farm needs a place where cattle can be restrained individually or in small groups.

Additional issues to consider as part of the overall cattle handling system include moving, sorting, and containing cattle prior to and after treatment in the chute. Often, we move or work cattle by cutting small groups from the herd and sorting individuals as needed. If you consider the time involved, a desirable method would be to cut individuals from a larger group. This means that we need a method to turn a larger group of animals into a single file line before entering the chute.

Figure 1 provides one example for adding a simple handling area to the end of a larger pen. In this scenario the handling equipment can either be a permanent structure with a headgate attached to an alleyway to form a working chute or an alley constructed to accommodate a portable squeeze chute (hoof trimmers chute also could be substituted when required).
The design of such a handling facility likely will vary from farm to farm. The design may call for simple wooden construction or these structures also can be much more complex and technologically sophisticated. There are any number of contractors available to devise a powered chute and sorting system. The defining issue for the dairy producer will be the time and funding available.

If you plan to design and construct your own handling structures there are construction issues and dimensions to consider.

The Holding Chute

The holding chute is the pen immediately behind the head gate. The holding chute can be made from wood or steel, but must be of rugged construction. For adult cattle the width should be about 26 inches. It should have a non-slip floor (1). The length should be at least 5 feet if there is a service gate to allow access to the rear of the animal (1). The side panels should be easily opened or removable to provide access to the animal from either side. A blocking gate is needed at the rear of the chute to keep the next animal in line from pushing into the holding chute. The animal may be released directly through the headgate or through a side-opening gate.

If a portable chute or squeeze is used as the holding chute, the base on which it sits needs to be level, solid and at a height which does not cause the cattle to have to step up or down as they enter. Concrete can be used as the base material if the chute is anchored to prevent the chute from sliding during use. The addition of a permanent roof over the chute will make this a comfortable work area year round. The addition of electricity and water will be helpful if you plan to do veterinary work here.

The Working Chute

The working chute is the alley connecting the crowding area with the holding or squeeze chute. It also should have a non-slip flooring surface and be 26 inches wide (1). The sides should be at least 5 feet high and at least 20 feet long (1). A curved working chute will help in moving cattle through the system. To provide the strongest chute, posts should be no farther than 6 feet apart, located on the non-animal side of the chute walls (1).

The Crowding Pen

This pen is designed to funnel a group of cattle into the working chute. The pen should have one straight side and the other at a 30° angle as it approaches the working chute. This design helps cattle to form into a single file. Crowding pens that funnel down on both sides simultaneously cause cattle to “jam up” in the opening of the working chute (2). The crowding pen should accommodate 10 to 15 animals at a time (1). Larger groups are more difficult to work with. In more sophisticated facility designs the crowding pen may be circular with a central swinging gate (2). The swinging gate should be about 10 feet in length (1). Experience has shown that the crowding pen will work more efficiently with solid sides (1).

The Extras!!

Several fixtures can be added to a handling facility to provide extra capacities. A scale can be built into the working chute (or the facility constructed so it can be added later). A scale is placed just behind the holding chute. With dairy management becoming more sophisticated, knowing the body weight of heifers, calves and cows is important for monitoring growth and developing management goals.

Another beneficial extra would be a loading ramp or chute. Placed outside the handling facility as a spur, a loading chute prevents the need for trucks to enter the cow yard and increase the risk of compromising biosecurity. Loading (and unloading) chutes can either be sloped or stepped. In either case a maximum incline of 3.5 inches of rise per 1.0 foot of run is recommended (1). If the ramp is stepped the treads should be no less than 18 inches apart and rise no more than 4 inches (1). Concrete steps should have a broom finish. Sloped wooden flooring can be improved by bolted 1 by 3 inch hardwood cleats 6 inches on center (1). Ramps should be no wider than 30 inches (1).

Safety First!!

Regardless of the way cattle are moved, restrained, or handled on a farm, the primary goal for everyone is safety: the safety of people and the animals. The reasons for handling or working with cattle are many. The goal is to get the job done as efficiently, quickly, and quietly as possible. The other goal is injury avoidance. Time spent planning to minimize problems, will pay dividends later. As the plan devel-
Putting Consistency into Practice with SOPs

Phil Durst  
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Northeast Lower Michigan

With an eye to continually improve profit on his dairy, Mike Moeggenberg of Shepherd, implemented standard operating procedures (SOPs) for fresh cows at the beginning of this year. High milk production in early lactation make these the most profitable days in a year of the cow’s life, but early lactation health problems that increase veterinary costs result in lost cows and decreased production of milk and thus steal profit. Improving the transition of cows through this stressful time and reducing health problems improves profitability.

Having seen the standard procedure recommended by Dr. Upham, a California veterinarian, in Hoard’s Dairyman magazine, Mike implemented it with several changes on his farm. Dr. Upham, whose practice serves large dairies in the San Joaquin Valley, says, “my clients have become firm believers in these approaches to the postpartum cow.” He goes on to say that many clients “feel that their cows peak higher, lose less body condition and do not require routine uterine infusions...” The results of following those SOPs have been pleasing to Moeggenberg, as well. More of his cows begin lactation without the problems that were common in the past.

The SOPs used by Moeggenberg include standard monitoring and treatment actions for all cows. For the first 10 days of lactation, daily rectal temperatures are taken on all fresh cows. Glucose is given routinely, both intravenously and subcutaneously, and treatment regimens are standardized depending on the occurrence of fever or other indicators of problems.

The Point of SOPs

SOPs specify actions that are standard for all animals that meet certain criteria. In this case there are standard procedures for all fresh cows no matter what lactation, and standard procedures when there is fever. Because procedures are standardized and the SOP is written down, there is greater consistency in how cattle are managed and treated. Consistency is practiced whether Moeggenberg or his employee deal with the fresh cow, and that consistency makes it easy to evaluate the success of the practices.

To make sure that SOPs are followed completely, Mike uses individual note pads on clipboards where information is recorded. Each time a cow or heifer freshens, events are recorded on a blank note pad. Every treatment or action is subsequently recorded. With a glance, Mike can monitor what has been done with each fresh cow through time.

Standard operating procedures are simply management tools that can help you achieve your goals. The SOP was not the goal. Mike’s goal was to increase the performance of fresh cows. The SOP helped him to do that by consistently applying a monitoring and treatment program to all cows. Consistency doesn’t just happen on the dairy farm. An SOP is a deliberate attempt to make it happen.

Developing, Implementing SOPs

Developing standard procedures allows you to take an area of management and work out ahead of time how it will be handled. That provides the opportunity to gather input from people you rely on for advice as well as to get input of those who will have to implement the practice. Therefore, communication between partners, owners, employees and service people is improved greatly.

When the decision is made ahead of time about how cows are to be handled, then a decision does not need to be made each time a cow calves, or some other criteria are met. That saves time for the owner, and reduces the interruptions by employees asking what to do.

Michigan State University Extension recommends developing SOPs to help you manage your dairy. In the winter program series, Investigating Disease on the Dairy Farm, we discussed how SOPs can help in both disease prevention and the investigation of problems. An article discussing the use of SOPs in investigating herd problems will appear in a later edition of this publication.

SOPs also may be of benefit to standardize tasks that may be done by any...
one of several people, to make changes in an area of recurring problems, or as a good reminder for something that does not come up that often. For instance, consider SOPs for these situations: management and treatment of purchased animals; orientation of new employees; implementing new colostrum feeding protocol; plans for action when bacteria count exceeds a certain level; or, plan for handling a chemical or manure spill.

Jim Winkel of McBain has nine standard protocols that he has developed and written down. These cover the course of action for various cow problems including milk fever, retained placenta, ketosis, metritis, mastitis, sore feet, pneumonia or respiratory problems, high rectal temperature and displaced abomasum (DA).

He developed them in 1995 as the operation was growing beyond the point where he was responsible for treating all problem cows. He began by writing down the treatment routines and then had his veterinarian and nutritionist critique them.

Besides Jim, his herdsman and assistant herdsman use the procedures. Jim says that it would be good for a manager to just read over the SOPs monthly to make sure that he or she wants to continue following the same procedure, or decide if there are changes to be made. Every time Jim updates an SOP, he notes the revision date and notifies his employees of the change.

Standard operating procedures are meant to cover the basic situations that can be handled routinely. However, flexibility is still required because there always will be individual cows that for some reason or other don’t fit the routine. Recently at the Winkel’s a 2-year-old with an udder that made her an unlikely candidate to be re-bred presented a DA. Therefore, the herdsman made the decision to deviate from the SOP for the DA occurrence, and a less expensive surgery was performed. In this situation, and any time someone departs from the written protocol, the reasons are communicated to the manager or employees to make sure they understand and are in agreement.

Now what about your dairy? Are there areas of management that would be improved by implementing SOPs?

Decide where an SOP might help you meet a goal in your operation. Maybe there have been areas of recurring problems. What standard procedures will avoid those problems? Get input from your management team on the course of action when certain criteria are met. As Jim Winkel and Mike Moeggenberg have done, keep these criteria simple and consistent so that initiation of the SOP is clear-cut.

Talk over the SOP with everyone involved in its implementation to make sure that it is both practical and detailed enough. Check it out with a dry run and make sure any tools or materials required in the SOP are available and handy.

Be sure all SOPs are written down. They may be kept in a manual or written on large cards. Both should be accessible to those responsible for using the SOPs. Large cards should be laminated and posted where they will be needed, such as posting the SOP for calving assistance in the maternity pen. Make sure that everyone reads the SOPs (in a language they understand) and importantly, make sure everyone, especially you, follows them.

SOPs for Your Business

Standard operating procedures are a management tool of business, whether the business is producing milk or a business in the industrial park or downtown. They are a tool to ensure that an operation achieves management goals no matter who is working. The increased communication and freedom from making a decision every time a particular situation occurs makes SOPs a welcome tool. The benefits of developing and implementing SOPs are for dairy managers regardless of the size of their operation. Even yours!

If you have developed SOPs or do so in the future, we’d like to hear about it. Please send a copy to Pam Jahnke in the MSU Department of Animal Science at Michigan State University, 2265L Anthony Hall, East Lansing, MI 48824-1225 or fax it to her at 517-432-0147. The MSU Extension Dairy Team will be developing a template to help producers write their own SOPs. It would be great to have some examples from your operation, and we’d be glad to hear what you are doing!

Computers vs. Cows: The Problems With Computer Models

Mike VandeHaar
Dept. of Animal Science

Fred Barclay was miserable. He had seen average milk production drop in the past year from 85 to 55 lb/cow per day. When his feedman couldn’t help, he called in experts. Feed company experts. University experts. They all used fancy computer programs. One added urea. Another added more soybean meal. Another threw his hands up in despair and suggested the problem was disease. But one just sat on a hill and watched the farm. He was especially interested in watching Herb, the feeder. He watched Herb drive the loader to the bunker silo and get some corn silage. He noticed that Herb apparently had scooped up exactly the right amount—he didn’t go get more corn silage and he didn’t carry any back to the bunker. Then did the same thing with cottonseeds. And with high-moisture corn. And the soybean meal. Apparently Herb had a remarkable ability to quantify feeds by sight. He always scooped up exactly the right amount of an ingredient with the loader—never too little and never too much. What was...
Herb’s trick? Was it luck? Was it experience? Was there an electronic scale on the loader tractor? Well, as it turned out, Herb wasn’t really reading the mix sheets because they confused him and he was too embarrassed to tell anybody. Once Fred helped Herb, production started bouncing back (1).

So the experts balanced and fussed with their computers. They sounded sophisticated and impressive and had diets perfected to the nearest gram. But of course, Herb added feeds to the nearest loader bucket.

Accuracy vs. Precision

Which of the following statements is more accurate?

1.) This ration needs a couple more pounds of soybean meal.
2.) This ration needs 2.046 pounds more of soybean meal.

Accuracy is how close a value is to the true actual value. Statement 1 sounds like a guess and was made without using a computer program; it is not precise, but it might be accurate. Statement 2 is precise and requires a complex computer model. Our natural tendency is to think that greater precision means greater accuracy, but precision has nothing to do with accuracy! Statement 2 might be precise, but it might be completely inaccurate.

The basic problem with computer models is that they rely on equations. And equations rely on observations, many of which may not be accurate. But whether the equation is accurate or not, you can always get an answer that has lots of decimal places. Because it is precise, it gives the appearance of accuracy. So the model predicts that the cow is absorbing precisely 72.45 grams of methionine per day, and the requirement is precisely 78.52 grams per day. The equations had coefficients with several decimal places. For example, protein gain of the uterus was 0.13266 times empty uterus weight, which was a function of day of pregnancy. These precise equations, however, didn’t add up to much protein, so I could not understand his recommendation to feed dry cows bypass protein. I asked him how the overall model could suggest such a need. What did I find? The developers didn’t like the numbers that the precise equations gave, so they arbitrarily decreased the conversion efficiencies to double the protein requirement. The result was that dry cows needed bypass protein. And with all that precision in the equations, most folks assumed the high bypass protein requirement was accurate.

My point is not to complain about any particular model, but to illustrate the problems with developing computer programs for dairy nutrition. And as I develop dry cow equations for the next version of Spartan, I am still not satisfied with any existing model. We have research data to develop equations for energy and protein requirements of dry cows, and we have equations to predict feed intake, but when I put those together, the resulting energy and protein densities are lower than I would recommend based on feeding studies with different diets. Precision does not translate into accuracy.

How Accurate are Computers?

All dairy nutrition computer programs use some sort of model. This model is simply a set of mathematical equations and tables that attempt to describe the way dairy nutrition works. Some models are simple. Some are more complex. But none come close to accurately describing the complex system of a cow and her diet and predicting her response to that diet.

Specifically, our major problems with models are that we cannot accurately measure or predict:

1. the energy value of feeds, especially forages;
2. the responses in feed intake, milk production, and body gain to dietary changes;
3. the ruminal fermentation or degradation of feeds;
4. the fiber requirement of cows;
5. the flow of microbial protein from the rumen to the small intestine; and,
6. the amino acid composition of feeds, the profile of amino acids actually absorbed by cows, or the use of amino acids by the small intestine and liver.

The energy value of a feed cannot be directly measured. We can only estimate it based on its content of acid-detergent fiber (ADF), neutral-detergent fiber (NDF), lignin, starch, protein, and fat. But some NDF is not very digestible, and although lignin concentration helps, we cannot accurately predict NDF digestibility (2). This is exacerbated by the fact that we can’t accurately predict ruminal passage rates of individual feeds and their components. Consequently, we might have an idea of ruminal digestion rates, but we can’t accurately predict total ruminal fermentation of carbohydrates or degradation of proteins. Without knowing the production of ruminal fermentation acids, we can’t accurately predict how much fiber is needed to stimulate salivation and buffering of the system. And without being able to accurately quantify ruminal fermentation and predict ruminal passage rate, we can’t accurately predict microbial protein flow. Consequently, one of the major problems with amino acid
models ultimately comes down to our inability to predict ruminal passage rates and ruminal pH. And although some computer models include estimates of passage rates for feeds, they are inaccurate. We are skeptical that this problem will be solved any time in the next 10 or maybe even 50 years. Furthermore, there is much we do not understand about the regulation of feed intake and nutrient partitioning in cows. Thus, we might make a diet change that should provide more energy for milk production, but the cows might eat less. Or maybe they partition most of the extra energy to body fat.

To illustrate the problem, let’s examine the microbial yield equation from the Cornell Net Carbohydrate and Protein System (CNCP) as published by O’Connor et al. (3). This model incorporates much of the best research data available. To validate the model, the authors examined the relationship of the flow of bacterial protein to the small intestine predicted from the model to that observed from several data sets including young heifers up through cows producing 90 lb/day (r²=0.76 across all animals). They found that for many feeds, the variation in actual bacterial protein flow. However, when I reanalyzed the relationship with only the data from cows producing more than 55 lb of milk, the model accounted for only 2% of the variation in bacterial protein flow. Thus, while giving the appearance of accuracy, the model may have been worse than an educated guess for the flow of ruminal bacterial protein production in the model of the Cornell Net Carbohydrate and Protein System (3). This graph compares the flow of bacterial crude protein (CP) to the small intestine observed in several studies with the flow predicted by dietary intake and animal characteristics in the CNCP model. The model is reasonably accurate when considering all cattle from young heifers to cows producing 90 lb/day (r²=0.76 which means that changes in predicted flow matched changes in observed flow 76% of the time). However, the model lacks accuracy when only the high producing cows (enclosed in the oval) are considered (r²=0.02). Lack of accuracy in predicting ruminal microbial protein production is a major problem with all computer models.

![Graph showing validation of ruminal bacterial protein production](image)

**Figure 1.** Validation of ruminal bacterial protein production in the model of the Cornell Net Carbohydrate and Protein System (3). This graph compares the flow of bacterial crude protein (CP) to the small intestine observed in several studies with the flow predicted by dietary intake and animal characteristics in the CNCP model. The model is reasonably accurate when considering all cattle from young heifers to cows producing 90 lb/day (r²=0.76 which means that changes in predicted flow matched changes in observed flow 76% of the time). However, the model lacks accuracy when only the high producing cows (enclosed in the oval) are considered (r²=0.02). Lack of accuracy in predicting ruminal microbial protein production is a major problem with all computer models.

How Should We Balance Diets?

Models give guidelines. They may be precise but they are only rough approximations and generalized to meet the needs of most farms—they cannot be used to fine-tune a ration. Too often, people get caught in the details of a model. They try to balance the diet to meet absorbed methionine or rumen-protected methionine regardless of what a computer model tells them. Then monitor performance of the cows to decide if they benefited from it or not.

![Graph showing validation of ruminal bacterial protein production](image)
Getting More Milk from Forages

Mike Allen and Masahito Oba  
Dept. of Animal Science

Forages supply a significant portion of the energy and protein used for milk production. However, they are not always the most economical sources of energy and (or) protein. Volatility of feed ingredient prices and weather conditions during forage growth and harvesting can dramatically affect the value of nutrients in forages relative to other feed ingredients. Feeding strategies should reflect the relative values of nutrients among feeds; when forages are relatively expensive, diets should be formulated with minimum forage and when forages are a bargain, diets should be formulated to maximize forage use.

There are additional limits to the range in forage content of diets that are independent of the relative prices of ingredients. Cows consuming diets with inadequate forage content are more likely to have ruminal acidosis, which might decrease fiber digestibility, microbial protein production, and milk fat content, as well as increase incidence of health problems such as laminitis and displaced abomasums. This is because forages are higher in fiber than most other feed ingredients and fiber helps prevent ruminal acidosis. Fiber generally ferments less rapidly than starch and sugars so high fiber diets result in a less severe drop in ruminal pH after meals. In addition, long forage fiber stimulates chewing and secretion of salivary buffers, which neutralize fermentation acids in the rumen. Increasing the forage content of the diet provides a more consistent fermentation and increases stability of rumen pH. However, cows consuming high forage diets are more likely to have dry matter intake limited by physical capacity of the rumen. Fiber is more filling than other feed components because it is more slowly fermented and has a longer retention time in the rumen. High forage diets are more likely to limit milk production, increase loss or decrease gain of body condition, increase incidence of ketosis and decrease reproductive performance. When groups of cows are fed a total mixed ration, feed intake of some cows in the group will be limited by physical fill more than others. The most profitable feeding strategy is one that considers both costs of feed ingredients and animal performance.

Fiber digestibility of forages is variable and has a large effect on animal performance. More digestible fiber is less filling because it is retained in the rumen for a shorter period of time. Because it is less filling, diets containing highly digestible fiber allow greater dry matter intake for animals with intake limited by physical fill. The objective of this article is to answer some common questions about fiber digestibility of forages and strategies to maximize benefits of forages with high fiber digestibility.

Q: How variable is fiber digestibility of forages?  
A: Extremely variable! Ruminal neutral detergent fiber (NDF) digestibility of forages range from less than 25% to more than 75%. However, not all of this variation is from forages alone. Characteristics of the animal and non-forage feed ingredients modify the maximum NDF digestibility of forages. Individual animals have different retention times in the rumen because of differences in rumen size, level of feed intake, and chewing efficiency; and other dietary ingredients affect ruminal pH, microbial populations and microbial activity. NDF digestibility of forages is best compared using in vitro rumen
fermentation. In vitro rumen fermentation is conducted by incubating forages that have been dried and ground with ruminal microbes for a specific period of time (~30 hours for dairy cows). In vitro fermentation eliminates many factors that affect NDF digestibility in experiments with animals and therefore allows a more fair comparison of feeds. In vitro NDF digestibility varies from 25 to 60% for both alfalfa and corn silage grown in different environments. Any way you look at it, NDF digestibility is extremely variable.

**Q: When will NDF digestibility affect feed intake?**

**A:** When physical fill of the rumen limits dry matter intake. This means that under some circumstances, enhanced NDF digestibility increases dry matter intake and in other situations it does not. It is unlikely that feed intake amongst all cows in a group will increase to the same extent when a forage with higher NDF digestibility is fed because all cows in the group will not have feed intake limited by physical fill to the same extent. Some cows might not have feed intake limited by fill at all. Generally, feed intake of higher producing animals is limited by physical fill to a greater extent than higher producing animals and feed intake of animals consuming higher forage diets is limited by physical fill to a greater extent than that of animals consuming high grain diets. High producing herds, herds that maximize forage feeding, and high-group cows will benefit most from forages with high NDF digestibility.

**Q: How much effect can NDF digestibility have on milk yield?**

**A:** A dramatic increase in milk yield from forage with enhanced NDF digestibility was reported by Nebraska researchers who compared normal sorghum silage and a brown midrib (BMR) sorghum silage fed to mid-lactation dairy cows. The BMR sorghum silage had higher NDF digestibility in vitro and slightly higher NDF content than the normal sorghum silage. The silages were included in total mixed rations at 65% of DM (35% concentrates). The cows consuming the BMR sorghum silage with higher NDF digestibility consumed 24% more (~11 lb per day) feed and produced 46% more (~18 lb per day) milk. Although these were not high producing cows (average milk yield was 50 lb per day), physical fill probably limited feed intake because they were fed high forage (65%), high NDF (>40%) diets.

We recently compared a low lignin corn hybrid containing the brown midrib 3 (bm3) mutation to a normal hybrid using cows with high milk yield. The corn silages were included in total mixed rations formulated to contain 56% forage with 80% of the forage as corn silage and 20% of the forage as alfalfa silage. In vitro NDF digestibility averaged 49% for the bm3 corn silage and 39% for the normal corn silage. When the cows were offered the bm3 corn silage, they ate 4.4 pounds more feed per day, produced 5.5 lb more milk per day and gained more body condition than when they were offered the normal corn silage. Milk yield before the experiment of the 32 cows in our study ranged from 65 to 120 pounds per day. Cows producing 120 pounds of milk per day had an average improvement of over 15 pounds per day from the bm3 corn silage but those producing less than 75 pounds of milk per day had little or no improvement in milk yield. This implies that the highest producing cows were most limited by physical fill and benefited most from the lower filling effects of the highly digestible NDF in the bm3 corn silage. Furthermore, feed intake of the lower producing cows was not limited by physical fill with this diet.

In another experiment, we compared bm3 corn silage to normal corn silage in diets formulated to provide 29% or 38% NDF. The low fiber diets averaged 42% forage and the high fiber diets averaged 66% forage. The bm3 corn silage increased feed intake and milk production at each level of forage in the diet, and, as expected, the higher NDF digestibility corn silage was more beneficial when offered in the high forage diet (Table 1).

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<tr>
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<th>29% NDF diet</th>
<th>38% NDF diet</th>
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<tbody>
<tr>
<td>Dry matter intake, lb/day</td>
<td>52.6</td>
<td>54.3</td>
</tr>
<tr>
<td>Solids-corrected milk yield, lb/day</td>
<td>69.5</td>
<td>72.4</td>
</tr>
<tr>
<td>Body weight change, lb/day</td>
<td>1.7</td>
<td>2.4</td>
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Table 1. Effects of enhanced in vitro NDF digestibility of corn silage from the bm3 mutation on feed intake, milk yield, and body weight change when offered in diets formulated at two concentrations of NDF.

Cows offered bm3 corn silage in a high NDF diet produced as much milk as when they were offered the bm3 corn silage in a low NDF diet. Although energy intake was higher when consuming the low NDF diet, a substantial amount of energy was partitioned to body condition. However, when cows were offered the normal corn silage in a high NDF diet, they produced 4.6 lb less milk than when they were offered the same silage in a low NDF diet. This observation has important practical implications. When cows consuming TMRs are switched from a low forage diet to a higher forage diet to prevent excessive body condition gain, forages with high NDF digestibility might allow the cows to maintain milk yield. Because of this, forages with high NDF digestibility might also benefit cows in mid- to late-lactation when they are fed higher forage diets to prevent excessive body condition gain.

We also evaluated the effect of enhanced NDF digestibility across a wider range of forages using data reported in the literature and found that enhanced NDF digestibility of for-
age increased dry matter intake and milk yield. One unit increase of NDF digestibility was associated with 0.37 lb increase in dry matter intake and 0.51 lb increase in milk yield. This analysis demonstrates that enhanced NDF digestibility is an important factor affecting feed intake and milk yield over a wide range of conditions.

Summary
Fiber digestibility is extremely variable among forages and is an important measure of forage quality. Forages with high NDF digestibility have the potential to increase feed intake and milk yield. Benefits of enhanced NDF digestibility on animal performance are greater for high producing cows and when high forage diets are fed.

Genetics
Ted Ferris
Dept. of Animal Science
Kathy Lee
Extension Dairy Agent
Northwest Lower Michigan

In August several changes were incorporated in the genetic evaluations of dairy bulls and cows. These changes include:
• genetic base updates for yield and type traits
• adjustments for true protein
• modifications in the Net Merit (NMS) calculation
• a revised Type-Production Index (TPI) formula for Holsteins

Genetic Evaluations Change

It will be helpful for you to know the changes in predicted transmitting abilities (PTAs) for various yield, fitness/health, and type traits. Table 1 shows the approximate changes in August PTAs due to the base change. Note that the minus sign indicates that the average PTA decreased with the base adjustment.

As an example, let’s say that Holstein Hank’s PTA Milk in May 2000 was +2170 lb. We expected his PTA Milk in August 2000 to decrease by 670 lb due to the genetic base change. If no other changes occurred in the amount of daughter, parent, and other relative information available, we would have expected his August 2000 PTA for milk to have been +1500 lb. Of course, we know that additional information is usually incorporated in each subsequent genetic update, and improvements can be made in the genetic evaluation procedures. Consequently, changes in August 2000 PTAs for individual animals reflect the base change plus availability of additional information and PTA computation refinements.

Genetic base updates present a great opportunity to review your breeding program. Are you selecting service sires based on the traits that reflect your herd goals? Do you need to update the selection criteria for the traits you are focusing on?

Remember that genetic evaluations are used to rank animals based on genetic merit. A specific PTA value is more meaningful when you know where that value ranks among all animals from which you are selecting. Percentile rankings are available for Net Merit to help you determine the relative superiority of service sires. To maximize genetic improvement in your herd, it is recommended that you select sires at or above the 80th percentile. See Table 2 for NMS levels of top percentiles for AI sires.

Table 1. Approximate changes in August 2000 PTAs due to genetic base update.

<table>
<thead>
<tr>
<th>Trait</th>
<th>Ayrshire</th>
<th>B. Swiss</th>
<th>Guernsey</th>
<th>Holstein</th>
<th>Jersey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk (lb)</td>
<td>-364</td>
<td>-536</td>
<td>-510</td>
<td>-670</td>
<td>-550</td>
</tr>
<tr>
<td>Fat (lb)</td>
<td>-12</td>
<td>-22</td>
<td>-20</td>
<td>-20</td>
<td>-18</td>
</tr>
<tr>
<td>Protein (lb)</td>
<td>-10</td>
<td>-18</td>
<td>-18</td>
<td>-20</td>
<td>-20</td>
</tr>
<tr>
<td>Productive Life (mo)</td>
<td>-0.6</td>
<td>-0.3</td>
<td>-0.5</td>
<td>-0.5</td>
<td>-0.9</td>
</tr>
<tr>
<td>Final Score</td>
<td>-0.36</td>
<td>-0.46</td>
<td>-0.72</td>
<td>-0.54</td>
<td>-1.05</td>
</tr>
</tbody>
</table>


True Protein
One requirement of the recent Federal Milk Marketing Order reform was the change to testing for true protein. Prior to January 1, 2000 the milk cooperatives and processors determined crude protein in milk by measuring true protein combined with...
nonprotein nitrogen. Now they test for true protein only, which is approximately -0.2 % lower than crude protein.

Beginning on May 1, 2000 all DHIA laboratories across the US also began testing for true protein. Subsequently, protein production data reported to USDA since May 1 for use in genetic evaluations is based on true protein. USDA converts the DHIA data collected before May 1 to true protein by adjusting the protein records by -0.19 percent. As of August 2000, US genetic evaluations for protein yield and percentage are based on true protein. However, genetic rankings of animals based on PTA protein are not affected by the change to true protein testing.

**Purpose of indexes**

Selection indexes have been used for some time by producers and AI organizations to rank bulls and cows. A selection index is a formula that combines two or more traits into a single value using weights based on known economic values such as milk price or estimates of desired emphasis of a trait. An example is milk-fat-protein dollars (MFP$):

\[
\text{MFP$} = \$0.10(\text{PTA Milk}) + \$1.15(\text{PTA Fat}) + \$2.55(\text{PTA Protein})
\]

where each predicted transmitting ability (PTA) in the calculation is weighted by its economic value. Milk prices used here were obtained from average U.S. prices over recent years. A current base price of $12.70 is assumed.

The purpose of an index is to select parents for genetic improvement in more than one trait and do it in an organized fashion. Ranking all sires based on an index acts as a simple filter to locate sires that have the desired combination of characteristics. The weights are used to give proper consideration to a sire’s strengths and weaknesses.

Consider MFP$. When MFP$ is computed, three traits are multiplied by their economic value and added together. Using this index, sires that are high in milk and low in protein yield will be considered over sires lower in milk and higher in protein yield only if their combination of the economically weighted traits or MFP$ ranks them higher.

When deciding which index to use to rank bulls, first determine what your breeding goals are. Then look at the various indexes available. Which index has the appropriate traits with the appropriate weights? NMS may fit many commercial producers’ goals which include functional type (i.e., udder, feet, and legs) and lifetime income. With a list of bulls based upon NMS, you can determine how the service sires you plan to use rank among all active AI bulls by looking at the percentile average for the selected group. You should be able to get a group to average above the 80th percentile if your main goal is to improve production and functional type.

**Changes in Net Merit (NMS)**

USDA changed the NMS formula to incorporate additional factors that influence lifetime revenues and expenses for dairy cows. NMS now is defined as the expected lifetime profit expressed relative to the base population for the breed. Because the new index represents lifetime merit, as opposed to a single mature equivalent (ME) lactation merit used prior to August 2000, NMS is adjusted for the number of expected lactations for each cow based upon the cow’s and her relatives’ information for “longevity”.

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

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

General descriptions of the three sub-indexes follow.

a.) **Yield$** is the expected milk income minus additional feed costs.

b.) **Udder$** includes PTA for udder (PTA Udder) and PTA for somatic cell score (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.

c.) **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 (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.

### Table 2. NMS levels of top percentiles for AI sires by breed for August 2000 USDA genetic evaluations.

<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=23)</td>
<td>203</td>
<td>236</td>
<td>264</td>
<td>337</td>
<td>354</td>
<td>386</td>
<td>447</td>
</tr>
<tr>
<td>Brown Swiss (n=47)</td>
<td>250</td>
<td>284</td>
<td>316</td>
<td>359</td>
<td>373</td>
<td>394</td>
<td>450</td>
</tr>
<tr>
<td>Guernsey (n=22)</td>
<td>253</td>
<td>295</td>
<td>330</td>
<td>340</td>
<td>387</td>
<td>390</td>
<td>406</td>
</tr>
<tr>
<td>Holstein (n=609)</td>
<td>284</td>
<td>317</td>
<td>347</td>
<td>388</td>
<td>419</td>
<td>442</td>
<td>478</td>
</tr>
<tr>
<td>Jersey (n=86)</td>
<td>275</td>
<td>294</td>
<td>321</td>
<td>343</td>
<td>352</td>
<td>372</td>
<td>403</td>
</tr>
</tbody>
</table>

"n=“ indicates the number of bulls in the current Active AI population for each breed.
The relative weightings for the three sub-indexes in the revised NM$$ index are:

- 67% Yield$ to 16% Udder$ to 17% Other$

As technology and the addition of accurate information on traits that affect lifetime merit have become available, new traits have been added to merit indexes. This process is likely to continue.

**Changes in TPI Formula**

The Holstein Association also made changes in its Type-Production Index (TPI) in August. These changes were made to:

- increase the emphasis on milk fat in order to bring the weightings of fat and protein closer to their current multiple component prices;
- include productive life and somatic cell score information; and;
- increase the relationship between TPI and the overall breeding objective for high producing long-lasting cows.

The new TPI includes:

- two production traits: PTA Fat and PTA Protein;
- three type components: PTA Type, Udder Composite, and Feet & Leg Composite; and
- two fitness traits: PTA Productive Life and PTA SCS.

The relative emphasis on production, type and fitness is 57%, 29%, and 14%, respectively.

**Take Home Message**

Genetic improvement is one of the best tools dairy farmers have for increasing their profits. Like compound interest, genetic gains in dairy herds using superior sires grows annually. Today, the tools are better than ever and improvements in these tools will continue. Making optimal use of these selection tools such as indexes and keeping abreast of changes in the genetic base will allow producers to set appropriate goals and benefit from genetic improvement in the years to come.

**References**

4. USDA Animal Improvement Programs Laboratory(AIPL):http://aipl.arsusda.gov/

**Over $50,000 in Scholarships Awarded to Dairy Students**

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**Miriam Weber**
Dept. of Animal Science

The Michigan Dairy Memorial and Scholarship Foundation, Inc., set a new record in the amount of scholarship funding provided by the Foundation in 1 year to students with a dairy interest at Michigan State University. Twenty-one scholarships totaling more than $50,000 were awarded to current and incoming students.

The Foundation has honored 127 dairy leaders in Michigan since its founding in 1955. Individuals honored during the last year include Clancy Aerts, Max Graybeil, Paul Meredith, Frank Merriman, Weldon Pollard, Jack Schut, and Ed Smiley.

The Foundation recently was ranked 10th at MSU in the amount of money spent for scholarships. To date, over 300 MSU students have received scholarships totaling over $530,000. This year, scholarships were awarded to the individuals listed below.

In addition, 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, 3 Dairy Memorial Scholarship recipients mentioned later in this article also received $1,200 Howard Cowles Dairy Scholarships for the upcoming academic year: Sarah Krippes, Christina Mitchell, and John Whitmore.

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

- **Betsy Atherton**
  Grew up on a family dairy farm in Gaines. Over the years, Betsy purchased and raised twelve dairy animals that she showed at the local and state levels. In addition, Betsy participates in FFA, 4-H, basketball, National Honor Society, and band at Byron High School.

- **Jeremy Brenner**
  Plans to study dairy management at MSU, with a goal of returning to his family dairy farm in Litchfield in the future. Jeremy has held offices in FFA, 4-H, and his high school class and participated in football and basketball. Jeremy is heavily involved on the farm and has worked for other dairy farmers in his area.

- **Kristin Kramer**
  Grew up on a dairy farm in Harbor Beach. Kristin participates in FFA, 4-H, National Honor Society, and Michigan Junior Holstein Association. Kristin works with her parents on cow and calf management on their farm and has shown dairy cattle since she was 9 years old.

- **Beth Munsell**
  Credits her family farm background in Fowlerville and involvement in youth activities for sparking her interest in an Animal Science major at MSU. Beth was a member of the 1999 Michigan 4-H Dairy Judging Team and is active in other 4-H and industry youth activities. Also, Beth
attended the 1999 American Legion Auxiliary Michigan Girls’ State.

**Lora Sommers** graduated from Kellogg Community College in May with an Associate’s Degree in science. Lora currently works at Murphy Dairy Farms and with the Calhoun County Agricultural and Industrial Society in coordination of activities. She has been involved extensively as an officer in FFA and 4-H. Lora plans to become an agriscience teacher at the high school level.

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

**Jeremy Arend** from Baroda will be a senior in Agribusiness Management. Jeremy completed the 2-year Ag Tech Dairy Management program and currently participates in Alpha Gamma Rho and Dairy Club. He interned with Cargill Animal Nutrition this summer, and plans to complete a Graf undergraduate research project with Dr. Chris Wolf in Agricultural Economics this fall.

**Abby Gordon** grew up on a dairy farm in Saline. Abby is a junior in Agribusiness Management and plans to work as a loan officer in the agricultural industry. Abby has participated in 4-H, Dairy Club, as an FFA state officer, as an Ambassador for the College of Agriculture and Natural Resources (CANR), and works for the MSU Extension Service as a Project Assistant.

**Mary Haase** from Alma, is a second-year student in the Ag Tech Dairy Management program this fall. Mary currently works as a herdsperson on the Feldpausch Dairy in Fowler. She has participated in FFA, 4-H and in the MSU Dairy Club. Mary’s future plans include owning a dairy farm.

**Attalee Hardy** is a sophomore in Animal Science, with a focus on becoming a veterinarian. Attie comes from North Adams, Michigan, and works in her spare time on a large dairy farm near Jonesville. She has participated in 4-H and FFA, and was elected to a state FFA officer position for 2000-2001. Attie is an intern at Northstar-Select Sires and Michigan DHIA.

**Michelle Hyde** from Morley, Michigan is a senior in Agriculture and Natural Resources Communications. She participates in the Bailey Scholars Program, MSU National Agri-Marketing Association, Agricultural Communicators of Tomorrow, MSU Dairy Club, and Michigan Junior Holstein Association. Michelle is working as an intern at Northstar-Select Sires.

**Walter Iciek** grew up in Gladwin, where he lived and worked on his family’s dairy farm. Walt participated extensively in 4-H, as an FFA state officer, and on the family dairy farm. In addition, Walt currently works as an intern for Lt. Gov. Dick Posthumus. Walt is a junior in Agriscience Education.

**Sarah Krippes** from Howell, is a senior in Animal Science. Sarah works at the MSU Dairy Farm, as a research assistant in the Department of Animal Science, and as assistant manager at her family’s Maplekey dairy goat farm. In addition, Sarah participates in the MSU Dairy Club and Sigma Alpha. Sarah plans to obtain her doctorate and work at a university in reproductive physiology.

**Brandon Lupp** from Sebewaing, is a sophomore in Agriculture and Natural Resources Communications. Brandon served as a FFA state officer and participates in the MSU Bailey Scholars Program and the MSU Honors College. Brandon plans to work in public policy with an emphasis on agriculture and natural resources.

**Katie McCune** grew up on a family farm in St. Louis, Katie served as the State FFA Secretary and owned 25 Holsteins during high school in a partnership with her brother. Katie is a sophomore in Agriculture and Natural Resources Communications at MSU. She currently works for the Michigan Cattlemen’s Association as managing editor.

**Christina Mitchell** grew up on a family dairy farm in Hersey, where she worked as a herdsperson. She participated in 4-H and Farm Bureau youth activities, worked at a veterinary clinic as a veterinary assistant, and as Vice-President of the MSU Dairy Club. Christina interned at Yoplait U.S.A. this summer. She is a junior in Animal Science and plans to return to the family dairy farm.

**Angela Paradine** from Coldwater is a senior in Food Science. Angela participates in the MSU Bailey Scholars Program and is Historian of the MSU Food Science Club. She currently works in the laboratories of two professors in Food Science and Human Nutrition. Angela plans to obtain her doctorate in Food Science and work in research, with a focus on human nutrition.

**Melissa Siemen** grew up on a family dairy farm in Harbor Beach, where she works as an assistant calf manager. Melissa has participated extensively in FFA and 4-H and is a member of the Michigan Junior Holstein Association. She is a member of National Agri-Marketing Association and Sigma Alpha at MSU. Melissa is a sophomore with a double major in Agriculture and Natural Resources Communications and Advertising.

**Laurie Tolan** lived on a family dairy farm in Ossineke, where she has assisted with herd management since she was 14. Laurie participates in the MSU Dairy Club, Rodeo Club and is the Treasurer of the MSU Pre-Veterinary Medical Association. Laurie works at the MSU Veterinary Clinic and completed a work experience with Phil Durst, Dairy AoE Extension Agent. Laurie plans to enter veterinary school at MSU.

**Carrie Vollmer** grew up on a family farm in Edon, Ohio where she raised dairy and beef show cattle. She has participated in 4-H, FFA, as President of Sigma Alpha sorority, Student Senate, and in the National Agri-Marketing Association. Carrie is a junior in Agriscience Education and plans to become an agriscience teacher.

**John Whitmore** grew up on a family dairy farm in Ithaca. He is a senior in Animal Science and plans to return to the family farm after graduation. He is involved heavily on the farm and also works as an independent seed sales representative. John has worked in the MSU Meats Lab and in a dairy...
First Annual Dairy Challenge Initiated at MSU

Ben Church
Junior, ANR Communications

With the arrival of the new century, many new and innovative changes are happening within the dairy industry and at Michigan State University, especially in the way students are educated. This year the Department of Animal Science hosted the first annual Dairy Challenge on Friday and Saturday, April 7 and 8. The Dairy Challenge is a 2-day experience for MSU students in evaluation of dairy farm management designed to acquaint and challenge students with their knowledge of recommended practices and principles. The Dairy Challenge represents one element of the Dairy Associates Program being established in the Department of Animal Science.

A Challenging Forum

The event’s purpose is to create a challenging forum for undergraduates with dairy interests to evaluate critically dairy management practices on commercial dairy farms, and then develop presentations of their assessment for a panel of experts. It also provides students with the opportunity to meet and interact with representatives in the industry. “It’s a worthwhile activity to participate in because it is good to meet people in the industry and to see what is happening on local farms,” said John Whitmore, a senior in Animal Science whose team finished in third place in this year’s contest.

Cargill Animal Nutrition provided the financial support for this inaugural event. As a strong industry and student supporter, Cargill sees the need for students to strengthen their skills in critical thinking and teamwork while working in a hands-on farm environment. “Based on the quality of presentations that the students put together in a short amount of time, it is obvious that they are gaining a quality education,” stated Fred Martsolf, regional sales manager with Cargill. “They will have an easy transition from this type of activity to a position in the industry. Cargill Animal Nutrition was pleased to be a part of this first Dairy Challenge and looks forward to supporting this and many other activities at MSU in the future.”

Hands-on Farm Evaluations

On the first day of the Dairy Challenge participants went directly to a farm to conduct their evaluation. At that time they were given basic information on the farm, including a general description of the operations and facilities, and production records of the herd from the previous year. This year the Risch farm in Webberville, owned by the Risch family, was the basis for the evaluation. The Risch family consistently achieves high milk production from their herd of 170 Holstein cows in renovated older facilities.

On the second day the teams convened early to prepare their presentations. Mr. Jerry Krummrey, a dairy cattle nutritionist with T & K Consulting in Mason, gave a short presentation on the Risch farm nutrition program. The students then had 1 hour with Krummrey to ask him specific questions. After lunch the teams of students gave presentations to a panel of experts: Dann Bolinger, MSU Extension Dairy Agent; Dr. Bruce Clark, Monsanto Dairy Business; Brian Troyer, Land O’Lakes; and Matt Budine and Fred Martsolf, both with Cargill Animal Nutrition. Presentations were scored on the basis of the teams’ assessment of management practices, recommendations to the producer, and a 10-minute question and answer session.

Banquet Honors Teams

The day ended with a recognition banquet where the winning teams were announced. There was a tie for first place between the teams of Bob Baker, Jennifer Drake, Nico Eadie, and Gretl Schlatter; and Jenny Daniels, Emily Green, and Brent Robinson. The teams in the first place tie each received $800 per team in cash scholarships. The third place team of Dana Kirk, Dan Minnis and John Whitmore received $400 in cash scholarships. Other teams participating included Greg Baker, Jason Canaday, Sarah Krippes, and Chuck VanErp; and Jeremy Higgins, Amanda Karsten, Corrine Karsten, and Tyler Wilson. The Risch family also was presented with a framed Bonnie Mohr print.
like a bad movie with many sequels, the US dairy market situation is the same as it has been for all of 2000. Too many cows in the West (California cow numbers up 4.1% over 1999 through July; Idaho numbers are up 11%; and New Mexico is up 7.2%) and lack of any adverse weather events resulted in an awful lot of milk looking for a home. On the whole, milk production was estimated to be up 4.8% for the US mostly on the strength of a 3.7% increase in per cow milk production.

Of course, the other side of the milk price story is demand. And, as Dr. Larry Hamm will tell you, increases in demand have saved the day recently for milk prices. Cheese consumption in particular increased 1.5 pounds per American consumer in 1999. Recall that it takes about 10 pounds of milk to make a pound of cheese and the result of this increase was 15 more pounds of milk per American in the last year. Commercial disappearance has been strong in 2000 usually keeping prices above the support price even with the large increase in production. However, Dr. Hamm and other dairy price forecasters predict relatively depressed milk prices for the next year.

The cheese price (class III) and the butter and non-fat dry milk price (Class IV), are national prices that underlie the fluid milk prices in federal orders. The Class IV price has been higher than the Class III price for all of 2000 thus far (Figure 1). Built off the higher of Class III or IV price, the fluid milk, Class I, price in the Mideast order finally reached the $14/hundredweight (cwt) mark in July this year.

Michigan Production and Prices

In Michigan, total milk production for 2000 was up 2.9% through the first 7 months of 2000 compared to 1999. This production increase was largely the result of a 4.9% increase in milk per cow—milk cow numbers in Michigan are down slightly in 2000—compared to 1999.

Since peaking at $18.11/cwt in No-
MSU Professor Emeritus Receives Pioneer Award

A Michigan State University Professor Emeritus was posthumously named the recipient of a prestigious National Dairy Shrine (NDS) Pioneer Award.

Dr. G. Malcolm Trout — dubbed the “father of the homogenization of fluid milk” — was recognized at the 51st Annual NDS banquet on October 5 in Madison, WI., during the World Dairy Expo. Trout is credited with refining the process and making milk homogenization commercially acceptable and feasible.

He also is the author and co-author of more than 200 publications in dairy foods technology.

In 1960, he joined MSU’s Department of Food Science and Human Nutrition. Prior to his position at MSU, he was a research professor at West Virginia University.

Trout was born in 1896 on an Iowa farm. A World War I veteran, he earned his B.S. degree in dairy industry, followed by his M.S. in 1924 from Iowa State University, and his Ph.D. from Cornell University in 1936. He was married to Agnes Mary Crain and raised two children. He died in November of 1990.

Besides Trout, three other honorees were recognized with Pioneer Awards for their contributions to the dairy industry. Portraits of Trout and the other honorees will be on display at the NDS Visitors’ Center and Museum in Fort Atkinson, WI.

The NDS boasts 15,000 members from every facet of the dairy industry. The organization provides more than $20,000 annually in awards and scholarships for college students, dairy producers and industry leaders.

But with the consolidation to the Midwest order, the market administrator no longer calculates a mailbox price. As before, a higher ratio indicates a better margin above feed costs. While not as low as the early months of 1998, when feed prices were quite high, the ratio this past spring was the lowest since spring 1999. The climb in June and July of this year was because the price of corn dropped all the way to $1.60 a bushel and hay price declined to $57 a ton. Meanwhile, milk prices already were low so the decline in feed price resulted in an increase in the milk-to-feed price ratio.

Calendar of Events

October 31-November 2

Professional Dairy Heifer Growers Association, Northeast Regional Conference, Akron, Ohio. For additional information or conference brochure and registration form call Dr. Herb Bucholtz, 517-355-8432.

November 8

A program on Hoof Health Care in Northeast Lapeer County. For more details contact Craig Burns at 517-743-2251.

November 10

A program, “Complying with the New Site Selection and Odor Control GAAMPS,” from 9 to 3 p.m. at the Regional Education Service District in Ithaca. For more information contact Natalie Rector at 616-781-0784.

December 7 & 14

Feeder Training Program at Gracies Country House, 12201 M-13, in Burt. For more details contact Craig Burns at 517-743-2251.

January 16 & 17, 2001

2001 Update on NRC Nutrient Requirements of Dairy Cattle. This program, hosted at Michigan State University, will be the first public presentation of the new 2001 NRC Nutrient Requirements of Dairy Cattle. This will be a live satellite videoconference by the NRC committee. The program will highlight the model for: energy, protein and amino acid requirements for growth and lactation; mineral, vitamin and water requirements, and minimizing nutrient excretion.

This program is for practicing nutritionists, veterinarians, extension personnel and dairy farmers who formulate and balance dairy cattle rations.

The 2001 NRC publication and model software will be part of the registration cost of the meeting.

For more details and registration material contact: Dr. Herb Bucholtz (517) 355-8432 by December 1, 2000.
Are Your Management Strategies Maximizing Genetic Potential?

Genetic progress and new technologies have generated cows capable of increasingly high milk production. High producing cows are clearly the most demanding cows to manage. Allowing these high producing cows the chance to achieve their genetic potential through the best possible management practices is what this year’s MSU Extension Dairy Team’s statewide winter meetings are all about.

Are your cows physiologically prepared for lactation from proper dry-off to proper nutrition during the dry period and at the time of calving? Are they housed free from environmental hazards that may cause uterine or mammary infections? Are your high producing cows consistently maintaining maximal intake of high quality feedstuffs through lactation? Will these cows become pregnant and have a chance to repeat their performance? These questions and more will be the main topics of discussion at this year’s meetings. We invite you to participate in these important discussions.

Looking forward,

MSU Extension Dairy Team

Program Agenda

9:00 – 10:00 a.m. Registration
  • Donuts, milk, and coffee
10:00 – 10:15 a.m.
  • TB Update
    Dan Grooms and Local Dairy Agents
10:15 – 11:00 a.m.
  • Manure Nutrient Management: Steps to Take on Your Farm
    MSU Manure Management Team
11:00 – 11:20 a.m.
  • Raising Production Per Cow Can Mean More Profit
    Sherrill Nott
11:20 – Noon
  • Raising the Management Bar: Giving Potentially High Producing Cows the Chance to Excel
    Richard Pursley
Noon – 1:00 p.m. - Lunch
1:00 – 1:30 p.m.
  • Update on Transition Cows, Standard Operating Procedures
    Dave Beede
1:30 – 2:00 p.m.
  • Mastitis Update: Immunity and Therapy
    Ron Erskine and Phil Sears
2:00 – 2:30 p.m.
  • How to Increase Fertility in Lactating Dairy Cows
    Richard Pursley
2:30 – 3:00 p.m.
  • Frankly Speaking! A Candid Interview with a Michigan Dairy Producer
    (Local Dairy Agents)
3:15 p.m. - Adjourn
PRE-REGISTRATION FORM

(Complete form, clip, include payment, and mail)
Please return this form with a check at least 14 days before the meeting you plan to attend:
Pam Jahnke
Department of Animal Science
Michigan State University
2265L Anthony Hall
East Lansing, MI 48824-1225

1. Name
2. Name
Address
City/State  Zip
County  Phone

WHICH MEETING WILL YOU ATTEND?
Bark River  Ithaca
Gaylord  Ubly
Cadillac  Hickory Corners
West Branch  Hillsdale
Mason  Grandville

PRE-REGISTRATION IS REQUIRED!
Pre-registration is $40.00 per person which includes lunch and one program notebook. On-site registration is $50.00 and $20.00 for each additional farm or family member. Lunch is not guaranteed for on-site registrants.

Number of people Pre-registration fee Amount

Additional farm/family/business members: $20.00

Ck. Number Total Enclosed

Make checks to: MICHIGAN STATE UNIVERSITY
(Your canceled check is your receipt)
If you have need for special materials or services, please contact Pam Jahnke at 517-353-4570.

DATES AND LOCATIONS

Jan. 22 (M): Bark River
Note: Registration begins at 9 a.m. Central Time/10 a.m. Eastern Time. Bark River Senior Center, 0.25 mile south of the blinking yellow light off US-2 and US-41, in Bark River, 906-466-2331.
Jan. 23 (Tu) Gaylord
B. J. Restaurant, 900 N. Center St. (Old 27 North), approximately 1 mile north of M-32 on east side of street (across from Fairgrounds), 517-732-4010.
Jan. 24 (W): Cadillac
Bill Oliver’s Best Western (Conference Center) on M-55 west of intersections M-55 & M-115, 800-654-8375.
Jan. 25 (Th): West Branch
Quality Inn/Forward’s Conference Center, 0.25 mile north of Exit 212 off I-75 on BL-75, 517-345-3503.
Jan. 26 (F): Mason
Ingham County Fairgrounds. From US 127, Take Kipp Road Exit - then east 1.6 miles. Fairgrounds on the north side of Kipp Road.
Jan. 29 (M): Ithaca
Gratiot-Isabella RESD. Take the Washington Road exit off US 27, 0.25 mile west, 517-875-5101.
Jan. 30 (Tu): Ubly
Jan. 31 (W): Hickory Corners
Kellogg Biological Station. From Hickory Corners go south on 40th Street (past KBS Dairy). Turn right on B Avenue to Education Center Auditorium, 616-671-2400.
Feb. 1 (Th): Hillsdale
Hillsdale County Fairgrounds. From US 12, take M-99 south past Hillsdale College and beyond downtown, to South Street. Go east along side of the Fairgrounds to the 4-H Community Building.
Feb. 2 (F): Grandville
Jerry’s Country Inn, 3360 Fairlanes, S.W. Take exit 69A off I-196, east on Chicago Drive, south on Fairlanes, 616-249-3660.

MSU EXTENSION CONTACTS:

Locations  Phone numbers:
Bark River
- Warren Schauer .................. 906-786-3032
- Ben Bartlett .................. 906-439-5880
Gaylord  517-345-0692
- Phil Durst .................. 517-345-0692
- Kathy Lee .................. 231-839-4667
Cadillac  517-345-0692
- Kathy Lee .................. 231-839-4667
West Branch  517-345-0692
- Phil Durst .................. 517-345-0692
Mason  517-546-3950
- Dean Ross .................. 517-546-3950
- Phil Taylor .................. 517-543-2310
Ithaca  517-224-5240
- Dann Bolinger .................. 517-224-5240
- Mike McFadden .................. 517-772-0911
West Branch  517-345-0692
- Phil Durst .................. 517-345-0692
Marygrove  517-546-3950
- Dean Ross .................. 517-546-3950
- Phil Taylor .................. 517-543-2310
Ubly  517-269-9949
- Kurt Anderson .................. 517-269-9949
- Craig Thomas .................. 810-648-2515
- Craig Burns .................. 517-743-2251
Hickory Corners  517-673-0370
- Bill Robb .................. 517-673-0370
- Phil Taylor .................. 517-543-2310
Grandville  517-543-2310
- Rebecca Mitchell ................. 616-527-5357
- Ira Krupp .................. 616-846-8250
- Phil Taylor .................. 517-543-2310
- Bill Robb .................. 616-673-0370

Program Development Team
Richard Pursley, Rebecca Mitchell, Dean Ross, Mike McFadden, Sherrill Nott and Ted Ferris.
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