On-Farm Tools For Monitoring Feeding & Production

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Many industries incorporate various process controls as part of their daily management practices. On dairies, process control or on-farm evaluation tools have typically occurred in conjunction with DHIA testing, or through forage testing and ration formulation. These tools provide meaningful data for management decisions, but they are generally used on an individual cow basis (monthly DHIA testing) or occur infrequently (forage testing and ration formulation). For many dairies, individual data may be costly or difficult to obtain, and monthly data may be insufficient for routine management decisions.

This paper will focus on inexpensive but timely methods of monitoring production, efficiency, and feeding on large dairy operations. Two broad areas will be addressed: feeding management tools and production monitoring tools. Emphasis will be on managing groups on a daily or weekly basis with relatively inexpensive and simple tools.

Feeding Management Controls

Ration & Particle Size Evaluation. Dairy herds under modern management schemes have the capability to average over 30,000 lbs milk per cow per year. Top dairy producers and nutritionists continually challenge cows to achieve ever higher levels of milk production. High producing cows require higher intakes of an energy dense ration to support today's levels of production. Since energy intake is a function of energy density and dry matter intake, nutritionists struggle to maximize dry matter intake and energy density while maintaining effective fiber and rumen health.

Formulating energy dense rations often requires high levels of grain or byproducts. Inadequate forage intake can result from a high grain diet fed to an early lactation animal with low dry matter intake. Normally, nutritionists think of supplying minimum quantities of fiber (ADF or NDF) to promote rumination and saliva production. However, particle size of the feed, along with fiber content, will dictate the quantity of chewing and saliva produced. "Effective fiber" is a term used to describe the ability of a feed to promote chewing activity and saliva production.

Particle size may be marginal when rations include processed forages and by-product feeds, or when rations are over-mixed. Reduction in particle size may alter the physical nature of fiber, reducing its ability to stimulate rumination and saliva flow, hence reducing effective fiber. Mertens (1997) calculated a physical effectiveness fiber (pef) factor for NDF of various feeds. The pef factors for alfalfa hay were 0.82 (long), 0.77 (coarsely chopped), 0.72 (medium chopped), 0.60 (finely chopped), and 0.54 (ground or pelleted). If a sample of alfalfa hay tested 45% NDF, it would have 34.7% effective NDF if coarsely chopped (45% x 0.77) and 27% if finely chopped. Effects of inadequate effective fiber in lactation rations include: acidosis (subacute or acute), erratic dry matter intakes, decreased milk yields, lowered milk fat production, and health problems (laminitis, ketosis, displaced abomasum).

Data throughout the literature and field observations strongly support the concept of adequate particle size. For purposes of brevity, one study evaluating particle size will be discussed. Grant and coworkers at the University of Nebraska and the U.S Dairy Forage Research Center in Wisconsin evaluated the effects of alfalfa hay particle size on production and rumen health of Holstein cows. One trial in the study evaluated three particle sizes of alfalfa hay, which was the sole forage. All hay was ground in a tub grinder with various screens to achieve fine (0.24" screen) or coarse (3" screen) particle length. An intermediate particle length was achieved by mixing equal parts of the fine and coarse hay. Results from the study are in Table 2. On paper, the three diets were similar. Dry matter intake and actual milk yield were also similar for the three treatments. However, due to particle size differences, there were differences in all remaining

Table 1. Guidelines for TMR, corn silage, and haylage particle sizes.[1]

	TMR	Corn Silage	Haylage
Top Sieve (>3/4")	6-10% or more	2-4% if not sole forage 10-15% if chopped and rolled	15-25% for bunker silo
Middle Sieve (3/4"-5/16")	30-50%	40-50%	30-40%
Bottom Pan (<5/16")	40-60%	40-50%	40-50%

[1] Adapted from Heinrichs, 1996.

Table 2 Effect of forage particle size[1] on milk and milk fat production and rumen function.[2]

	Fine	Medium	Course
Diet NDF	28.8	29.2	29.0
Diet ADF	20.1	20.8	20.8
Dry Matter Intake, lb/d	49.8	50.2	49.8
Actual milk, lb/d	53.7	58	54.4
4% FCM, lb/d	45.7[c]	54.8[a,b]	52.1[b,c]
FDM/DMI	0.92[c]	1.10[a]	1.04[b]
Activity, min/24 hr			
Eating	322.5[c]	346.3[a,b]	350.0[a]
Ruminating	381.3[c]	483.8[a,b]	496.3[a]
Total chewing time	703.8[c]	830.0[a,b]	846.3[a]
Milk Fat, %	3.2[c]	3.5[c]	3.8[c]
Acetate:Propionate	2.08[c]	3.20[b]	3.89[c]
Rumen pH	5.40[c]	5.80[b]	6.25[a]

[1] Hay particle size differed as follows: fine = ground through 0.24" screen in tub grinder, course = ground through 3" screen in tub grinder, medium = 50:50 (DM basis) mix of fine and course hay. All diets were 55:45 hay to concentrate ration.
[2] Grant et al., 1990.
[a,b,c] Means within rows with unlike superscripts differ ($P<0.05$)

Table 3. Effects of mixer type and mixing time on particle size distribution (as-fed basis)[1].

Mixer type	Mixing time	Top Sieve (>3/4")	Middle Sieve (3/4 - 5/16")	Bottom Pan (<5/16")
Horizontal	Normal	20.15	37.68	41.16
	+15 minutes	18.38	40.65	40.97
Vertical	Normal	20.06	35.99	43.94
	+15 minutes	18.91	33.82	47.27

[1] Rippel et al., 1998.

 (continued from page 115)

parameters. The optimum particle size diet appeared to be the medium. Cows receiving this diet had the highest and most efficiently produced fat corrected milk yield. Chewing activity, milk fat percent, acetate:propionate, and rumen pH all increased as particle size increased. This data clearly demonstrates that particle size, either too great or too small, can impact milk production and rumen health.

The importance of adequate effective fiber has generated an interest in developing an on-farm assessment of ration fiber effectiveness to ensure that high levels of performance are sustained while maintaining rumen health. Particle size separation attempts to identify the proportion of the ration which is effective in stimulating cud chewing and buffer production from that which is rapidly digestible. Many forage labs will analyze particle size along with routine forage testing. For on-farm evaluation, NASCO's Penn State Particle Size Separator (C15924N, Fort Atkinson, WI and Modesto, CA) is commonly used by nutritionists and veterinarians.

The NASCO Penn State Particle Size Separator quantifies particle size into three categories: <5/16”, 5/16-3/4”, and >3/4”. Particles less than 5/16” are considered rapidly digested, and those greater than 3/4” are considered effective in stimulating cud chewing and buffer production. This separator is simple, easy to use, and practical for routine on-farm use. Guidelines for TMR and forage particle size are in Table 1.

It is important to evaluate particle size at the bunk where cows are consuming feed. If inadequate particle size is detected at the bunk, the cause may result from a number of factors. Finely chopped forages or inadequate ration forage are common causes. Harvesters with on-board kernel processors allow longer chop length for corn silage. Another common cause of inadequate particle size is over-mixing. Rippel and coworkers (1998) evaluated the effects of mixer type and mixing time on particle size distribution (using NASCO's Penn State Particle Size Separator) of rations in north-central Texas (Table 3). There were no significant differences between mixers and mixing time due to the tremendous variation in samples. However, longer mixing times appeared to reduce the number of particles greater than 3/4”. Field observations support this, suggesting that over-mixing reduces particle size. Most professionals recommend limiting mixing time to less than 5 minutes, and avoiding mixing while loading.

Loading order is another consideration in reducing particle size. Rippel et al. (1998) evaluated the effects of mixing order for wheatlage (W), chopped alfalfa hay (A), and concentrate (C) on particle size (Table 4). The mixing orders evaluated were W-A-C, A-W-C, A-C-W, and W-C-A. When alfalfa was the first ingredient added to the mixer, coarse particles >3/4” decreased and fine particles <5/16” increased. If particle size is limiting in a dairy ration, altering the mixing order may help reduce particle size reduction in the mixer.

One final consideration in evaluating particle size is sorting. Cows often sort, selectively choosing portions of the TMR. Often coarser particles with plenty of effective fiber are the least palatable portion of the ration. It is critical to evaluate the ration that the cows are actually consuming. Another challenge is bunks that are not cleaned regularly. Fines can accumulate in the bunk if not cleaned routinely (daily preferred). This will result in reduced particle size of what the cows are actually consuming.

In general, western dairy rations with relatively large concentrations of alfalfa hay may not have the particle size problems like other regions of the country. For regions such as the northeast that feed higher levels of fermented, processed forages and little hay, particle size is more limiting (Table 5). However, all dairies can benefit from evaluating and monitoring ration particle size.

Feed Inventory. Feed is the single largest operating expense on dairy farms. Despite this fact, few producers track feed inventory closely to determine shrinkage and inventory discrepancies. Shrinkage on individual ingredients can vary from 0.5 to 20% (Dutton, 1998; Gaige, 1998). Excessive losses due to scale errors, rodent or pest damage, wind, weather, etc. can be monitored and evaluated if inventories are tracked.

Feed inventory tracking can help eliminate over- or under-feeding of ration ingredients. For various reasons, feeders may not always feed the ration they've been given. Many dairy producers and nutritionists can relate stories of a feeder not adding a particular ingredient because it was time consuming or difficult to load. Or, of a feeder adding too much of an expensive ingredient, because such a small amount is needed. Unfortunately, these situations are often discovered well after the fact. By inventory tracking, these problems can be discovered and addressed quickly. Often poor milk production does not result from a poor ration "on paper", but rather from a deficiency in feeding management. Thus, although the formulated ration may be desirable, the ration actually consumed may not be.

Inventory tracking can also be beneficial in feed pricing. Feeds that have high shrinkage should be discounted when determining their value. For example, suppose that, through inventory tracking, it is determined that shrinkage for ground shelled corn is 10%. If ground shelled corn is selling for $100/ton, what would the "true" cost be? If there was zero shrinkage, the cost would be $100 for 2000 lbs. With 10% shrinkage, the true cost is actually $100 for 1800 lbs. [2000 lbs x (100%-10%)], which equates to $111.11 actual cost per ton [$100/1800 lbs x 2000 lbs]. Thus, the true cost of $100/ton corn in this example is $111/ton.

Table 4. Effect of ingredient loading sequence on as-fed particle size distribution (Rippel et al., 1998).

	Top Sieve (>3/4")		Middle Sieve (3/4 - 5/16")		Bottom Pan (<5/16")	
Order[1]	%	CV[2]	%	CV	%	CV
W-A-C	28.7[a]	17.4	35.3	7.7	35.8[b]	13.7
A-W-C	29.1[a]	19.6	32.9	12.4	37.9[a,b]	12.4
A-C-W	22.8[b]	22.0	36.2	9.4	40.9[a]	5.9
W-C-A	29.7[a]	9.3	33.6	10.8	36.5[b]	9.4

[1] W = wheatlage, A = chopped alfalfa hay, C = concentrate.
[2] CV = coefficient of variation.
[a,b] Means in the same column with different superscripts differ (P<.10).

Table 5. Comparison of TMR as-fed particle size distribution between Texas and northeastern U.S. herds (Rippel et al., 1998).

		Top Sieve (>3/4")		Middle Sieve (3/4 - 5/16")		Bottom Pan (<5/16")	
Ration	n	%	SD[2]	%	SD	%	SD
Texas TMR							
Silage-Based	7	18.4	12.4	42.7	11.1	38.7	10.5
Hay-Based	12	22.2	9.7	31.8	9.6	45.9	8.9
Northeast TMR[1]	367	6.1	4.5	35.5	10.1	58.4	11.5

[1] Lammers et al., 1996b.
[2] SD = standard deviation

Tracking is beneficial to determine actual feed costs.

There are several methods for tracking feed inventory. None of the methods are 100% accurate, and higher precision is attained over longer time frames. The easiest but least accurate method is to simply inventory feeds on a regular basis and compare to what was supposed to have been fed. This is the most common method employed on dairy farms.

Another method is to track inventory based on what was actually fed to cows. A spreadsheet such as the one displayed in Figures 1-4 will do this, or similar software programs may be available that perform similar tasks. Ration ingredient inclusion (as a percent of the ration on as-fed basis) must be entered for each group. Then, total weights of each ration fed must be entered daily. From these two numbers, total lbs of each ingredient fed per day is calculated. This can be subtracted from the current inventory to keep a daily inventory of all feeds on the dairy. In addition, daily feed intakes (including refusals) can be easily calculated.

The most sophisticated and costly method of tracking inventory is by using a computerized feeding management system. E-Z Feed (Valley Agricultural Software, Tulare, CA) is one well-known example of a computerized feeding management system. These systems generally include a scale interface mounted on the feed truck or mix wagon, a hand-held portable computer (Palmtop), and software. A properly programmed system that receives accurate information can provide valuable output.

Computerized feeding management systems are generally easy to use and manage. The manager keeps rations in a computer in the office, then downloads feeding information (ingredients and weights for each pen) to a hand-held portable computer which is transferred to the feed truck. No paper is given to the feeder. As the feeder initiates the first load, the scale interface displays the first ingredient (by name or numerical code), then the pounds to be added. As the feeder adds feed, the number displayed approaches zero. For example, suppose 1000 lbs of hay need to be added to a mix. The scale display would show the feed (by name or number) then display “1000”. As feed was added, the “1000” would continually drop until it reached 0, then it would go negative. When the feeder was done with hay, the system would move to the next ingredient, again displaying the name or number for the feed and the amount to be fed. This process would continue until the mix is complete. The information could then be downloaded to the office computer for the manager to evaluate.

A computerized feeding management system can perform inventory tracking based on what is actually loaded in the wagon, providing an accurate estimation of inventory changes. One producer from Texas reported a 6% reduction in feed shrinkage from using one of these systems. In addition, these systems allow a manager to track and

Monthly Averages
July-98

Pen	Cows	Milk lb/day	As Fed Intake lb/day	Dry Matter Intake lb/day	Feed Costs $/cow per day	$ per lb DM	$ per cwt	Income over Feed Cost
Herd	985	68.1	83.8	53.5	3.91	0.07	5.76	3.67
1	111	75.0	80.7	51.6	3.77	0.07	5.04	4.59
2	115	82.9	85.0	54.3	3.97	0.07	4.83	5.27
3	98	66.4	85.0	54.2	3.97	0.07	5.99	3.44
4	119	63.8	84.3	53.8	3.94	0.07	6.19	3.18
5	115	62.7	87.2	55.6	4.07	0.07	6.51	2.92
6	107	73.7	97.1	61.9	4.53	0.07	6.16	3.69
7	110	70.1	80.1	51.1	3.74	0.07	5.36	4.07
8	111	69.6	81.9	52.2	3.82	0.07	5.50	3.94
9	100	46.1	75.0	48.0	3.53	0.07	7.86	1.62
10	0	0.0	0.0	0.0	0.00	0.00	0.00	0.00
Close-Up's	0		0.0	0.0	0.00	0.00		
Far-Off's	0		0.0	0.0	0.00	0.00		

Flow meter and feed intake milk weights

Shift Totals For Milking Cows

	01-Jul-98	02-Jul-98	03-Jul-98	04-Jul-98	05-Jul-98	06-Jul-98	07-Jul-98
Total Milking Cows	969	967	974	982	987	1000	1009
Total Milk Per Cow	68.4	70.5	71.0	70.3	72.7	71.6	70.4
1st milking, lbs	33157	34245	34640	35669	35876	35968	35190
2nd milking, lbs	33152	33964	34514	33319	35876	35639	35806
3rd milking, lbs	0	0	0	0	0	0	0
4th milking, lbs	0	0	0	0	0	0	0
Feed Truck, lbs/d	82360	82360	82360	82360	82360	82360	82360
Pen 1							
Number of Cows	110	110	110	110	110	121	120
1st milking, lbs	4284	4432	4314	4192	4327	4910	4788
2nd milking, lbs	3892	4278	4378	3360	4327	4910	4666
3rd milking, lbs							
4th milking, lbs							
Feed Truck, tare wt.	28770	28770	28770	28770	28770	28770	28770
Feed Truck, gross wt.	37660	37660	37660	37660	37660	37660	37660
Feed Truck, net wt.	8890	8890	8890	8890	8890	8890	8890
Pen 2							
Number of Cows	121	120	119	119	119	119	119
1st milking, lbs	4827	5145	5185	5766	5460	5108	5053
2nd milking, lbs	5286	5132	5158	5112	5460	5108	5053
3rd milking, lbs							
4th milking, lbs							
Feed Truck, tare wt.	19180	19180	19180	19180	19180	19180	19180
Feed Truck, gross wt.	28770	28770	28770	28770	28770	28770	28770
Feed Truck, net wt.	9590	9590	9590	9590	9590	9590	9590
Pen 3							
Number of Cows	99	98	98	97	97	97	97
1st milking, lbs	3143	3265	3278	3384	3274	3028	3028
2nd milking, lbs	3178	3247	3114	3119	3274	3028	3028
3rd milking, lbs							
4th milking, lbs							
Feed Truck, tare wt.	68180	68180	68180	68180	68180	68180	68180
Feed Truck, gross wt.	76440	76440	76440	76440	76440	76440	76440
Feed Truck, net wt.	8260	8260	8260	8260	8260	8260	8260
Pen 4							
Number of Cows	121	121	121	121	120	118	120
1st milking, lbs	4312	4068	3915	4098	4080	4103	4103
2nd milking, lbs	3614	3792	4184	3767	4080	4103	4103
3rd milking, lbs							
4th milking, lbs							
Feed Truck, tare wt.	58240	58240	58240	58240	58240	58240	58240
Feed Truck, gross wt.	68180	68180	68180	68180	68180	68180	68180
Feed Truck, net wt.	9940	9940	9940	9940	9940	9940	9940

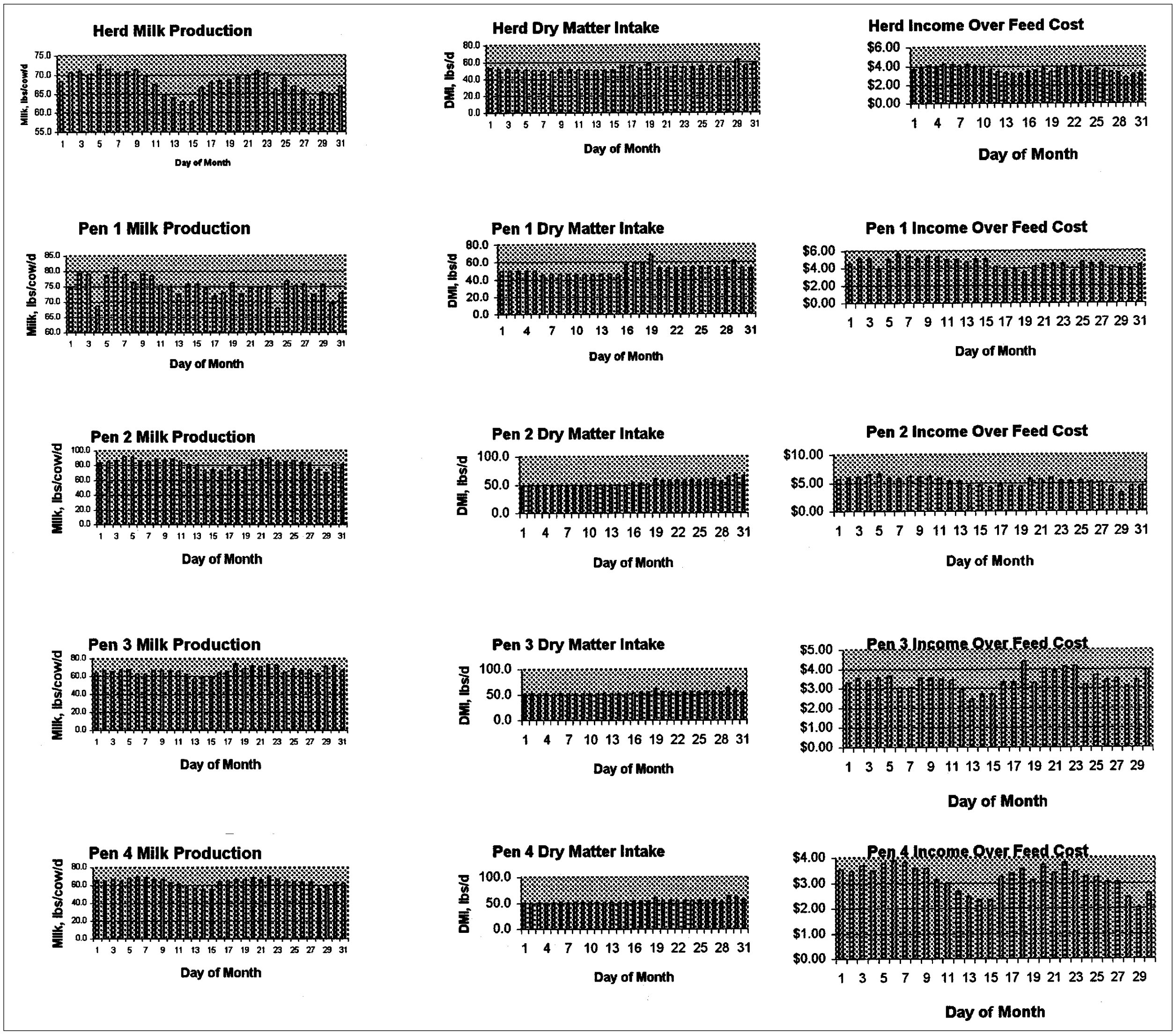
Figure 1. Milk and feed weight printouts from spreadsheet to monitor milk and feed data (Only Pens 1-4 included).

evaluate feeders. Most systems will track how close a feeder comes to adding the correct quantity of feed. For example, suppose 100 lbs of flaked corn were supposed to be added to the mix, but the feeder actually added 105 lbs; for this load, the feeder's deviation would be 5% for flaked corn. For a given day or feeding, deviations for each feed can be determined for each feeder. Dairy managers have told the authors that top feeders stay within 1% for concentrate ingredients. Poor feeders can be eliminated quickly by monitoring deviations.

Most computerized feeding management systems can also be used to determine dry matter intake (including refusals) by pen. By interfacing with milk production data, powerful information can be generated. Some of these items are discussed later in the paper.

Production Management Tools

Milk Urea Nitrogen. Another tool that is gaining popularity in evaluating the feeding program on dairy farms is milk urea nitrogen (MUN) testing. It is one of the few on-farm tools that provides insight into what is happening inside the cow. When protein is fed to cows, it is either in the degradable or undegradable form. Degradable protein is degraded in the rumen by the microbial population. Some of the degraded protein is converted to ammonia, which is utilized by the rumen bacterial population. However, when excess ammonia is produced beyond the needs of the microbes, it is absorbed across the rumen wall and into the blood



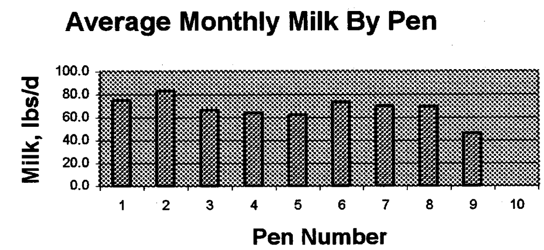
stream. Once in the blood, ammonia is detoxified to urea in the liver. Urea can be recycled for use by rumen microbes, excreted in urine, or exported in milk.

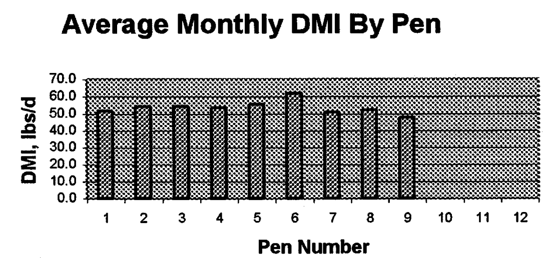
Monitoring the level of urea in milk can crudely indicate ammonia production in the rumen. Causes of excess ammonia production are generally two-fold: over-feeding protein or an imbalance in carbohydrate/protein availability in the rumen. High MUN's can indicate overfeeding of protein, which is costly from an economic standpoint. Overfeeding protein also can deprive the cow of needed energy, as the process of forming urea is an energy cost to the cow. High MUN's resulting from carbohydrate/protein imbalances imply that rumen function is not efficient. Correcting the imbalance will likely result in improved production and greater efficiency. Data exist to suggest that high MUN's may impair reproductive performance (Table 6).

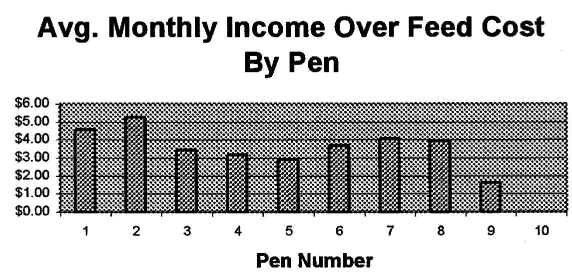
What is the target MUN for high producing dairy herds? Most work suggests that the normal range for MUN's is 10-16 mg/dl. Hinders (1996) reported that 7 California herds averaged 13 and 16 mg/dl for low and high groups, respectively. Intervention is generally considered when herd average values exceed 18 mg/dl. Milk urea nitrogen data is most useful when used to evaluate groups or a herd, and values for an individual cow should not be used as culling criteria.

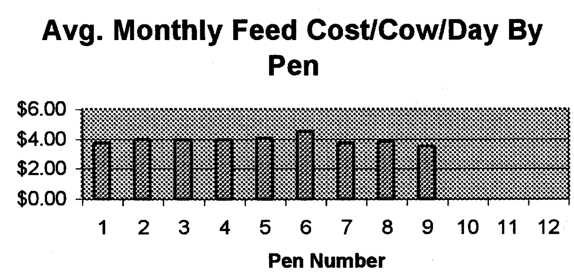
MUN testing is only valuable if performed regularly. Establishing a baseline and then monitoring regularly will help identify ration problems quickly. Most DHIA labs offer testing on an individual cow basis. However, monthly numbers may not provide timely information. Many producers have adopted weekly programs, testing groups and not individuals. Most DHIA labs will accept bulk tank or group samples for MUN analysis. Bulk tank testing is inappropriate if more than one ration is fed. String samplers (available through some DHIA affiliates) provide a cheap and simple method of collecting group samples. Fat, protein, and SCC can be tested along with MUN on a weekly basis using string samplers.

Flow Meters. Milk production is routinely monitored by calculating a herd average from the bulk tank, by monthly DHIA testing, or by recording daily milk weights electronically in the parlor.









Although these traditional production monitoring methods provide needed data, they have weaknesses. Bulk tank data is too general for many management decisions, particularly if more than one ration is fed or if cows are grouped by stage of lactation. Data collected monthly through DHIA testing may be insufficient for timely management decisions. Most producers desire weekly or daily information to evaluate production and make timely and proactive management decisions. Problems are also detected sooner with frequent monitoring. Electronic parlor meters provide a wealth of timely data, but are costly to install.

Monitoring production of groups is an ideal tool for large dairies. It has several advantages over bulk tank, DHIA, or daily electronic production monitoring. It is relatively inexpensive for large dairies (about $3,000 - 7,000 investment in most cases), and can provide daily information. If cows are grouped by stage of lactation, group production data can provide timely performance information by stage of lactation. The fresh and early lactation pens are critical groups on the dairy, and daily production information can be invaluable in quickly discovering problems before they manifest.

Recently, dairy producers have begun using flow meters to more frequently monitor milk production of groups or strings. Flow meters that monitor flow of water and other liquids have been around for many years; adaptation of these flow meters to the dairy parlor allow the producer to monitor milk production on a daily basis. There is more than one type of flow meter, and they can be installed by most milking equipment dealers.

Flow meters are generally installed near but past the receiver jar. Flow meters installed well past the receiver jar near plate coolers or the bulk tank may be less accurate due to the quantity of milk in the lines. A "basic" flow meter package has an LCD display in the parlor. Milkers must record milk weights for the group from the display and manually reset for the next group. Small printers are also available to print milk weights instead of manually recording. A spreadsheet similar to the one displayed in Figures 1-4 can be used to enter numbers and calculate daily averages. The most advanced systems automatically record data into software that interfaces with feed information.

A common question dairy producers have about flow meters is their accuracy. We monitored two large dairies in New Mexico to determine the accuracy of flow meters versus milk that was sold. For a three month period, flow meter numbers on these two dairies were within between 97.8 and 103.8% of the milk sold for each month. Producers found the information to be useful and valuable in managing their dairy.

Using The Data

Many dairies gather the data that has been discussed in this paper - milk weights, dry matter intakes, and MUN's. Although this data is recorded, often little is done with it. This is surprising, considering that feed is the largest expense and milk accounts for the majority of gross revenue. Closely monitoring variables relating to milk and feed (ration efficiency, dry matter intake, inventory control, milk production) can greatly influence net farm income. By developing an on-farm system for recording and evaluating this data, information for routine management decisions can be generated. Sophisticated systems are available commercially that generate much of this information.

A spreadsheet approach for generating information from data collected will be discussed here. Although spreadsheets lack some of the sophistication of commercial systems, they are inexpensive and easy to adapt to individual needs. For the purpose of discussion, spreadsheets are simple to follow and allow easy understanding of the information generated. Example outputs from the spreadsheet are in Figures 1-4. Inputs into the spreadsheet are as follows:

- Daily group milk weights from flow meter.
- Daily feed truck weights delivered to each pen including close-up and far-off dry cows.
- Daily cow numbers for each pen.
- Rations fed to each pen including close-up and far-off dry cows.
- Feed entering (purchased) or leaving (sold) the dairy each day.
- Costs and dry matter content for each feed ingredient.
- Weekly MUN for each pen.

With the above information, the following can be calculated on a daily basis for each pen or group:

– Daily milk production and dry matter intake by pen and herd and for each milking shift.

– Daily feed costs/cow/day by pen and herd and for each milking shift.

– Daily income over feed cost by pen and herd and for each milking shift.

– Daily feed:milk conversion by pen and herd and for each milking shift.

– Daily running inventory of feeds on the dairy.

– Weekly MUN for each pen, the herd, and for each milking shift.

The six items calculated above can be printed in numerical format or graphically displayed. Figures 1-4 provides examples of data output. The spreadsheet also calculates daily feed inventory based on what was fed. Monitoring this data on a monthly and weekly basis provides timely information for management decisions. This information will help a manager quickly discover changes in such things as forage quality, labor problems in the parlor, feeding problems, and transition cow problems.

Summary

Many dairies have the ability to track and monitor feed and milk production. However, too often the data is underutilized. Considering the economic impact of this information, effective utilization is critically important. It is necessary to use a spreadsheet such as the once described here or obtaining commercial software to fully utilize the data generated. Obtaining group information on a daily and weekly basis provides timely information dairy producers need to make routine management decisions.

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