Feeding Practices of High-Producing Herds: What Can We Learn?

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Take Home Messages

- Surveys of feeding and herd management practices used on commercial dairy farms can be a useful tool for dairy farmers to make comparisons and for consideration of possible changes to their dairy herd's management practices.
- Survey data should be critically evaluated. Were the data presented validated for accuracy? Average values are interesting, but also look at how the data ranged from the average.
- Do the conclusions or recommendations written about the survey data make sense? Can or could the conclusions be implemented on your dairy operation? For instance, in the Michigan survey presented in this paper some of the high producing Michigan herds had very high cow group stocking densities, but does that indicate to achieve high milk production the number of cows per free stall should be "over-loaded"?
- Diets, diet nutrient composition, and ingredients fed by the herds in the Michigan survey were not unusual. All herds emphasized a high degree of daily attention to feeding, nutrition, and overall herd management as the factors they felt contributed to their herd's high milk production.
- To achieve high per cow milk production there are no magic ingredients or herd management techniques. It is a combination of overall excellent management of all aspects involved in feeding and managing the entire dairy herd.

Introduction

Dairy producers are always interested in comparing their feeding management practices to what other dairy herds are doing. In recent years there have been several surveys on the feeding and herd management practices used on US dairy herds published in scientific journals and dairy

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conference proceedings. They contain a wealth of information (Jordan, 2002; Jordan and Fourdraine, 1993; Kellogg et al., 2001; Shaver and Kaiser, 2004; Boterman and Bucholtz, 2005). In addition, there are numerous survey articles published in dairy magazines and industry publications.

So, what can dairy farmers learn from surveys? Many surveys report their findings as averages for all the herds responding to the survey. Some of the surveys are conducted by mail in which the data might or might not have been verified for accuracy. Shaver and Kaiser (2004) reported on the feeding management practices of six Wisconsin dairy herds with milk production rolling herd average (RHA) greater than 13,179 kg. Their survey was done on-farm with intensive data collected and data verification. So, one of the first questions a dairy farmer may want to ask when reading a survey report on feeding management practices used on commercial farms: are the data reported accurate? Do the herds really do what the survey results indicate? Or did the farmers just think or imagine they were doing those practices and feeding those ingredients when they filled out the survey? Dairy producers should critically evaluate survey publications and the data before they attempt to implement feeding or management suggestions presented in those publications.

■ Michigan Survey of High Producing Herds

In 2004 we conducted a survey on eighteen (18) Michigan dairy herds with a milk production, DHI-Rolling Herd Average of greater than 13,150 kg (Boterman and Bucholtz, 2005). The goal of that survey was to identify feeding, nutrition, and herd management practices used on high producing Michigan herds in an attempt to help explain how those herds accomplished their high DHI milk production. Again, the data from this survey should be critically evaluated to determine if the management practices used on the Michigan herds would be useful and profitable for other dairy farmers to implement.

■ Survey Methods

The 18 herds were randomly selected from 35 Michigan DHI (MI-DHI) herds with greater than 13,150 kg RHA for milk. The selected herds were assigned to four subgroups based on lactating cow herd size: (1) less than 250 cows (5, herds), (2) 250-500 cows (5, herds), (3) 500-1000 cows (5, herds) and (4) greater than 1000 cows (3, herds). The herd owner or a herdsperson assisted in completing the survey form and we validated the data obtained during a visit to the farm. In addition during the visit we had the opportunity to observe specific or unique feeding and herd management practices employed

on these herds and recorded comments from the herd owners and herdspersons as to why they implemented certain herd management practices. The on-farm survey was conducted in late June and early July 2004. The DHI data used were from the July 2004 MI-DHI test. The survey herds RHA for July 2004, averaged 13,603 kg of milk with a range of 12,951 to 15,159 kg. The herds' nutritionists provided diet printouts for all lactating and dry cow groups. The printouts were used to determine ingredients used and the nutrient composition of diets. All herds were fed a total mixed ration (TMR).

■ Results of the Michigan Survey

MI-DHI Herd Information

The MI-DHI information for the 18 herds is presented in Tables 1a-c and Table 2. The last column of those tables contains the mean values for all 648 Michigan herds enrolled in MI-DHI for July 2004. Tables 1a and 1b report the DHI data based on the different herd size assignment described above. Fifteen of the herds milked three times daily and three milked two times per day.

The RHA and peak milk production as expected was the most notable difference for all 18-survey herds as compared to all 648 herds MI-DHI (Table 1a-c and Table 2). The other DHI herd management items listed in Tables 1a-c, certainly contribute to the 18 herds high production but any single item alone does not reveal great differences when compared to all 684 MI-DHI herds.

Notable was the DHI annual herd cow turnover for the 18-survey herds (Table 2) which is similar to the MI-DHI mean and suggest that the surveyed herds milk high production was not the result of high cow turnover. Some have suggested that high producing herds accomplish their high milk production by "pushing" cows too hard and the high production is the result of a high culling rate. Herd cow turnover ranged from 26% to 50%.

For the 18-survey herds, 9.1% of the cows leaving the herd were sold for dairy purposes as compared to the 5.1% MI-DHI mean (Table 2). When asked about that several of the herd owners with higher than average herd cow turnover rates indicated that they had a local demand by other dairy farmers to purchase their excess "sound" cows.

Also, 5% of the cows left the 18-survey herds for disease reasons compared to 18.6% for the MI-DHI mean (Table 2). This is an indicator to the high attention to the herd health program and herd management details employed in the survey herds.

Table 1a. General information from DHI records. (July 2004, MI-DHI test date)

	Herd size						MI
	<250 (n=5)			250-500 (n=5)			DHI
Item	Mean	Min	Max	Mean	Min	Max	(n=648)
Total cows in herd	149	83	222	286	241	334	153
Cows in milk, %	91	88	96	87	85	91	88
RHA milk, kg	14,086	13,582	15,159	13,653	13,167	14,037	10,779
Fat, kg	492	461	532	536	475	638	400
Milk fat, %	3.5	3.4	3.7	3.9	3.5	4.5	3.7
Milk protein, kg	420	401	442	410	386	425	313
Milk true protein, %	3.0	2.9	3.1	3.0	2.9	3.0	2.9
Milk SCC, x1000	146	93	205	215	149	267	281
Days in Milk	196	170	224	203	188	218	195
Times milked, /d	3	3	3	2.4	2	3	
1st lactation peak, kg	47	43	49	44	42	46	35
2nd lactation peak, kg	58	51	60	58	57	59	44
3rd+ peak, kg	63	55	67	61	59	62	47
All cows peak, kg	55	49	58	54	52	55	42
Days to 1st service, all cows	87	70	117	84	70	121	95
Days open, all cows	150	127	186	155	131	168	171
Calving interval, mo	14.2	13.4	15.3	14.3	13.5	14.7	14.8
Services/ pregnancy, all cows	2.8	2.1	3.9	2.9	2.0	4.4	2.8
Days dry, all cows	58	56	61	63	53	73	61
Age, 1st lactation, cows, mo	24.6	24	25	23.6	22	25	25
Age, all cows, mo	38.4	36	40	42.2	39	46	43
DHI Annual cow turnover, %	40	27	50	32	26	40	34

Table 1b. General information from DHI records. (July 2004, MI-DHI test date)

	Herd size						MI
	500-1000 (n=5)			>1000 (n=3)			DHI
Item	Mean	Min	Max	Mean	Min	Max	(n=648)
Total cows in herd	608	505	718	1783	1462	2217	153
Cows in milk, %	88	81	90	89	85	92	88
RHA milk, kg	13,380	13,190	13,577	13,086	12,951	13295	10779
Fat, kg	489	420	538	472	433	549	400
Milk fat, %	3.7	3.2	4.0	3.6	3.3	4.1	3.7
Milk protein, kg	394	389	401	389	378	396	313
Milk true protein, %	2.9	2.9	3.0	3.0	2.9	3.1	2.9
Milk SCC, x1000	214	126	299	336	309	386	281
Days in Milk	193	166	218	205	185	216	195
Times milked, /d	3	3	3	3	3	3	
1st lactation peak, kg	44	41	48	46	44	49	35
2nd lactation peak, kg	56	51	59	60	58	62	44
3rd+ peak, kg	60	57	64	62	61	64	47
All cows peak, kg	52	48	55	55	54	58	42
Days to 1st service, all cows	75	60	108	67	55	74	95
Days open, all cows	147	128	184	152	134	166	171
Calving interval, mo	14.1	13.4	15.3	14.2	13.6	14.7	14.8
Services/pregnancy, all cows	2.5	1.7	2.9	2.7	2.6	2.9	2.8
Days dry, all cows	58	42	72	52	46	64	61
Age, 1st lactation, cows, mo	24.0	23	25	24.3	23	26	25
Age, all cows, mo	38.8	33	43	41.0	38	44	43
DHI Annual cow turnover, %	34	26	41	34	27	43	34

Table 1c. General information from DHI records. (July 2004, MI_DHI test date)

	All 18 herds			MI-DHI
Item	Mean	Min	Max	(n=648)
Total cows in herd	587	83	2217	153
Cows in milk, %	89	81	96	88
RHA milk, kg	13,603	12,951	15,159	10,779
Fat, kg	500	420	638	400
Milk fat, %	3.7	3.2	4.5	3.7
Milk protein, kg	405	378	442	313
Milk true protein, %	3.0	2.9	3.1	2.9
Milk SCC, x1000	216	93	386	281
Days in Milk	198	166	224	195
Times milked, /d	2.8	2	3	
1st lactation peak, kg	50	41	49	35
2nd lactation peak, kg	58	51	62	44
3rd+ peak, kg	61	55	67	47
All cows peak, kg	54	48	58	42
Days to 1st service, all cows	80	55	121	95
Days open, all cows	151	127	186	171
Calving interval, mo	14.2	13.4	15.3	14.8
Services/ pregnancy, all cows	2.7	1.7	4.4	2.8
Days dry, all cows	58.8	42	73	61
Age, 1st lactation, cows, mo	24.1	22	26	25
Age, all cows, mo	40.0	33	46	43
DHI Annual cow turnover, %	35	26	50	34

Table 2. Reasons for cows leaving survey herds from DHI records. (July 2004, MI-DHI test date)

	Herd size					
Reason	<250 Mean, %	250-500 Mean, %	500-1000 Mean, %	>1000 Mean, %	All 18 herds Mean, %	MI-DHI (n=648)
Dairy purposes	23.2	0.2	12.3	0.1	9.9	5.1
Low production	4.7	22.1	20.0	29.5	17.9	16.9
Reproduction	30.1	25.4	16.8	14.9	22.6	20.3
Mastitis	7.9	14.0	9.5	6.5	9.8	10.2[1]
Udder	4.2	2.6	1.7	0.5	2.4	-[1]
Feet/Leg problems	6.8	4.5	5.6	4.7	5.5	8.5
Disease	2.6	2.4	6.8	10.1	5.0	18.6
Died	12.9	20.1	17.8	23.2	18.0	20.3
Injury/Other	7.4	8.4	9.2	10.1	8.6	-[2]
No Reason	0.4	0.2	0.4	0.4	0.4	-[2]

[1] MI-DHI combines culling reason for Mastitis and Udder in summary for all MI-DHI herds.

[2] Not reported in summary for all MI-DHI herds.

The mean values for milk SCC as an indication for mastitis control was lower for the survey herds (Table 2) and this suggests that udder health is a priority.

Reproduction status indicators: days to first service, days open, calving interval and services per pregnancy (Tables 1a-1c) for the 18-survey herds were all lower than the mean for the 648 MI-DHI herds. This indicates that the reproduction and breeding programs on those high producing herds are also a priority.

General Herd Management Information

Tables 3-6, describe the general management of the herds and facilities management.

The number of cow groups (Table 3) varied with the larger herds having more groups. The criteria for moving lactating cows to another group (Table 4) also varied but reproductive status was the main criteria for moving cows to another group.

The mean number of lactating cows per free stall (Table 5) for all herds was slightly above 1 cow per free stall. However, the maximum stocking density was 1.47 cows per free stall and this occurred mainly in the larger herds with newer facilities. The stocking density and “over-loading” by those herds was

an interesting observation and greater than reported by Shaver and Kaiser (2004).

Table 3. Number of groups (lactating & dry)

Herd size	Mean	Min	Max
<250 cows	3.8	3	5
250-500 cows	5.0	4	6
500-1000 cows	7.2	6	9
>1000 cows	12.0	10	14

Table 4. Criteria or reasons for moving lactating cows to another group

Criteria	Number herds using criteria
Days in milk	4
Reproductive status	10
Milk yield	6
Need dry off	1
Health	1
Move cows to balance group sizes	2

Table 5. Number of lactating cows per free stall

Group	Mean	Min	Max
Post-fresh	1.02	0.67	1.25
High-producing	1.14	0.94	1.47
Mid-lactation	1.18	1.08	1.47
Low-producing	1.10	0.73	1.36
1st lactation	1.16	1.05	1.44

Table 6. Feed bunk space for lactating cows, cm/cow.

Group	Mean	Min	Max
Post-fresh	64.6	30.5	81.1
High-producing	30.5	30.5	82.0
Mid-producing	54.6	41.5	63.4
Low-producing	47.2	21.9	66.4
1st lactation	44.8	30.5	55.2

However, the “over-loading” could be misinterpreted to result in high milk production. A generally suggested stocking density often reported in the literature is one cow per free stall. The question could be asked, would the milk production for those herds have been greater if the groups were not “over-loaded”? That is an interesting question for dairy farmers who are, or are considering, “over-loading” groups to ask. Those farmers may want to evaluate in their own herd what is the actual effect stocking density has on milk production and cow health.

Feed bunk space for lactating cows (Table 6) ranged from 21.9 to 82 cm/cow for all groups on the day the herd was visited and this is similar to the findings of Shaver and Kaiser (2004). Feed bunk headlocks for the lactating cows were used in five herds and not used in thirteen herds. In the herds with greater than 500 cows (8 herds) only one herd (12.5%) used feed bunk headlocks.

Feeding Management Information

Tables 7-12 describe the feeding management of the herds.

The number of feedings per day to the lactating cow groups (Table 7) varied between 1 to 6 times per day which is similar to that reported by Shaver and Kaiser (2004). This was influenced by facility layout, capacity of feed bunk to hold feed, herd size, mixer capacity, labor availability and feeding logistics. The one herd (334 cows) feeding six times per day had elevated feed bunks with limited feed holding capacity.

Table 7. Number of feedings per lactating cow group, times/day.

Group	Mean	Min	Max
Post-fresh	1.5	1	3
High-producing	2.0	1	6
Mid-producing	1.8	1	3
Low-producing	1.6	1	3
1st lactation	1.7	1	3

Feed push-up per day (Table 8) ranged from 2 to 12 and was not affected by herd size. The herd managers all commented that having feed available to the cows is something they stress to their employees especially those responsible for feeding and feed push-up.

Table 8. Number of feed push-ups per day.

Herd size	Mean	Min	Max
<250 cows	6.4	3	10
250-500 cows	3.6	2	4
500-1000 cows	5.2	3	9
>1000 cows	8.0	4	12

Monitoring of high moisture feedstuff dry matter (DM) (Table 9) varied by feed type and herd size. Haylage DM (2.34 times/mo) was determined most often followed by corn silage (1.95 times/mo). This indicates that these farms test roughages for DM about every 2 weeks. Larger herds tended to determine feedstuff DM more often. A written record of feedstuff DM was done on 56% of the herds with the reported purpose that the data was used by the feeder for on-farm diet adjustments at feeding time and the nutritionist to use when evaluating the diets.

Table 9. Dry matter determination of high moisture feedstuff, times/month.

	Herd size						
Feed	<250	250-500	500-1000	>1000	Mean	Min	Max
Haylage	1.37	2.80	2.25	3.33	2.34	0	8
Corn silage	0.83	2.00	2.25	3.33	1.95	0	4
HMC	0.31	0.68	1.23	1.29	0.90	0	4

56% (9/16 herds) kept written record of feedstuff DM history.

Monitoring of daily feed intake of the lactating cow groups (Table 10) was done in various ways for the herds surveyed. Eleven herds, 65% of those reporting, kept a written record of daily feed intake. Those herds indicated the data were used by the feeder to determine TMR batch sizes for the next feeding and for monitoring feed intake history by their nutritionist. Also, 3 of the herds with greater than 500 cows were utilizing a commercial TMR feed recording management software program and 3 additional herds were planning to purchase software.

Table 10. Monitoring of daily feed intake of lactating cow groups.

Item	Number herds who do/number herds reporting	
Monitor daily	17/18	
Visual observation, not recorded	6/17	
Written record	11/17	
Weigh & record orts	2/17	
Use TMR recording software	3/17	(1- 500-1000 cows, 2- >1000 cows)
Plan to buy TMR recording software	3/17	(500-1000 cows)

Feed refusals (orts) from the lactating cow groups (Table 11) were re-fed mainly to growing heifers and steers, or were disposed as manure. Some herds re-fed orts to low-producing groups and the close-up dry cows. Most herd managers indicated that feed bunks were cleaned daily but that was not a question in the survey, although it should have been.

Table 11. Destination of feed refusals (orts) from lactating cow groups.

		Group orts are from, number				
Group orts fed to	N^{o} - %	Fresh	High-Group	Mid-Group	Low-Group	1st lact
Heifers	21 - 34	3	8	2	7	1
Low-producing	8 - 13	2	3	2	-	1
Close-up dry cows	3 - 5	0	1	1	1	0
Steers	9 - 15	2	2	1	2	2
Dispose as manure	20 - 33	4	4	3	6	3

Table 12 reports the proportion of time within a week the principal feeder did the feeding and this varied by herd size. For herds with less than 250 cows the principal feeder was the main feeder because of a smaller labor pool. Herds from 250 to 1000 cows tended to have more people who were classified as feeders and each feeder did varying proportion of the feedings within a week. For the herds with greater than 1000 cows one or two people were responsible for doing the feeding.

Table 12. Proportion of time within a week principal feeder did the feeding.

	Herd size				
% of time	<250	250-500	500-1000	>1000	Total herds
0-40	0	1	2	0	3
41-60	1	1	1	0	3
61-80	2	0	1	1	4
81-100	2	3	1	2	8

Roughage Storage and Management Information Collected by the Survey

Most herds used bunker silos for storing roughages (Table 13) with high moisture corn mainly stored in upright silos. Also, most but not all herds covered the bunkers with plastic. Our observation during the herd visits was all the herd owners and herdspersons were very particular to feed only the better appearing silages to the lactating cows. All herd owners emphasized that they did not feed silage from the top of the bunker or spoiled appearing silage near the sidewalls to the lactating or transition cows. We observed that the silages in bunkers were well packed. The herd owners emphasize the importance of packing bunkers during harvest.

Table 13. Storage facilities, ( ) number herds that cover bunkers

	Storage type			
Feed	Bunker	Upright Silo	Bagged	Other
Haylage	15 (14)	1	2	0
Corn Silage	15 (12)	1	2	0
High Moisture Corn (HMC)	5 (5)	10	1	2[1]

[1]Use HMC temporarily, 1 farm did not use HMC.

When asked what methods the herds used to decide when to harvest first cutting alfalfa (Table 14), six (33%) herd owners reported they used a prediction method of alfalfa NDF such as: growing degree days (GDD) or the predictive equation for alfalfa quality stick (PEAQ). However, most herd owners used the more traditional methods for deciding when to harvest first cutting alfalfa. We asked this as part of the survey because we were interested in knowing if these high producing herds were implementing the prediction methods for alfalfa NDF to decide when to harvest first cutting

alfalfa. The results indicate that the use of the prediction methods, GDD or PEAQ was not as high as we had expected.

Table 14. Methods herds use to decide when to harvest 1st cutting alfalfa.

Method	Number
Growing degree days	5
PEAQ-stick	1
Plant height	3
Bud stage	8
Calendar date	6
Other, (based on grass maturity, advised by nutritionist, when neighbors start)	3

All herds indicated they had goals for silage DM percent ranges when harvesting roughages for silage (Table 15), but only a few reported they had an absolute standard protocol for monitoring DM during harvest. When herds purchased roughages from a custom grower the herd owners indicated that DM was determined more frequently but none had written protocols for doing DM testing. Silage inoculants (Table 15) were used by a number of herds.

Table 15. Goal herds use for DM% during harvest and use of silage inoculants.

	Goal for DM during harvest, %			Use of silage inoculants, %	
Feed	Mean	Min.	Max.	Use inoculants	% Use inoculants
Haylage	37	30	50	12 (13)[1]	66 (12/18)[1]
Corn silage	33	30	45	12	66
High moisture corn	70	65	78	6	46 (6/13)[1]

[1]Use inoculants depending on circumstances.

We were also interested in the criteria herd owners used to select hybrids for corn silage (Table 16). Sixty six percent indicated they utilize NDF-digestibility as part of their criteria when selecting hybrids for corn silage. All herd owners also indicated they use a number of criteria to make their final hybrid selection.

Table 16. Criteria herds use for corn silage hybrid variety selection.

Criteria	Herds using criteria, %
NDF-digestibility	66
Yield	40
Other[1]	40

[1]Seed price, test weight, variety yield plot data, weather condition tolerance, advice of seed dealer

Diets and Feedstuff Information

To obtain information on the nutrient composition of the diets for the lactating, dry and close-up dry cows we used the diet printouts that were provided from each herd's nutritionist. All herds utilized a nutritionist for diet formulation and consulting. Sixteen of the herds used nutritionists that were affiliated with a feed company and two herds used a consulting nutritionist that did not provide any of the ingredients used in the herd diets.

The nutrient compositions of the diets are presented in Tables 17a – 17e. The nutrient composition for all the diets appeared to be within expected nutrient values. In our survey we utilized the diet printouts from the nutritionists and this presented some difficulties for us when we tried to determine the diet nutrient composition because some printouts did not contain certain values for certain nutrients, thus we were not able to present that data. Shaver and Kaiser (2004) in their study collected samples of feed ingredients and the high group TMR for laboratory analysis. This would have been desirable to do for our study but was a larger task than we were capable of doing.

We were also interested in the various ingredients used in the diets of the herds (Table 18). For our study we asked the herd owners or herdspersons to list the ingredients and in particular what feed additives were used in the lactating, dry, and close-up cow diets. The herd owners were able to provide a partial listing, but all referred us to their nutritionist's diet printouts for a complete listing. From the nutritionist's diet ingredient printouts we again were able to ascertain only a partial listing of particular nutritional supplements and additives that were included in the diets. That was because most herds used a "custom blended grain mix" (78%) and, or a "custom mineral/vitamin mix" (22%) and for those mixes, many of the nutritional supplements and additives were not reported or listed. Those custom mixes were part of a company proprietary product or the nutritionist's personal private mix formulation and were thus not made available to us. So, we were not able to obtain a complete listing of all the nutritional supplements and additives nor the amounts used in the diets. That was a limitation for our study and probably for other survey studies.

Table 17a. Diet nutrient composition from nutritionist diet printouts for: High-producing group or single TMR for all lactating cow groups, (18/18 herds data).

Item	Mean	Min	Max
Formulated for, kg milk/cow/d	47	41	54
TMR, % DM	48	39	56
DM Intake/cow, kg/d	26	23	30
Nutrient composition, DM basis			
CP, %	18.5	17.2	19.6
RUP, % of CP	35.7	28.5	42.5
NE_L, Mcal/kg DM	1.74	1.59	1.83
ADF, %	18.6	15.3	21.8
NDF, %	29.1	25.5	32.3
NFC, %	39.3	37.0	42.8
Fat, %	5.2	3.5	6.2
Ca, %	0.97	0.83	1.11
P, %	0.41	0.31	0.47
Mg, %	0.33	0.29	0.42
K, %	1.37	1.01	1.68
Vitamin A, IU/kg DM	1638	281	3266
Vitamin D, IU/kg DM	421	261	735
Vitamin E, IU/kg DM	9.3	4.5	14.1

Table 17b. Diet nutrient composition from nutritionist diet printouts for: Low-producing lactating cow diets, (6/18 herds had specific low-producing group diets).

Item	Mean	Min	Max
Formulated for, kg milk/cow/d	47	41	54
TMR, % DM	47	43	54
DM Intake/cow, lb/d	23	18	28
Nutrient composition, DM basis			
CP, %	17.6	16.3	18.3
RUP, % of CP	34.1	31.3	35.4
NE_L, Mcal/kg DM	1.72	1.66	1.74
ADF, %	19.2	18.3	21.5
NDF, %	29.8	27.6	31.7
NFC, %	39.9	38.5	41.5
Fat, %	4.8	3.9	5.8
Ca, %	0.92	0.77	1.05
P, %	0.43	0.40	0.44
Mg, %	0.33	0.30	0.35
K, %	1.41	1.25	1.59
Vitamin A, IU/kg DM	1033	892	1564
Vitamin D, IU/kg DM	305	251	349
Vitamin E, IU/kg DM	11.1	7.7	17.1

Table 17c. Diet nutrient composition from nutritionist diet printouts for: Fresh lactating cow diets, (4/18 herds had specific fresh group diets).

Item	Mean	Min	Max
Formulated for, kg milk/cow/d	38	36	43
TMR, % DM	48	45	50
DM Intake/cow, lb/d	19	16	24
Days cows are in group, d	32	8	45
Nutrient composition, DM basis			
CP, %	18.2	17.8	18.8
RUP, % of CP	36.2	30.9	38.9
NE_L, Mcal/kg DM	1.74	1.63	1.76
ADF, %	19.0	17.7	21.0
NDF, %	29.7	26.8	32.5
NFC, %	38.4	37.0	40.3
Fat, %	5.0	4.3	5.9
Ca, %	0.98	0.84	1.10
P, %	0.44	0.37	0.52
Mg, %	0.35	0.32	0.42
K, %	1.41	1.24	1.81
Vitamin A, IU/kg DM	1843	280	3999
Vitamin D, IU/kg DM	432	254	694
Vitamin E, IU/kg DM	18.7	8.9	31.8

Table 17d. Diet nutrient composition from nutritionist diet printouts for: Close-dry cow diets, (9/18 herds had specific close-up group diets).

Item	Mean	Min	Max
TMR, % DM	50	45	56
DM intake/cow, kg/d	13	11	15
Nutrient composition, DM basis			
CP, %	15.4	12.8	17.1
RUP, % of CP	36.7	28.4	40.6
NE_L, Mcal/kg DM	1.57	1.37	1.63
ADF, %	21.7	15.1	27.1
NDF, %	37.2	27.4	44.0
NFC, %	32.3	31.4	33.6
Fat, %	3.6	3.0	5.4
Ca, %	1.10	0.58	1.40
P, %	0.36	0.30	0.48
Mg, %	0.37	0.27	0.44
K, %	1.20	0.82	1.65
Vitamin A, IU/kg DM	2793	431	3766
Vitamin D, IU/kg DM	1056	465	1540
Vitamin E, IU/kg DM	27	20	37
Anions used in diet	4/9 herds used anions		

Table 17e. Diet nutrient composition from nutritionist diet printouts for: Dry cow diets, (8/18 herds had specific dry group diets printouts).

Item	Mean	Min	Max
TMR, % DM	44	37	48
DM Intake/cow, kg/d	14	12	15
Nutrient composition, DM basis			
CP, %	15.0	12.8	18.3
NE_L, Mcal/kg DM	1.43	1.37	1.59
ADF, %	28.8	21.4	34.9
NDF, %	42.2	33.0	47.1
Fat, %	2.9	2.6	3.1
Ca, %	0.86	0.32	1.26
P, %	0.39	0.31	0.59
Mg, %	0.34	0.27	0.44
K, %	2.00	1.58	2.50
Vitamin A, IU/kg DM	2076	781	2966
Vitamin D, IU/kg DM	550	294	980
Vitamin E, IU/kg DM	24	8	38

Table 18. Feedstuffs herds used in lactating cow TMR diets, data obtained from nutritionist diet printouts, (total herds = 18).

Feedstuff	Number herds/total, using feedstuff as a separate ingredient
Alfalfa Silage	18/18
Dry Hay	5/18
Straw	1/18
Corn Silage	18/18
Dry Corn Grain	8/18
HM Corn Grain	16/18
Soybean Meal	9/18
"By-Pass" Soybean Meal, product	1/18
Roasted Soybeans	3/18
Canola Meal	1/18
Urea	1/18
Corn Distillers Grain	5/18
Blood Meal	1/18
"Protected" Amino Acid product	4/18
Whole Cottonseed	6/18
Liquid Fat, product	1/18
"By-Pass" Fat, product	6/18
Beet or Citrus Pulp	6/18
Soy Hulls	1/18
Brewers Grain	1/18
Sugar	1/18
Bakery by-product	1/18
Molasses-liquid, product	3/18
Custom Blended Grain Mix[1]	14/18
Custom Mineral/Vitamin Mix[2]	4/18

[1]Custom Blended Grain Mixes contained an assortment of feedstuffs and additives

[2]Custom Mineral/Vitamin Mix contained an assortment of minerals, vitamins and additives

■ Application of the Information

The most interesting observation made during our visits with the herd owners and herdspersons was their attention to details involved in the daily management of the herd feeding program and with overall herd management.

So, what can be learned from this and other surveys of dairy farm feeding and herd management? High producing herds manage all aspects of the feeding program and over all herd management with a high degree of intensity. They pay attention to all aspects of managing of the herd.

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