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Minnesota DHI Reproduction Information

An Integrated Reproductive Management Publication

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The ideal calving interval for maximum productivity is 12 months. When intervals extend beyond 13 months, significant economic loss will occur. By keeping intervals below 13.0 months, severe economic loss will probably be avoided. Estimates on economic losses for calving intervals extending beyond the ideal 12 months have ranged from $3.00 to $5.50 loss per cow per day. Though definitive research is needed to determine more accurate loss figures, these estimates portray the economic seriousness of the problem.

The average calving interval for Holstein herds in Minnesota during 1984 was 13.0 months. Over 40 percent of those herds had calving intervals exceeding 13 months with only a very small percentage of herds at the ideal 12-month level. Obviously there is still considerable room for improved reproductive performance among Minnesota dairy farms.

Herd Summary

Factors most influencing calving interval are heat detection, conception rate, days to first breeding, and culling for reproductive failure. These measures of reproductive performance are displayed on the DHI Herd Summary (figure 7). When the reporting of reproduction information by the farmer and DHI supervisor has been timely and accurate, these values are helpful assessments of reproductive performance.

CULLING RATE

Culling rate can have a profound influence on calving intervals. If culling rates are unusually high, one should determine the underlying reason. Reasonably good calving intervals can be maintained in the face of considerable infertility if cows with reproductive problems are culled. Consider cull rate before making assessments of the true reproductive performance in a herd.

The authors are extension dairy specialists.

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HEAT DETECTION INDEX

The heat detection index is an estimate of the percentage of heat cycles observed during the breeding interval. The detection index is calculated as follows:

$$\frac{21 \times 100}{\text{Average interval between breedings or recorded heats}}$$

CONCEPTION RATE

The DHI conception rate represents the maximum possible conception for cows in the herd. It includes those cows that are confirmed pregnant plus those recently bred. The calculation is as follows:

$$\frac{\text{Number of cows pregnant + possibly pregnant} \times 100}{\text{Total number of services}}$$

The DHI rate is not an index of recent herd reproductive performance, but a historical account of the average conception rate among all cows bred in the herd. The timeliness of the DHI conception rate figure is dependent on when pregnancy is recognized. Pregnancy recognition will be more timely on a farm where fertility work is routinely being done by veterinarians. The conception rate represents an estimate of the very best possible conception rate, and is likely to be inflated on farms with many problem cows.

CALVED TO FIRST BREEDING

The average number of days from calving to first breeding has great influence on calving interval. Minnesota DHI records indicate that the average days from calving to first breeding is 84 days. Yet if a 12-month calving interval is to be achieved, the cows must be pregnant 85 days after calving. One of the simplest ways to improve calving intervals is to make a management decision to begin breeding as soon as feasible.

Understanding the interaction between heat detection, conception rate, and days to first breeding is crucial to taking steps to improve reproductive management. For example, if a dairy farmer expects a 12-month calving interval but has only 40 percent heat detection and a 40-percent conception rate, he can quickly see how unrealistic the goal is. In order to achieve such a goal with that level of performance, breeding would have to begin 51 days before the cow calved. For this dairy farmer, improved heat detection is essential. Table 1 shows the relationship between heat detection, conception rate, and days to first breeding and demonstrates the impact of reproductive management factors on reproductive performance.

Table 1. Relationship between heat detection, conception rate, and days to first breeding.*

The day breeding must begin to achieve a 12-month calving interval at varying heat and conception rate performance levels.

Heat Detection %	40	50	60	70
100				
90				
80	30	45	54	61
70	25	39	49	58
60	15	32	43	53
50	1	21	35	47
40	−51	5	22	37

Conception Rate %

*Based on percent heat detection and conception rates, the figures in table 1 represent the number of days to allow between calving and breeding in order to achieve a 12.0 month calving interval. To make the table applicable to calving interval goals of 12.5 and 13.0 months, add 15 or 30 days respectively to each number in the table.

The most serious criticism of the Reproductive Herd Summary values is that they are historical in nature and may not always reflect recent reproductive performance in the herd. Therefore, they have not been useful monitors of reproductive performance in providing early warning of reproductive failure.

Reproduction Report

Retrospective study of reproductive performance in Minnesota DHI herds reveals that the greatest obstacles to achievement of a 12-month calving interval are poor heat detection and too great a delay in days to first breeding. The changing of current trends and improved reproductive performance will require an increased educational focus on these two factors. First, educators and dairy farmers must appreciate the relationship between heat detection, conception rate, and days to first breeding. Secondly, there needs to be a record system that gives both historical and current accounting of herd reproductive performance.

The herd summary will continue to carry the historical measures of reproductive performance. The DHI Reproduction Report is designed to provide more current information, facilitating early identification of problems in reproductive performance and enabling timely correction in either management deficiencies or reproductive disease. Individual problem cows as well as recent herd trends will be emphasized.

The format of the reproductive report is very similar to that of the SCC Report. Herd summaries predominate on the upper portion of the report while detailed individual cow data are listed in the lower portion (figure 6). The report will be discussed by section and examples will be given to illustrate its usefulness.

SECTION A. MONTHLY REPRODUCTIVE CYCLES

Early recognition of reproductive failure or infertility is necessary in order to avoid serious losses. The use of routine veterinary herd fertility programs will facilitate early recognition of clinical reproductive disease (cystic ovaries, metritis, etc.) so that timely treatment will lessen the number of days affected cows stand open. Herd specific vaccination programs will lessen infertility and abortions due to subclinical diseases. Early pregnancy diagnosis (prior to 42 days) will reduce days lost due to presumed pregnancy. However, even the most skilled farm managers or veterinary teams will be unable to significantly improve reproductive performance without the use of good records. Records not only serve to monitor the success or failure of veterinary procedures, but also define reproductive management deficiencies which must be remedied if total success is to occur.

Poor heat detection is the greatest single obstacle to successful A.I. programs. Minnesota studies involving large numbers of cows show that detection of heat is more of a management problem than a cow problem. Ninety percent of all cows thought to be anestrus (not showing heat) were cycling normally. Only 10 percent of supposedly anestrus cows were actually not cycling as a result of some pathological problem.

Well fed and healthy cows will normally begin to cycle by approximately 20 days post partum (after calving). Not all of these early ovulations are accompanied by strong heat signs. However, by 60 days post partum, nearly 100 percent of normal cows are cycling and expressing normal heat signs. Whether or not these cows are observed in heat depends on the intensity of the heat detection effort. This fact is clearly verified in a summary of three studies found in table 2.

Table 2. Percentage of normal cows detected in heat at first, second, and third ovulation when maintained under different systems of observation.

Observation system	Ovulation First (20 days)	Second (44 days)	Third (64 days)
(1) Continuous 24 hr. observation			
(A) King, et al.	50%	84%	100%
(B) Williamson, et al.			100%
(2) Casual (herdsman)			
(A) King, et al.	20%	44%	64%
(B) Williamson, et al.			56%
(C) Morrow, et al.	23%	46%	64%

In the summary of Monthly Reproductive Cycles (figure 1), the number of heats is calculated from estimates given for each month. This figure represents the number of heats theoretically possible beginning with the first reported heat date or on day 60 post partum if no heat date is reported prior to 60 days. Reported heats are those heats where the cow is observed and recorded in heat or is in heat and also bred. Reported heats divided by the estimated number of theoretical heats times 100 will give the percentage of cows detected in heat. The DHI Reproduction Report will allow monthly monitoring of heat detection efforts. For example, the John Dairyman herd (figure 1) had 100 percent heat detection in November and 50 percent in December.

This herd's average heat detection index was 62 percent. The present average heat detection performance among DHI herds is a dismal 44 percent. In general, the heat detection performance is better on the high producing herds (table 3) although improvement could be made on these farms as well.

Good heat detection is a function of a complete awareness of the physical and behavioral signs of heat and the time spent looking for cows in heat. A recommended reference is *Detection of Heat in Dairy Cows*, extension

Figure 1

MONTHS	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL
MONTHLY REPRODUCTIVE CYCLES													
Est Num Heats	6	4	4	8	6	8	7	11	10	23	11	9	1
Reported Heats	4	2	3	6	6	4	5	8	8	20	9	7	0
Num Breedings	3	1	2	5	6	4	4	7	5	18	6	5	0
Num Conceived	2	1	1	3	2	3	1	5	2	9	4	0	0

Table 3. 1984 Heat Detection Performance on Holstein DHI Herds in Minnesota at Various Levels of Performance

	Rolling Herd Averages by Thousand lbs Milk			
	11-12	14-15	17-18	20+
Number of herds	394	1,095	565	73
Cows per herd	46	50	53	52
Heat detection index	38	44	50	53

publication AG-FO-2018. Since a cow standing firmly while another cow mounts (standing heat) is the most reliable sign of heat, success in heat detection is dependent on cows being able to interact. Table 4 nicely demonstrates the relationship between the number of daily observations and the percentage of cows detected in heat. If you are observing cows only once per day for 20 to 30 minutes, you are missing half of the cows in heat. An excellent heat detection goal under Minnesota dairying conditions would be 80 percent. Monthly reminders of heat detection performance will help dairy farmers improve productive performance.

Table 4. Relative Efficiency of Heat Detection Schemes.*

Heat Detection Scheme	% Correctly Found in Heat
Continuous 24 hr observation	98-100%
Observed three times daily	90%
Observed two times daily	80%
Observed once daily	50%

*These figures assume that cattle being observed for heat are allowed to freely interact.

Also listed in the Monthly Reproductive Cycles chart (figure 1) is a monthly compilation of the number of cycling cows detected in heat and bred as well as the number of cows that became pregnant as a result of those breedings. This enables easy calculation of conception rates on a monthly basis. The information is useful, but must be interpreted with caution. The average expected conception rate under normal conditions would be 60 to 65 percent, reflecting good reproductive performance. Conception rates calculated on a monthly basis in a small herd are likely to vary considerably. For example, the conception rate for one month might be as high as 80 to 100 percent. If such a high rate does occur, one must realize that this level of performance should not be routinely expected. This is a statistical phenomenon quite similar to the situation in which a farmer got 80 percent heifer calves in one particular calving season. Over the long run, we know that the average would be closer to 50 percent heifers. Likewise, the average expected conception rate under good conditions would be 60 to 65 percent. However, we should expect a somewhat higher conception rate in heifers than older cows. We also know that some bulls are more fertile than others.

When the conception rate drops below 50 percent in any month as was the case in the John Dairyman herd in November, January, and March, we ought to try to determine why. If the cows bred during that month were older cows or were cows that had experienced post partum uterine disorders such as retained placentas or metritis, these lower conception rates would not be surprising. Or perhaps high ambient temperature and humidity had a detrimental influence on conception rate or early embryonic death in May and June. In Arizona dairies, for example, conception rate is reduced to as low as 10 to 20 percent during the hot summer months. But if monthly conception rates are low and cannot be easily explained, then other things must be considered. The timing of A.I., A.I. technique, poor quality semen or faulty semen handling should be considered as possible explanations. Nutritional factors may also need attention.

If no management or physiological factors can be found, one can be content that the low conception rate is a statistical phenomenon similar to the case of the farmer who got 80 percent heifer calves. Though such concerns may arise on occasion with this type of reporting system, there should be sufficient warning to allow for early action.

SECTION B. MONTHLY CALVING PATTERN

Figure 2 provides a historical account of the numbers of cows and heifers that have calved over the past 13 months as well as the anticipated number of cows and heifers expected to calve during the next six months.

Calving patterns may be helpful in managing labor or in anticipating or adjusting milk flow. The planning of calving management as well as heifer breeding and labor will be aided by the recording of monthly calving patterns.

SECTION C. LIST OF PROBLEM COWS

The problem cow list is an effective means of focusing attention on those individuals in the herd that are most hindering reproductive performance. Note cows Vanesa and Elsie (figure 3) in the John Dairyman example herd. This list consists of heifers or cows in the herd ghat have been open more than 120 days and are not confirmed pregnant or that began a lactation by abortion or premature calving. These cows are listed in calving order so that those of greatest concern are listed first. Those listed with an asterisk next to the number are problem cows that are bred but not confirmed pregnant. The problem list helps indicate the extent of the reproductive problem. In comparing two herds, each with 13.5 month calving intervals, one would be more concerned about reproductive management when the list of problem cows is numerous compared to the herd with one or two cows with excessively long calving intervals.

It is important to be able to get an assessment of a cow's performance at a glance. Graphic presentations of herd summary data often are the most effective means of calling attention to both strengths and weaknesses in reproductive management.

Figure 2

MONTHS	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL
MONTHLY CALVING PATTERN													
Cows Calved Last	1	3	2	4	3	3	4	2	1	2	0	1	0
Heifers Calved Last	3	1	2	3	2	2	1	3	0	0	0	0	0
Cows To Calve	1	3	4	3	6	3							
Heifers To Calve													

Figure 3

LIST OF PROBLEM COWS					
BARN NAME	DAYS OPEN	BARN NAME	DAYS OPEN	BARN NAME	DAYS OPEN
VANESA*175					
ELSIE *169					

Construction of a Q Sum Graph (figure 4) is a simple method of keeping abreast of recent herd reproductive performance trends. This graph can be used to supplement DHI reproductive records. The success or failure of successive breedings are charted on graph paper by beginning at an arbitrary reference point. With each diagnosed pregnancy, a circle is drawn in a square to the right and up. A pregnancy failure is indicated by an X marked to the right and one square down. Such a graph is demonstrated in figure 4.

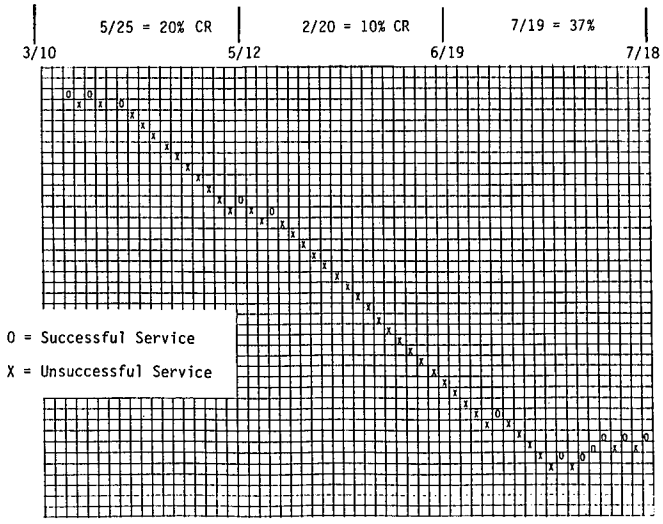
SECTION D. REPRODUCTIVE ACTIVITY CHART

Failure trends are quickly noticed when Q sum graphs are used, allowing correction of problems before a disaster occurs. This particular graph (figure 4) was constructed in retrospect in an attempt to solve reproductive problems on one dairy farm. The dairyman had begun doing his own A.I. sometime in March and had serious A.I. technique problems which did not get resolved until June. Conception rates between 3/10 and 5/12 were 20 percent and from 5/12 to 6/19 were 10 percent. Conception rates after June 19th were improving at 37 percent. It appears that conception rate trends during July indicate normal expected performance. Had performance been monitored with the Q sum graph, the problem may have been discovered and corrected sooner.

Q sum graphs can be adapted readily to microcomputer technology but are awkward when the printout is confined to a small space. The Reproductive Activity chart (figure 5) found on the upper right hand corner of the DHI Reproduction Report is meant to be used in a manner similar to Q sum graphs. The Reproductive Activity chart consists of ten columns with ten squares per column.

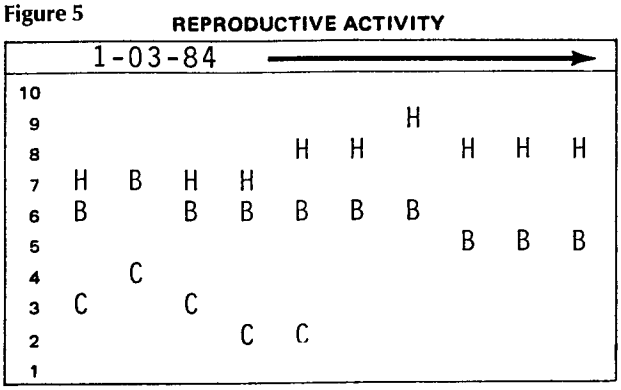
Each column represents ten percent of the theoretically estimated heats in the herd during the past six months. The beginning date is printed to the left of the arrow found in the top of the chart. In the column on the left side (figure 5) the H indicates that seven out of ten heats were observed and recorded six months ago. Heat detection was improved slightly during the past six months; the columns on the right side of the chart indicate that currently the dairyman is detecting eight out of ten heats. The letter B indicates the

Figure 4. Q Sum Graph



number of cows not only observed but bred out of ten theoretical heats. The letter C indicates the number of cows that conceived. Cs only appear in the left hand side of the graph because we are not sure which breedings were successful for cows bred more recently.

Figure 5



Reproductive activity charts enable you to spot poor reproduction performance early enough to get corrective measures in place before the entire herd is in trouble. In the above example, heat detection has gone from about 70 percent to 80 percent during the past six months indicating heat detection is not a problem in this herd. Recently (the right side of chart) about five out of eight cows observed in heat were being bred. Note that in the first two columns conception rate was acceptable (50 to 55 percent) but that conception rate declined more recently. The management factors affecting conception rate should be reviewed by the herd owner.

As was pointed out in the example of the herd plotted on the Q Sum Graph, dairy farmers beginning their own A.I. should carefully monitor their results. Rapid decline in conception rate should be a warning that A.I. technique or semen handling may not be correct. It is hoped that this chart will be helpful to both farmers and those with whom they consult on reproductive matters in assessing the herd's reproductive performance at a glance.

SECTION E. INDIVIDUAL COW DATA

Individual cow data (figure 6) on the DHI Reproductive Report has considerably more reproduction information than offered before. Though most of that information is self-explanatory, it may be of value to highlight how some of this information may be used, particularly to improve reproductive performance.

Assuming all heats observed are being recorded by the farmer and also are being accurately transferred to the DHI barn sheet by the DHI supervisor, a study of the days to first heat can be revealing. Even more revealing would be a calculation of the average days to first heat on a herd basis. One hundred percent of normal cows will show standing heat by 60 days post partum (table 5).

Table 5. Standing Estrus at First Heat Post Partum

Post partum days	Type of Estrus	
	Non-standing %	Standing %
1-20	64%	36%
21-40	15%	85%
41-60	11%	89%
61	0%	100%

Lauderdale, 1974

The percentage of cows seen in heat by 60 days post partum is an excellent reflection of either the herd's reproductive health or the heat detection efficiency (Reproduction Summary, figure 7). For example, in a high producing herd, you may find that the percentage of cows showing heat is acceptable, but the farmer is complaining that the cows are not showing heat well at the time he would like to begin breeding (60 to 70 days post partum). It could be that heat detection in this herd is adequate but there is a need for adjustment in early lactation feeding to maximize DM intake, thus minimizing a negative energy balance with its subsequent depression of heat signs.

As previously cited, 90 percent of all cows not seen in heat are cycling normally but are not being observed. The missed heats column (figure 6) emphasizes this fact. In a few cases where there is reproductive pathology (cystic ovaries, etc.) or stress-related reproductive inactivity, cows will be listed as having been missed in heat when this may not be true. For example, it is not uncommon to find first calf heifers with completely inactive ovaries due to the stresses resulting from adjustment to stall barn living or to the lactation ration, recuperation from a difficult calving, or needing nutrients to continue growth. In such cases, rectal examination of the cow or heifer by a veterinarian will determine if the cow is truly anestrus or being missed because of poor heat detection.

Repeat breeders are defined as those cows that are cycling normally and are showing normal signs of heat, but have not become pregnant after being bred three times. Repeat breeder cows are common among Minnesota dairy herds. Normal incidence is 10 to 15 percent. The column labeled "Times" under the "Last Breeding or Heat" column can be used to identify repeat breeder problems which tend to occur in older, high-producing cows. It is common for a cow to habitually have repeat breeder problems year after year. These studies also showed that there is an increase in repeat breeder cows as herd size increases.

The most common cause of repeat breeders is faulty heat detection. Hormone tests of milk samples collected at the time of insemination show that nearly 20 percent of cows bred were not even in heat. The timing of insemination should be based on standing heat, that is, a cow standing firm with all four legs braced while mounted by another cow. For best A.I. results, cows should not be inseminated based on non-standing signs of heat such as mounting other cows, hyperactivity, mucus discharge, or a swollen vulva. This leads to poor timing of A.I. and many repeat breeders. Consider these factors when the incidence of repeat breeders is greater than 10 percent.

The future of any herd is determined by the quality of the bull used. For many years, the DHI Herd Summary has been printing the average PD$ service sires being used in the herd. This information has been an excellent monitor of the general breeding policy in the herd. The new DHI Reproduction Report will report PD$ of service sires on the last breeding of every cow. This will add greater depth to the DHI genetic information.

Pregnancy diagnosis is an important part of the herd fertility program. Equally important is the determination that a cow previously bred and thought pregnant is open. The discovery of an open cow 42 days after breeding or sooner is important to minimizing days open. In a herd on a monthly veterinary reproductive health program, the range of days from breeding to the pregnancy exam should be a maximum of 35 to 70 days. The exam of most value is that one prior to 42 days post breeding so that timely treatment or more intensive observation for heat can prevent undue loss of time. Examinations of cows for pregnancy beyond two months post breeding will not be as effective in helping maintain low calving intervals.

The last four columns, "Days in Milk," "Production Index," "Peak Milk" and "Sample Day Milk (Actual) (Expected)," are useful as culling aids.

The DHI Reproduction Form contributes to a better understanding of dairy farm reproduction. As time goes on, we are certain that DHI reproduction information will become vital to the management success of every Minnesota dairy farm.

JOHN DAIRYMAN | 101 HAECKER HALL | ST PAUL | MN 55108 | 0609

HERD CODE	MAIL DATE
41-00-0033	7-10-84

MINNESOTA
DAIRY HERD IMPROVEMENT
DHI 230 11/82

REPRODUCTION

SAMPLE DATE	PAGE
7-02-84	1

Figure 6

MONTHS	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL
MONTHLY REPRODUCTIVE CYCLES													
Est Num Heats	6	4	4	8	6	8	7	11	10	23	11	9	1
Reported Heats	4	2	3	6	6	4	5	8	8	20	9	7	0
Num Breedings	3	1	2	5	6	4	4	7	5	18	6	5	0
Num Conceived	2	1	1	3	2	3	1	5	2	9	4	0	0
MONTHLY CALVING PATTERN													
Cows Calved Last	1	3	2	4	3	3	4	2	1	2	0	1	0
Heifers Calved Last	3	1	2	3	2	2	1	3	0	0	0	0	0
Cows To Calve	1	3	4	3	6	3							
Heifers To Calve													

LIST OF PROBLEM COWS

BARN NAME	DAYS OPEN	BARN NAME	DAYS OPEN	BARN NAME	DAYS OPEN
VANESA	*175				
ELSIE	*169				

REPRODUCTIVE ACTIVITY

1-03-84 →

10										
9							H			
8					H	H		H	H	H
7	H	B	H	H						
6	B		B	B	B	B	B			
5								B	B	B
4		C								
3	C		C							
2				C	C					
1										

COMPUTER NUMBER	COW'S SIRE ID	COW'S SIRE PD $	DATE CALVED	LACT NUM	DAYS TO 1ST HEAT	DAYS OPEN	NUM HEATS MISSED	TIMES	LAST BREEDING OR HEAT DATE	SERVICE SIRE ID	SERVICE SIRE PD $	BARN NAME	DATE TO DRY	DAYS BRED TO PG EXAM	DUE DATE	DAYS IN MILK	PROD INDEX	PEAK MILK	SAMPLE DAY MILK ACTUAL	SAMPLE DAY MILK EXPECT	REMARKS
0069	APACHE	-1	10-07-83	2	70	70	0	1	12-16-83	3H672	82	APACHE	8-02-84	56	9-21-84	270	96	77	21	24	
0077	17H365	61	3-03-84	2	25	94	0	2	6-05-84	11H2143	1	CB			POSS PG	122	103	77	60	56	
0049	29H2417	52	1-05-84	4	51	94	1	1	4-08-84	9H599	137	CRISCO	11-24-84	54	1-13-85	180	108	103	70	67	
0070	FORD	95	10-27-83	2		117	1	3	2-21-84	17H387	94	DEANNA	10-08-84	36	11-27-84	250	107	74	44	48	
0043			12-01-83	4	74	74	1	1	2-13-84	23H217	66	EFFIE	9-30-84	44	11-19-84	215	102	89	63	57	
0042			1-11-84	4	41	169	3	2	6-28-84	11H1660	43*	ELSIE			POSS PG	174	118	99	72	75	
0033	29H1879	41	12-26-83	5	60	100	1	1	4-04-84	17H390	117	GYPSY	11-20-84	35	1-09-85	190	99	97	59	64	
0061	KNIGHT	49	8-27-83	3	59	79	0	2	11-14-83	7H1115	57	HOLLY	7-01-84	33	8-20-84	311	108	75	22	29	
0062	ART	52	1-23-84	3	48	89	1	1	4-21-84	40H2455	-32	IRIS	12-07-84	41	1-26-85	162	93	76	55	53	
0056	STARWAR		10-02-83	3	91	114	2	2	1-24-84	11H1660	43*	JILL	9-10-84	49	10-30-84	275	108	85	48	52	
0060	KNIGHT	49	12-22-83	3	65	99	0	1	3-30-84	11H2238	-2*	KIM	11-15-84	40	1-04-85	194	120	93	61	59	
0078	17H248	-16	2-05-84	2	31	70	0	1	4-15-84	17H387	94	LORI	12-01-84	47	1-20-85	149	98	74	55	56	
0076	40H2652	-50	3-25-84	2	38	100	2	H	5-02-84			MAMIE			OPEN	100	105	79	63	56	
0040	29H2434	75	2-02-84	4	30	72	0	1	4-14-84	40H2573	64	MANDY	11-30-84	48	1-19-85	152	103	90	68	73	
0083	BICKEN	64	7-22-83	1								MARLO	***** DO	NOT	BREED **	347	95	51	40	38	
0080	WIZARD	20	6-29-83	1	59	117	1	3	10-24-83	11H1660	43*	MEGAN	DRY	54	7-30-84						
0081	BUTTERD+	119	6-15-84	2	14	18		H	6-29-84			MIKKI				18		75	75		
0064	BOQUET	45	4-10-84	3	74	74	1	1	6-23-84	11H1636	56*	MOLLY			POSS PG	84	98	91	77	82	
0082	BUTTERD+	119	7-11-83	1	72	93	1	2	10-12-83	7H1115	57	MONA	DRY	44	7-18-84						
0059	ERIC	34	11-19-83	3	62	84	0	2	2-11-84	17H387	94	NICKY	9-28-84	46	11-17-84	227	115	95	60	61	
0065	KNIGHT	49	4-22-84	3	47	72		H	6-29-84			PLUTO			OPEN	72	93	85	69	79	
0073	BUTERDA+	119	1-24-84	2	67	112	1	2	5-15-84	17H390	117	RITA			POSS PG	161	120	87	63	68	
0058	GERRI	75	8-06-83	3	77	77	1	1	10-22-83	21H380	93	SALLY	DRY	56	7-28-84						
0084	CITAMAT	-48	9-17-83	1	49	49	0	1	11-05-83	11H2132	91	SNOW	DRY	42	8-11-84						
0001	29H1928	-44	9-20-83	7	114	158	4	2	2-25-84	11H1660	43*	UNA	10-12-84	32	12-01-84	287	123	101	49	58	
0087	7H401	100	11-29-83	1	55	175	1	4	5-22-84	11H1636	56*	VANESA			POSS PG	217	103	60	47	56	
0091	3H672	82	2-01-84	1	24	70	0	1	4-11-84	10H6031	74*	VELMA	11-27-84	54	1-16-85	153	117	78	60	61	
0054	29H2434	75	11-03-83	3	54	54	0	1	12-27-83	11H0466	77	VENUS	8-13-84	45	10-02-84	243	104	83	49	45	
0086	40H2328	20	10-21-83	1	65	65	0	1	12-25-83	17H387	94	VERA	8-11-84	47	9-30-84	256	111	68	47	53	
0085	21H280	95	10-26-83	1	79	141	2	3	3-15-84	11H1273	87	VIENNA	10-31-84	55	12-20-84	251	103	60	41	44	
0090	40H2652	-50	1-06-84	1	51	94	0	1	4-09-84	40H2455	-32	VIOLET	11-25-84	53	1-14-85	179	91	64	41	40	
0092	29H2581	-51	2-08-84	1	39	81	0	2	4-29-84	10H6466	71	VISTA	12-15-84	33	2-03-85	146	75	42	33	37	
0088	40H2652	-50	12-01-83	1	63	63	0	1	2-02-84	11H0466	77	VIXEN	9-19-84		11-08-84	215	73	46	32	34	
0089	17H355	-19	12-25-83	1	63	103	0	2	4-06-84	9H599	137	VONNIE	11-22-84	56	1-11-85	191	78	45	37	37	
0094	7H2294	31	2-27-84	1	37	80	0	1	5-17-84	29H3303	56	VYRNA			POSS PG	127	74	44	37	42	

*****

HERD CODE	TYPE OF RECORD	ASSOC	SUPVR	LAB	CO
41-0C-0003	DHIR	62	882	4	62

TEST INTERVAL	LAB DATE	RECEIVED	MAILED
06-04	07-02	07-05	07-06	07-10-84

MINNESOTA EXTENSION SERVICE
UNIVERSITY OF MINNESOTA

LAST MAIL	REPORT
06-09	81

OPTIONS
ACTION LISTS
SCC

JOHN DAIRYMAN
101 HAECKER HALL
ST PAUL
MN 55108

MINNESOTA
DAIRY HERD IMPROVEMENT

HERD SUMMARY

J. WILLIAM MUDGE
EXTENSION DAIRYMAN

SAMPLE DATE	LAB
07-02-84	4.90
NUMBER COWS	MN DHIA
35	17.23
BREED	AVG BODY WT	TOTAL
HOL	1330	22.13

DHI 202
1-84

PRODUCTION, INCOME AND FEED COST SUMMARY

DESCRIPTION	SAMPLE DAY AVG PER COW	DHI ROLLING HERD AVG 12 TESTS
NUMBER COWS	35	34.8
% COWS IN MILK	89	87
MILK LBS	46.2	17217
% FAT	3.77	3.75
FAT LBS	1.74	645
% PROTEIN	3.23	3.13
PROTEIN LBS	1.49	539
TOTAL DM PER CWT BW	3.0	2.8
FORAGE DM PER CWT BW	2.0	1.6
ENERGY INDEX	96	96
PROTEIN INDEX	121	102
MILK PER LB GRAIN DM	3.3	3.0
VALUE OF PRODUCT $	5.59	2113
TOTAL FEED COST $	2.55	895
INCOME OVER FEED COST $	3.44	1218
FEED COST PER CWT MILK $	5.52	5.20
MILK PRICE PER CWT $	12.97	12.27

MANAGEMENT INFORMATION

SAMPLE DAY FEED	AVG LBS CONSUMED	PCT DM	NET ENERGY	CRUDE PROTEIN	COST $/TON
HAY - - - - - -	10	71	45	13	60
PASTURE - - - -	96	20	45	13	15
GRAIN INDIV FED	15	88	78	16	182
PROTEIN SUPP -	1	88	78	37	330

SUMMARY OF COWS NOW IN HERD

LACT NO	NUMBER COWS	STANDARIZED ME MILK	$ VALUE	INDEX	AVERAGE AGE	% IDENTIFIED SIRE	DAM
1ST	13	17000	2108	93	2-02	100	100
OTHER	22	19145	2374	106	4-08	91	91
ALL	35	18347	2275	101	3-09	94	94

CURRENT SCC EVALUATION

LACT NO	NUMBER COWS	PERCENT COWS BY LINEAR SCORE 0,1,2	3,4	5,6	7,8,9
1ST	10	60	30	10	0
OTHER	21	57	19	14	10
ALL	31	58	23	13	6

COWS MILKING ON SAMPLE DAY

LACT NO	NO COWS	PEAK MILK
1ST	10	56
OTHER	21	86
ALL	31	76
PEAK RATIO (1ST: OTHER)		.65

YEARLY SUMMARY

LACT NO	COWS ENTERING HERD NUMBER	%	COWS LEAVING HERD NUMBER	%
1ST	14	40	3	9
OTHER	0		6	17
ALL	14	40	9	26

AVERAGE SIRE PREDICTED DIFFERENCE

SIRE	NUMBER	MILK	DOLLAR
SERVICE SIRE	31	584	66
1ST LACT	13	37	6
OTHER LACT	19	-46	21

REPRODUCTIVE SUMMARY

	NUMBER COWS	DAYS SINCE CALVING	DAYS TO 1ST HEAT	DAYS TO 1ST BREEDING	DAYS OPEN	SERVICES PER CONCEPTION	NO COWS EXTENDED CALV INTERVAL	MINIMUM CALVING INTERVAL MONTHS
PREGNANT COWS	25	234	60	76	89	1.5	1	12.1
POSSIBLY PREGNANT	1	84	74	74	74	1.0		11.6
PROBLEM COWS	5	160	45	67	126	2.2	2	13.3

MAX CONCEPTION RATE	HEAT DETECTION INDEX	COWS IN HEAT BY 60 DAYS	REPEAT BREEDERS
62%	75%	55%	17%

DAILY HERD TOTALS

DHI MILK	MILK SOLD	% SOLD
1618	1612	100

COWS DRY BEFORE CALVING

NO COWS	AVG DAYS DRY	< 40 DAYS	40-70 DAYS	> 70 DAYS
21	61	0	16	5

SAMPLE DAY PRODUCTION

SAMPLE DATE	TOTAL COWS	% IN MILK	MILKING COWS ONLY AVG DIM	MILK	% FAT	% PRO	SCC
7-02-84	35	89	191	52	3.8	3.2	
6-03-84	35	94	180	61	3.5	3.3	
5-01-84	36	97	150	57	4.0	3.1	
4-02-84	37	92	133	57	3.8	3.1	
3-03-84	37	84	113	65	3.7	3.0	
2-02-84	36	81	118	63	3.8	3.1	
1-03-84	34	76	124	60	3.8	3.1	
12-01-83	36	72	146	54	3.9	3.1	
11-04-83	35	86	173	48	3.9	3.2	
10-04-83	34	79	194	43	4.0	3.2	
9-05-83	33	88	194	45	3.6	3.3	
8-02-83	33	85	188	44	3.7	3.1	
6-28-83	29	93	197	54	3.7	3.3	

DHI ROLLING HERD AVERAGE ENTIRE HERD

MILK	% FAT	FAT	% PRO	PRO
17217	3.7	645	3.1	539
17193	3.8	645	3.1	539
16996	3.8	638		
17081	3.8	641		
17307	3.8	653		
17566	3.8	666		
17918	3.8	682		
18200	3.8	695		
18296	3.8	698		
18390	3.8	699		
18552	3.8	707		
18575	3.8	709		
18632	3.8	709		

Figure 7