DAIRY HERD HEALTH PROGRAMMING CONFERENCE

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The College of Veterinary Medicine
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DAIRY HERD MONITORING

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In a major shift toward preventive medical services in dairy practice, veterinarians are taking a more active role in the overall management and planning on dairies. [1,2] Veterinarians are routinely offering services like nutritional consultation, housing design, and financial advice that were considered outside the realm of veterinary medicine in the past. The dairy practitioner is adapting to the role of herd health and productivity consultant. This evolution will expand the opportunity for veterinary services to dairy farmers, and will be a profitable interchange for practitioner and producer alike. As is always the case, there is a price to pay for this new opportunity. Veterinarians will need to develop the new practice skills to compete in this arena. These areas include nutrition, computers and record systems, finances, and effective marketing of these services. We must convince dairymen to look to veterinarians for new and different services. Veterinarians need to develop effective ways to deliver these services to their clients and to charge for their efforts. [1-5]

Central to this development is the need for information. [1-7] In the future, veterinarians will be paid less for what they do and more for the information they can provide. This need for information includes knowledge from outside the dairy, such as new facts about diseases, management systems, and nutrition. Just as important, the need for information involves information about the dairy itself. It may seem contradictory that the dairyman needs an outsider to provide information about his own farm. A moment's thought should make it clear that this has always been true of dairies. Outside information came from many sources: Dairy Herd Improvement Association (DHIA) reports, the accountant's report, or the veterinarian's remark that calf mortality seemed high and hutches might be useful. The role of "information coordinator" has the potential to be a major service provided by veterinarians in dairy practice. If veterinarians do not take the initiative and become the dairy's central information and analysis source, their other roles will be significantly weakened or lost. The person who identifies increased calf mortality or decreased milk production will be the one asked to

solve the problem. The future for service to the dairy industry will belong to the person willing to work with records. That person will not necessarily be a veterinarian.

There are several levels of record keeping on dairies. Dairymen keep individual animal records to help them make decisions about single cows (or groups of them) and to feed data into monitoring systems. Monitoring is the "watchdog" part of record keeping. It does not include all aspects of dairy record keeping; it concentrates on the general herd status.

WHAT IS MONITORING?

Monitoring is an essential step in all systems that need to respond effectively to outside influences [8]. In endocrinology, the organ that produces a hormone must have some signal that tells it whether there is enough of the hormone. In inventory control in a practice, there must be some way to signal when supplies are too low. On a dairy, there should be some mechanism to flag problems and motivate changes. Without such monitoring systems, problems can grow to serious proportions without needed remedy, e.g., Cushings disease, no bottle of calcium for the next milk fever, or loss of milk market due to an elevated bulk tank somatic cell count.

Figure 1 illustrates the role played by monitoring in the management cycle on a dairy. First, the herd's status is monitored. If the status is unacceptable, plans are developed, decisions made, and actions taken. The status changes, and the cycle begins again. As Figure 1 illustrates, there are two aspects of the feedback system that are outside of the actual cycle. External influences affect the status of a dairy, things like feed changes, weather, management decisions, new pathogens, machinery failures, and financial changes. Without these external influences there would be no need to change or adapt to new circumstances. Happily for the veterinarian, these external influences are why dairymen need veterinary services. We help dairymen as they try to adapt to external forces and change. As we do we will open new possibilities for veterinary service to the dairy industry. It means, for example, that client education is an useful (and billable) veterinary activity, as are nutritional consultation, preventive program design, building design, and even financial advice. As individuals, we may not yet have the expertise to work in some of these arenas, but the opportunity exists for those who wish to develop the skills.

The second aspect that is external to the cycle is the goals, targets, or standards used to test current status for its adequacy. Without some sort of bench mark for comparison, there is no way to tell if you need to take action. Goals can

be difficult to set. They may be influenced by economic targets and constraints, personal and emotional considerations, physical restrictions, and time constraints. Goals almost always are subject to change over time. Goal setting will be discussed later.

Monitoring serves several major roles in dairy herd health medicine. It can highlight problem areas and focus efforts and resources where they are needed. Monitoring may help restore the dairyman's perspective, shifting needed attention away from the day to day urgent items to less urgent but perhaps more important areas. Monitoring reveals problems and trends; trends that might otherwise escape notice in the day to day routine. Monitoring can help motivate change in clients and the practitioner. Monitoring also serves the practitioner by documenting the direction and time course of improvements on the dairy that adopts a herd health management approach.

ESSENTIAL COMPONENTS OF MONITORING

1.Keep only useful data and use data that you keep!

The first and most important fact about monitoring is that monitoring is not an end in itself. Monitoring exists because the information will be used to influence plans, decisions, and actions. Keeping large volumes of data that no one uses will ultimately cause the entire system to lose credibility. Keeping unused data is a waste of time, effort, money, and the dairyman's limited supply of enthusiasm for record keeping.

2. Collect data, but produce information.

Data alone are usually not sufficient; data must be converted into information. On a 600 cow dairy, a list of somatic cell counts, lactation number, and days in milk of all lactating cows listed by cow ID number contains a wealth of data and has very little information value. Organize the same data into categories broken down by somatic cell count and stage of lactation and you would have a wealth of information.

3. Encourage consistent, accurate records.

The information stored and presented by a monitoring system must be accurate and consistent. If the records are inaccurate or incomplete, they lose their usefulness. When the information is useless, the dairyman will lose interest in keeping the data up to date and accuracy suffers further. The practitioner can play a key role in breaking this cycle. Encourage good record keeping, reward the dairyman with thanks and acknowledgement for good records, and make sure to use the records as part of the herd health program.

4. Make sure the information is available in time to be used.

The information must return to the user (dairyman, milker, banker) in a timely fashion. Simple information available in time is better than sophisticated information available too late. Getting information after making the decision is useless. This means that monitoring systems must be efficient as they collect, store, analyze and report back to the dairyman. (There is nothing wrong with investigating problems after the fact. The information may be useful when a similar problem happens in the future.)

5. Keep it simple, easy, and appropriate to the needs.

The monitoring system should be as simple and easy as possible. Whenever possible, use information that the dairyman already collects. Record systems should be easy to use, readily available to the dairyman as the events occur, and should use terms familiar to the dairyman. At each step in development, the veterinarian should ask: "Will the payoff in information justify the effort to collect this data?". Wherever possible, it pays to collect data that can be used to create more than one type of information. For example, DHIA data on production can contribute to individual cow evaluation, herd feeding program management, economic evaluations, financial projections, culling decisions, etc. It will be far easier to motivate the dairyman to keep production data when it supports so many aspects of his enterprise.

6. Use monitoring to clarify interactions on the dairy.

The analysis of herd information should clarify relationships between factors that contribute to a problem and should provide perspective on the importance of what has occurred. Since all possible interactions cannot be predicted, a monitoring system should allow for ad hoc evaluations among various factors. Changes in milk production may reflect mastitis, feeding programs, season, or reproductive efficiency, to name a few. An effective herd health monitoring system should allow the veterinarian to pursue the impact of changes in one factor on other aspects of the dairy.

7. Know your denominators.

Herd monitoring is done on populations, not individuals. Be sure to consider the underlying population. Rates (deaths per 100 cows, mastitis per lactating cow, milk per cow, etc.) provide more information than raw numbers. Ten cases of milk fever this month becomes much more meaningful if you know that there were fifteen calvings this month, not five hundred calvings this year. The denominator information (number of calvings, number of cows milking, etc.) is just as important as

the number of cases of the problem. Whenever achievable, the denominator used in the analysis should be a good estimate of the population at risk. For milk fevers this would be the number of cows calving, for abortion the number of cows that are pregnant.

8. Present the information in graphic, understandable terms.

Reams of undigested numbers look intimidating and no one uses them. The monitoring system should flag problem areas for closer scrutiny. Whenever possible, the information should be in a graphic form. The veterinarian should be present to explain and comment on results of analysis. Colored highlighting and handwritten notes will draw attention to specific areas. Information from a herd health monitoring system is best when presented personally, not by computer printouts.

WHAT IS THE DAIRY HERD MONITOR?

The MONITOR is one spreadsheet component of the Dairy Production Medicine Software, a series of spreadsheets for sale only to dairy practitioners for use in their practices [8-10]. The spreadsheets include monitoring, nutrition/ration balancing, economic, lactation curve, and utility functions. Each spreadsheet runs using the LOTUS software package. The practitioner needs very little computer experience or knowledge to use the system. We have distributed approximately 350 copies of the spreadsheets to dairy practitioners and schools of veterinary medicine.

The MONITOR spreadsheet analyzes and presents the herd health and productivity status of the whole dairy herd. It does not keep track of the details or status of individual cows. It produces a two page report (Table 1 a,b) which summarizes this information on several major aspects of the dairy. The practitioner, in cooperation with their client, sets a series of goals for each item. The MONITOR calculates an average for each item for the past year, and compares the average and the most recent month's performance to the goal. It flags items that do not reach goal. The spreadsheet can also graph any item's data for the past year or for all of the stored data (see graphs). Several items can be graphed simultaneously, in a variety of formats.

COMPUTER REQUIREMENTS:

Hardware:

A variety of computers can be used for the Dairy Herd Monitor. Many practices already have the necessary hardware. In order to run the Monitor, you need an MS DOS (IBM

compatible) microcomputer with a minimum of 640 K of RAM memory. You should have a machine that has a color graphics card, even if you will only have a monochrome display screen. Color screens are nice, but not necessary. A hard disk drive is desirable (at least 20 Mbytes) and recommended, but not necessary. If you are starting with computers for the first time, have your computer dealer set the machine up to run LOTUS for your particular hardware, including the printer.

Printing and printers are often the most frustrating part of computers. The printer should be capable of printing compressed print and also of printing graphs. The MONITOR software assumes that the printer is an Epson compatible printer. The only place that this is likely to create conflicts is in printing MONITOR reports. These reports print in compressed print so that all the results print on a standard sheet of paper. There is a special code (\015 to turn it on, \018 to turn it off) built into the printing instructions in each of these spreadsheets. The code tells an Epson compatible printer to switch to compressed print. If your printer uses the same code, no problem. If not, the spreadsheets may need modification (a possible task, but not for the novice).

Software:

The Monitor and the other associated parts of the Dairy Production Medicine package are written to use the LOTUS spreadsheet software. LOTUS is a widely used commercial spreadsheet software package that sells for around $300.

The are a few behind the scenes software configuration items to set up before you start. Your AUTOEXEC.BAT file should include the GRAPHICS command. This is easy to do yourself, or your dealer can do this if you are a computer novice. Invoking the GRAPHICS command makes printing quick graphs easier. If you are installing LOTUS on a hard disk, set it up so that it looks at the A: drive (the floppy disk) for the Monitor spreadsheets. The A: drive will then be the default directory. The LOTUS program itself will be on the hard disk, and the farms' data will be stored on a series of separate floppy disks. There will be one (or several) floppy disks for each farm, plus at least one backup of each farm disk. If you want to change the default drive yourself, the commands in LOTUS are: /WGDDescA:\~UQ (~ means press ENTER and esc means press the Esc key)

SOURCES OF DATA FOR DAIRY HERD HEALTH MONITORING

Dairy Herd Improvement Association (DHIA) Records

The single most important source of information for dairy herd monitoring is DHIA reports from the Dairy Records

Processing Centers (DRPC). DHIA plays the central role in both individual and herd level dairy record systems. The monthly herd summary report is the cornerstone data source for herd monitoring. When followed month to month, the data summary will provide much of the information needed to evaluate the herd's status. [11] Monthly reports vary widely between different DHIA centers in the way they calculate and report information. This can cause problems when comparing parameters between DHIA regions.

Production data derived from DHIA reports are quite reliable. Information about herd somatic cell counts is one of the most cost effective sources of information regarding herd mastitis status. The quality of reproductive data derived from DHIA records depends on the accuracy and completeness of recording and reporting by the dairyman and the on-farm testing personnel. Where recording and reporting are accurate and consistent, these measures of herd reproductive performance are invaluable monitoring aids. Although most DHIA systems lack effective approaches for recording and reporting disease from dairy farms, some DHIA regions (including the Southeast) are developing better schemes for monitoring health events.

DHIA centers have also developed systems for direct connection from the farm into the central computer database, and for linking on-farm computer record systems with the central system. The program for the southeast region is an excellent example of this relatively new development. Their DART system (Direct Access to Records by Telephone) enables either the dairyman or veterinarian to dial directly into the farm's records and to generate a variety of standard or self-defined lists of cows for a variety of purposes. [12] The DART system can be used in several ways: as the primary record system for a dairy, as a way to generate routine herd monitoring reports and action lists, or as an analytic tool for problem investigation.

The DHIA system is perhaps the best example of efficient use of dairy record keeping resources. A system that initially came into existence for other reasons (progeny testing and genetic improvement) now serves many important functions that support dairy production management. For practitioners, DHIA records provide information without any added effort for the dairyman or veterinarian. Dairy veterinarians would be well served to form strong working relationships with their local DHIA centers. The centers have developed a useful set of tools for dairy herd health practice. Dairy practitioners need to learn how to access and use these tools. These are the tools that allow a veterinarian to do a "physical examination" on a herd.

Individual cow records: paper and microcomputer systems

Depending on the dairy, individual cow record systems provide much of the data for monitoring the herd. There are many individual cow record systems, from white-washed barn walls to individual cow card systems to on-farm or practice based microcomputer systems. The actual type of system is less important than the accuracy and completeness of the data. Accessibility of the data to answer herd related questions is often difficult with individual cow records. Particularly on large dairies, paper record systems may become too cumbersome. There are several excellent microcomputer based dairy record systems available commercially. Depending on their design, they significantly reduce the difficulty of gleaning information from individual cow histories. Several of these systems now communicate directly with some DHIA centers, exchanging data between the microcomputer and the central system. This is the next logical step in the evolution of dairy record systems for large dairies. The expense of such systems may make them impractical for small dairies (<100 cows), unless the farm also uses the computer for other farm management and business activities.

As the size of a herd increases, searching the individual cow records for important monitored items becomes difficult. These items include things like incidents of disease and treatment, inventory of all ages of animals, and events such as parturition and insemination. In addition, some routine measurements from each dairy, such as body scores, feeding program information, and heifer growth rates are needed. We designed a paper data collection form to collect that on-farm data. Figure 3 a,b shows the front and back of the form (the paper monitor). The form hangs on a clipboard on the dairy. The dairyman checks the front of each sheet daily, recording the animal numbers for each monitored item on the appropriate line. The backs of the sheets are used at herd visits to collect herd data. Other areas on the form serve as a convenient place to record herd data from other sources such as mastitis laboratory results. Each DHIA test day, the dairyman begins a new paper monitors and sends the completed one to the veterinarian. These forms, along with the DHIA monthly summary report for the same period, provide the data for the MONITOR.

Practice and laboratory records

Particularly for mastitis, laboratory results play a significant role in the monitoring of herd health. Bulk tank cultures done on a routine basis provide a picture of udder health, milking hygiene, and the types of pathogens present in the herd. [13] Whether done in the practice itself, or in outside diagnostic laboratories, these data are important parts of herd monitoring systems.

STRUCTURE OF THE MONITOR

Table 1 a,b shows the complete analysis and results section of the MONITOR. Each row contains the information about a particular monitored item. The first column contains the name for the item, followed by the analysis section and then the data section. The columns in the data section on the right store the actual herd data, one column per month, with the most recent month on the left. The order of the data (newest on the left, oldest on the right), is worth emphasizing, since the left to right ordering is the same when graphs are drawn. The printed report in Table 1 shows only the past year's data. Data in months before August 1987 are stored in the spreadsheet farther to the right.

Table 2 a,b shows the goals section for the MONITOR. There are three columns, the goal itself, the description of the item, and the source of the item. The paper monitor is the "MONITOR" referred to in the third column of Table 2. Some items are calculated from other items; the source for these is "CALCULATED." An example is Adjusted Corrected Milk (ACM) in the production section of the first page of the MONITOR. You enter the items needed to compute this figure elsewhere, and the spreadsheet calculates ACM automatically.

Table 3 shows the top of Page 2 of the MONITOR and how the goals, analysis, and data sections line up next to each other. The goals section includes the first three columns: goal, description, and source. The fourth column repeats the item's name, for display and printing purposes. The analysis section fills the next several columns and then the actual farm data are displayed. Table 3 only displays the past 2 months, but the example herd has about 4 years of data recorded farther to the right, back to February, 1985.

The first of the analytic columns calculates the average for the item over the past year. These are rolling averages. As a new month is added to the MONITOR, the same month a year ago is dropped from the calculations. After the averages column, there is a column for goals for an average month on the left and for goals for the current month on the right. These columns are not entered, they are calculated from the goals set in the first column in the goals section to the left. Look at the item "Retained Placenta" in Table 3, and the arrangement of the analytic section will become clear. The goal for retained placenta is set in the far left column at 5 percent of calvings. In August, 1988, the example herd had 14 cows and 13 heifers calve, a total of 27 calvings. These are entered in the data column in the first few lines in Table 3. The spreadsheet multiplies 27 calvings by 5 percent and sets the goal for retained placentas for this month to be 27 * 0.05 =

1.4 cases of retained placenta. The actual herd performance was 5 cases of retained placenta. This exceeds the calculated goal and so the MONITOR flags the item by placing a star between the goal and the actual data. The process for the average month is the same. In an average month there have been 21.8 calvings in the herd (12.8 + 9.0). The goal for retained placentas for the average month is thus 21.8 * 0.05 = 1.1 cases per month. The actual average number of cases is 2.1 and so it is flagged. The stars in both columns signify that the herd has had more cases of retained placenta than the goal in an average month in the past year, and that the trend has continued this month.

The need for two analytic goal columns should now be clear. In our example case of retained placenta, the MONITOR based the goals for an average month on the results for an average month. Goals for the current month were based on the data for the current month. As the retained placenta example shows, the year's average performance for a given item (number of calvings) may not be the same as this month's performance. The denominators for goal calculations are different for the two analyses. There were 27 calvings in the current month of the example, while there were 21.8 calvings in an average month.

The goals expressed in the analysis section are always in absolute numbers, so that they can be compared to the absolute numbers of performance. Again using our retained placenta example, the MONITOR displays the goals as cases of retained placenta, so that they can be compared to actual cases of retained placenta. We have tried to base goals on animals at risk of the disease. For example, the goal for retained placenta depends on the number of calvings, not the total herd.

The analysis columns can be scanned for starred items to locate problem areas in the herd. Stars in both columns mean that the herd is generally not doing well for that item. A star in the average column and a dash in the current month's column means that the herd is probably making improvement and has finally reached its goal. A dash in the average column and a star in the current month's column may signal that something has recently gone wrong in the herd relating to that item.

Besides the items displayed in the MONITOR, there are seven lines scattered in various areas that allow the veterinarian to monitor custom items of their choice. Different herds have different problem areas; the custom lines allow the MONITOR to adapt to changing needs. The items can also be redefined in the stage of lactation and body score sections. DHIA record centers split the stages of lactation differently; the MONITOR can be changed to reflect the local DHIA conventions.

AUTOMATIC FUNCTIONS IN THE MONITOR:

The MONITOR automates several functions into behind the scenes "macros" that make things easy for the user. These functions are invoked by holding the ALT key down and typing the letter of the function you want. For example, ALT H takes you to an explanatory help screen, ALT N prepares the MONITOR up for a new month's data entry, ALT G starts the graphing function, etc. Figure 2 lists these functions.

OUTPUT FROM THE MONITOR:

There are two types of output from the MONITOR: tabular reports like the ones shown in Tables 1 and 2, and graphics output. The report prints on 2 pages of standard 8.5 x 11 paper. In practice, the veterinarian should never simply mail the report to the dairyman. Dairymen will probably ignore it, just like they ignore their DHIA report. The best approach is for the practitioner to highlight the report and write notes on it, and then to hand deliver the report at the next herd visit.

The MONITOR's ability to draw graphs is one of the major strengths of the program. Graphs visually evaluate trends in a herd in way that tables of numbers cannot. By far the most commonly used ALT function is ALT G, the graphing macro. By choosing from a series of menus, the user can create graphs of the dairy's data. Three types of graphs can be drawn: line, bar, and stacked bar. The past year's data can be graphed, or the graph can include all the data stored. Up to six different items can be selected for simultaneous display. Beyond these automated options, all of the graphics capability of LOTUS is also available to the user.

Graph 1 depicts the changes in rolling herd average and mature equivalent milk production for cows and first calf heifers during the past four years. The time scale runs from right to left with the most recent month to the left. One can quickly see that the herd average increased from approximately 15,000 lbs. of milk in the spring of 1985 to a peak of 17,500 lbs. in the summer of 1986. A major drop in rolling herd average production occurred since the summer of 1986. Examination of the data for mature equivalent production, however, reveals that mature equivalent milk production has generally improved over the whole period. We will discuss this farther below, in the section on specific items and their interpretation.

COMPARING SEVERAL HERDS

The Dairy Production Medicine Software system includes another spreadsheet (HERDCOMP) that will assemble a single month's performance from many dairies into another analytic spreadsheet, one column per dairy. This allows a practice to evaluate trends across all herds using the MONITOR. Comparisons between herds in a practice may also motivate change in dairymen as they see how well their neighbors are doing.

IMPLEMENTING THE MONITOR

When a dairy practice first begins formally monitoring the status of client herds, it is best to begin slowly, usually with only a few herds. The best start-up herds are those with good existing records, that have a good and stable relationship with the practice, and that have innovative dairymen. It is useful to start by meeting with the dairyman to discuss the program, including the tasks required of the veterinarian and of the dairyman. [3] Monitored herds must be part of the Dairy Herd Improvement Association (DHIA) records program. There will be a period of trial and error in getting started. Few practices are accustomed to routine computer record keeping for their clients and there will be a break-in period while everyone becomes computer literate. For practices already using computers and accustomed to analyzing DHIA records as a routine, the initiation period will be brief. Dairy herd monitoring is an art and a science. Like physical examination of an individual animal, monitoring becomes more efficient and effective with experience.

Obtaining the data to enter into the MONITOR is ninety percent of the battle. Motivating the client to keep additional records may prove difficult at first. Experience shows that the best way to begin is to enter a complete past year's DHIA data, even though the paper monitor data will be missing. The client will see the value of keeping the chronology of records, of graphical analysis, and you will spark their interest in keeping the additional data on the paper monitor. Trying to reconstruct the paper monitor data from the past is usually not a rewarding effort, unless the farm's records are particularly complete and organized. In the beginning, the DHIA data may have serious inaccuracies, particularly in the areas of reproduction and feeding program information. Routine use of the MONITOR often motivates the client to improve their reporting to the DHIA test personnel.

To get the DHIA herd summary information, have the client ask their DHIA processing center to mail a copy of their monthly report directly to the veterinary practice. This avoids having to borrow and return the client's report each month.

Getting the paper monitor data may be somewhat more difficult. If the veterinarian uses the paper monitor data at each herd visit and urges the dairyman to keep track of events, the process gradually becomes a habit. The dairyman should fill in the paper monitor daily; filling in the data takes only a minute if it is done regularly. If not completed daily, accuracy suffers.

The dairyman should begin a new paper monitor the day the DHIA tester comes, mailing the completed forms to the practice that day. Both the herd DHIA summary report and the paper monitor will arrive at the practice for clerical data entry at about the same time. Plan the herd visit about two weeks after the DHIA test date. This will leave time to receive the data in the mail and produce the graphs and reports before the next herd visit. This is an effective way to initiate discussion about herd health problems.

At first veterinarians may want to enter the data themselves until they are familiar with each item, the items' interpretation, and how the spreadsheet works. After the system is familiar to the veterinarian, the data entry can become a clerical task. Data entry takes about 15 minutes per herd each month. It may be a useful process for veterinarians to enter the data for each herd themselves every few months. The process of entry often stimulates thoughts about a particular farm's problems that do not arise from only looking at the printed results. The time of entry is also a good time to draw graphs of problem areas to aid in analysis.

Once the results are printed, the practitioner should mark the client's copy with her/his comments. This emphasizes the veterinarian's role as interpreter of the data, and avoids the problem of producing one more multi-page computer printout that collects dust in the corner of a farm office. Colored highlighting markers work well to emphasize areas that deserve attention (green for congratulations, red for trouble, yellow for areas to talk about).

There have been two common difficulties that arise as the MONITOR is introduced into a veterinary practice. If too many herds are begun at once, the start-up effort interferes with the normal flow of work in the practice. The other problem (opportunity?) occurs after the MONITOR is running. As problem areas come to light that were previously unknown or at least ignored, clients turn to the practice for solutions. For some practices this new demand for services creates problems, either because the practice is too busy or because it does not have the expertise needed. Both of these start-up problems can be avoided by beginning with only a few herds.

SETTING GOALS FOR THE MONITOR

After long term use of the MONITOR in several herds and discussions with practitioners who have been using the MONITOR, some basic approaches emerged about how goals can be set for different herds. Goal setting is not a static process. Goals will vary from farm to farm and will vary over time on a particular farm. A good starting point for goals is simply to take the average DHIA performance levels for similar herds use them as the initial goals. Table 4 provides those averages, broken down by herd production level, for the Dairy Records Processing Center at Raleigh. [14]

Starting with DHIA averages for goals has several advantages. It is easy to get the numbers and to set the goals. When explaining the goals to the dairyman, one can simply point out that these are the average values for other dairies at the same level of milk production. If the dairy is not at least reaching those averages, it is fairly clear that there is problem in that area. For the factors that do not have DHIA summary data (i.e., that come from the paper monitor), we recommend that veterinarians begin with their own judgement and experience in their local area. Published data may also aid in the development of appropriate goals.[13,15-23]

As time goes by within a herd, the veterinarian will gain confidence about which areas in a herd need intervention and where goals should be adjusted, either up or down. Some goals stay the same forever. For example, it is probably useful to set the goal for services per pregnancy somewhere between 1.5 to 2.5. That particular goal may never vary. Rolling herd average milk production, however, is the opposite case. The goal can be set 500 to 1,000 pounds above the herd's current level. When the herd reaches the goal, the dairyman can raise it higher (after an appropriate congratulatory period). The DHIA and "standard" figures are useful reference points and may be excellent motivators and should be viewed as starting points in developing goals for a dairy. Do not blindly accept DHIA performance averages and literature reports as goals. Performance in some herds will already exceed these targets, while in some herds the facilities, management skills, and herd status may make standard goals hopelessly high and discouraging. Set goals in such a way that they motivate positive change without discouraging effort. This varies from farm to farm, over time, and particularly from manager to manager.

A more philosophical question is whether one is setting goals (long term hopes) or interference levels (if it gets that bad you will do something). In practical day-to day management on a farm, the distinction between these two approaches to goal setting is less clear and is probably not important. From a

management perspective, goals are targets toward which one shoots with the intention of achieving them in the foreseeable future. Goals should be reasonable and achievable. The question of whether a deviation from a goal (not being where one would like to be) is an interference level depends significantly on what it takes to interfere. If it is going to cost $10,000 dollars to build a new barn to reduce calf mortality from the 6% to 5%, then it is probably not worth doing. If all it takes is an off-handed comment about insuring adequate colostrum intake, then one should interfere. A magical interference level cannot be specified below which one does nothing and above which one acts. The whole process is far too dependent on what the "something" is that one plans to do. This is the art of being a dairy veterinarian and where experience pays off.

SETTING UP DISKS FOR A PARTICULAR HERD

There are too many spreadsheets in the entire group of software in the Dairy Production Medicine Software to fit on one floppy disk. Generally, one wouldn't want all the spreadsheets for a particular herd anyway. The most effective way to organize the files is to create a separate disk for each herd. Typically, the disk will have the MONITOR for the herd and several of the analytic spreadsheets. If the dairy is on a nutrition program with the practice, the nutrition files probably should be on a separate disk for the herd. Don't forget to make backups of each floppy disk! Set up this way, there might be two disks for each herd, for example:

SMITH DAIRY HERD MONITOR DISK containing:	SMITH DAIRY NUTRITION DISK containing:
MONITOR	DARYFEED
MASTECON	MIXWAGON
PGFECON	FORAGES
REPRDCTN	
HFRCHART	

Other herds might use other spreadsheets, while some spreadsheets, like HERDCOMP or HFRCHART, would be on no individual herd disk.

MAJOR MONITORED ITEMS AND THEIR INTERPRETATION:

Types of items:

Since most of the following discussion will be about specific items from the MONITOR, it seems reasonable to make some general comments about monitored items. There are three general types of monitored items: status, explanatory, and denominator items. A particular item may have characteristics of more than one type, but the distinction is valuable when interpreting an item.

Status items are those that monitor performance of the dairy, things like rolling herd average, milk per cow per day, average days open, or age at first calving. Status items are sort of "bottom line" items, the ones you look at first.

Explanatory items are the ones you use when the status items are not where you want them. Suppose, for example, that average days open is too big, say 134 days. A reasonable next question might be "Is it because of poor heat detection or poor conception?". Percent of heats bred and 1st service conception rate are items one can use to **explain** the poor status of average days open. In this situation, they are explanatory items. The distinction becomes blurry. Average days open was the status item in this example, but it could just as well be the explanatory item for poor milk per cow per day. Drawing the distinction emphasizes the difference between things you would like to change for their own sake (milk production, somatic cell count, butterfat, culling) from things that you want to change because they contribute to other problems (percent of heats bred, dry matter intake, heifer peak milk). If a farm had great conception and could achieve a 100 day open interval even with poor heat detection, you might not want to work on heat detection. Average days open, not heat detection, is the reproductive "bottom line."

Denominator items create standardized rates for evaluating status and explanatory items. If you want to know if the herd has too many milk fevers, you have to know how many calvings there were. Number of calvings in this example is a denominator item. The inventory section mostly only serves this function.

The standard MONITOR items cannot answer all questions about what is going wrong on a dairy. It **can** point the way toward the likely cause of trouble, and track improvement as you work on the problem. Sometimes the data are there, but the relationship you need are not a set part of the MONITOR. One of the strengths of the system is that you have access to LOTUS and the custom lines. A little bit of creativity can go

a long way to answering questions. Suppose that you think a herd's rolling herd average has dropped because they are milking too many heifers, not because individual production has declined. There is no item "percent heifers milking," but you can go to a custom line, type in the name and set up a formula to create the item. The formula for column M would be (M42/(M42+M43)). Copy the formula into the remaining cells in the row (LOTUS /C command), and you now have the item you need (see Graph 11).

Momentum:

Another useful idea is the "momentum" of items, both biological and computational. Biological momentum is the easiest to understand; veterinarians deal with it daily. Biological momentum is the resistance to quick change in the biology of the system. Youngstock programs are a good example of biological momentum. If a dairy has been doing a poor job of raising heifers (calving at 32 months), you can change everything overnight (housing, nutrition, parasite control, breeding, etc.) and for at least a year heifers will still be too old at calving. The past biology simply has too much momentum to change quickly. Dry matter intake is an item with little biologic momentum. If you change the ration to balance NDF, increase bunk space, provide shelter at the bunk, and start a new silo of better silage, the dry matter intake can increase tomorrow.

Computational momentum is a bit tougher to grasp, but important for monitoring. It depends on the item's calculation, particularly for DHIA production and reproduction figures. Rolling herd average, for example, has a lot of computational momentum. Because it includes data from 12 test days, any single test report cannot change rolling herd average much. Mature equivalent milk has less computational momentum than herd average, but more than milk per cow per day. Items with high computational momentum are good for tracking general trends, those with low momentum for spotting new problems.

Average days open is another case of high computational momentum. If you can hire a new, talented breeder and improve heat detection, the biology of reproduction will change overnight. Average days open will change slowly, because DHIA includes all pregnant cows bred under the old, poor management in the calculation. The only way to change items with high computational momentum quickly is to cull cows and remove them from the database. If average days open drops 30 days between two tests, be suspicious that cows were culled, not that a reproductive miracle has happened.

Page 1:

Page 1 of the MONITOR covers herd production, production by stage of lactation, feeding and body scoring, inventory, and culling. In addition, the first page includes four lines that can be customized by the practitioner to monitor some non-standard aspect of the dairy.

The first section covers a variety of productive parameters in terms of total milk production, mature equivalent productions, milk per cow per day, herd stage of lactation production, value of milk, and cost of feed. For the Raleigh DRPC, these are all taken from the DHIA report. There are two calculated items in the first section: adjusted corrected milk and feed cost as a proportion of income.

Rolling herd average (RHA) is a general measure of herd productivity. It is the bench mark for comparisons with other herds and is a crude estimate of the dairy's income from milk. Projected mature equivalent (ME) milk production is the average estimate of how each cow would milk if she were at her lifetime peak lactation. Graph 1 shows the example herd's performance for rolling herd average and cow and heifer mature equivalent milk production over the past 4 years . Mature equivalent milk production adjusts production for age and season at calving with factors specific for each DHIA region. On an individual basis, ME milk will allow comparison between first calf heifers and older cows on an "equal" footing. On a herd basis, average heifer ME is usually 400 - 600 pounds less than average cow ME (Raleigh DRPC). Although the genetics of heifers is usually better, the cows have been culled more heavily. Graph 21 illustrates the difference between the two ME milk productions.

Graph 1 shows that rolling herd average milk has dropped over the past two years; a drop of as much as 2,000 pounds and a return to the herd's level when the MONITOR was begun. This drop translates into about $60,000 (2,000/100 * $14.65 * 200 cows) of lost revenue per year. Over the same period, mature equivalent production for both heifers and cows has gone upward. So how can the mature equivalent go up while the herd average goes down? The drop in RHA cannot be blamed on individual cow productivity, so another explanation is needed.

1) milk more heifers: Graph 10 shows this to be true. Graph 11 shows it on a proportional basis (this is the result of using LOTUS to create a custom item). More than 40 percent of the milking herd are now heifers.

2) milk more late lactation cows: if the average days in milk increases because of long days open, the herd will spend more time in late lactation. This will reduce herd milk

production without affecting mature equivalent averages. Graph 2 shows that average days in milk had increased dramatically about a year ago, paralleling increased days open (Graph 16). There has been some turn around lately, with a corresponding improvement in herd average. Graph 3 shows the effect of poor reproduction on average days dry. Note the lag time for the impact on days dry.

Graph 4 shows the herd's test day milk per cow per day and adjusted corrected milk. Adjusted corrected milk is a standardized measure of milk production per cow per day. It is standardized as though the herd were always 150 days in milk, produced 3.5 percent butterfat, and had 35 percent first calf heifers. It is a useful and sensitive measure of herd production that is less confounded by change in herd status not related to production. Notice in Graph 4 how the general trend is upward, but how seasonally variable daily production is. Also notice how last summer the actual production dropped much more than adjusted corrected milk. The actual drop was due to increased days in milk (Graph 2), not due to a feed management problem. Adjusted corrected milk shows that the herd was doing better than in any previous summer.

The second section provides space for peak milk and productivity by stage of lactation. This section a "poor man's lactation curve" for the herd. Graph 5 shows the gradual rise in peak milk for the herd. Peak milk is a cow's best test day production. Peak milk sets the rest of the cow's lactation curve. If you raise peak milk by 1 pound, then the total lactation production increases by more than 200 pounds. Besides peak milk, there are stage of lactation production figures for several stages of lactation. Graph 6 shows production in the first and second trimesters of lactation for cows. Notice how something last summer severely hurt the cows in early lactation so that they were doing no better than cows in mid lactation. The same thing happened in previous summers (heat stress for dry, calving and early postpartum cows), but the last summer was worse. (See how easy it is to compare between years when you have graphs?!) Graph 7 shows the same information for heifers and the same pattern holds. I would want to look at prepartum feeding, calving areas, and early lactation nutritional management.

If you believed the previous paragraph, you fell into one of the more common traps in monitoring:

YOU FORGOT TO CONSIDER THE DENOMINATOR!

Look at Graph 12. Notice that there were only a few calvings leading into the last summer. Maybe the whole "problem" of poor adjustment in early lactation that summer was the result of a couple of lousy milkers pulling the average

down among a small group. In small herds, (and in this case 200 cows is still small), you have to watch some items carefully for the impact of small denominator groups. This is particularly true for items with small computational momentum.

The third section of Page 1 includes dry matter intake and body scores. Dry matter intake is a crucial element of monitoring a nutritional program. If there is a drop like the one this month in Graph 8, it is an emergency. Check it for accuracy first and if true look for changes in the delivery program or spoiled/moldy forages. Body scoring is another valuable monitoring aid for nutrition. It is easy to learn and can track the gradual impact of feeding programs in ways that production alone cannot. Increasing production at the expense of herd average body scores will backfire in the long term. Graph 9 shows the gradual decline in scores in the example herd. The gradual downward trend in body scores correlates well with the decline in dry matter intake. Be suspicious of graphs like this one; I would suspect that the herd was not as consistent as it appears, but rather that it was only scored three times. Remember, the MONITOR will just repeat last month's number if you don't enter a new value.

The fourth section of this first page is the herd inventory. Keeping inventory accurate is important because many of the MONITOR's goal calculations depend on inventory figures as denominators. Inventory figures can also be important explanatory items, as Graphs 10 and 11 were for rolling herd average.

The final standard section of the first page is an analysis of the culling program. Culling is driven more by season, tax reasons, and setting milk production base, so goals to evaluate culling in a particular month make little sense. Rather than averaging each month, the spreadsheet sums cows culled and compares these to goals. For culling, goals are set as totals for the year. Our example herd has culled 87 cows in the last year, 40 % of the herd (87/216)! Most of those culls have been involuntary. I would suspect that the recent drop in average days open (Graph 16) reflects heavy culling for reproduction. There may also have been excess culling for clinical mastitis (see below).

Page 2

Page 2 monitors data pertinent to the reproductive program, mastitis and adult cow disease, and calf and heifer health, and growth and age at calving. While DHIA records are the essential backbone of dairy herd monitoring, they are incomplete sources for the data needed to evaluate a herd's status. The MONITOR depends on the paper monitor for incidence data (dystocias and calvings, etc.). The reproduction section follows the normal reproductive flow on the dairy: calving, peripartum and early postpartum disease, breeding, pregnancy confirmation and loss, and overall reproductive performance.

When evaluating the herd's reproductive status, work from the bottom up. Start with average days open and work backwards to find the problem area. For the example herd, the record has been spotty. Average days open have been as high as 190; a remarkably poor performance (Graph 16). The recent improvement in average days open is encouraging, but keep in mind that culling made the improvement.

The major problem has been heat detection; percent of heats bred has dropped as low as 10 percent while 1st service conception rate has been fairly stable (Graph 14). The heat detection problem must have been a labor problem. Someone/everyone must have stopped looking.

Services per pregnancy: all cows (S/P:all) is a measure of the effectiveness of the AI program. Services per pregnancy: pregnant cows (S/P:Preg) is a measure of the ability breed fertile cows successfully. It is affected by semen quality, insemination technique, timing of breeding, and accuracy of heat detection. If S/P:all is substantially larger than SP:preg (S/P:all - S/P:preg > 0.5) then there are a substantial number of problem breeder cows in the herd. These may be infected cows, cystic cows, etc. Generally if the difference is high it reflects an unwillingness of the dairyman to cull chronic repeat breeders.

There has been a gradual upward trend in both services per pregnancy statistics for the example herd (Graph 15). The general upward trend in S/P:preg suggests that the herd may need to evaluate breeding technique or nutritional causes of infertility. The broad difference between S/P:all and S/P:preg indicates a problem cow problem.

Different peripartum diseases often occur together on dairies. Herds with dystocia rates also have high rates of retained placenta, metritis, stillbirth, etc. These situations can be highlighted by drawing stacked bar graphs. Stacked bar graphs emphasize the accumulation of problems while de-emphasizing the particular type of problem. The very high

incidence of peripartum disease problems (Graph 13) suggests a general breakdown in dry cow and calving management. The calving area may be filthy (metritis), dry cow nutrition may need attention (R.P.) and workers may need training on how to handle dystocias (calf death). If these areas can be improved, then the number of problem breeder cows might be reduced. The apparent seasonal trend in Graph 13 is not real; it only tracks with the number of caws calved. (To confirm this, lay Graph 12 on Graph 13 and look at a light.)

Mastitis indices include somatic cell count data, clinical disease, and bulk tank milk evaluation. Goals for somatic cell counts are based on the log linear cell count code adopted by DHIA. For the example herd, the current average linear score is quite acceptable, although there was a serious rise in the previous summer (Graph 17). The current mastitis problem in the herd is not subclinical infection but rather clinical disease. The incidence of clinical mastitis in the herd is staggering (Graph 18). At an average of 22 cases per month, there were 264 cases of clinical mastitis over the last year; more than one case per cow in the herd! This must be an environmental organism problem. The somatic cell count would not be so low if the clinical mastitis were due to contagious pathogens like Staphylococcus aureus or Streptococcus agalactiae. I would focus attention on drying out a wet environment: mud, manure, filth in the calving lots, freestalls and holding areas, and on drying udders at milking. Prompt removal of the claws at the end of milking may also need attention. Part of the herd's high culling rate reflects cows that were ruined by clinical mastitis.

The disease section tracks only the major diseases in adult cows. As discussed previously, it is important to be aware of what was chosen as the denominator for calculating goals for these items. There has been a gradual rise in the overall rate of three diseases related to nutrition in the example herd (Graph 19). This includes milk fever, displaced abomasums, and lameness. The last two of these suggest that the milking cow ration may have inadequate fiber. The scattering of milk fevers should direct attention back to the dry cow feeding program.

The bottom of Page 2 is devoted to youngstock. The MONITOR tracks morbidity and mortality for the three major phases of the youngstock program: pre-weaning, pre-breeding, and bred heifers. Along with average age at calving and first lactation milk production, these items serve as a touchstone for monitoring the effectiveness of the youngstock rearing program. In the example herd, the ME milk of the heifers has gradually improved over time, catching up with the cows. (Graph 21). This would be more heartening if the average age at calving had not increased at the same time (Graph 20). Trading

late calving for better first lactation production is false economy. Heifers that calve at 24 months will produce more milk over a lifetime than heifers that calve later, even thought the older calves milk better in their first lactation. There have been a few outbreaks of disease in the preweaned calves, particularly last winter (Graph 22). I would predict a breakdown in management, either hygiene or assuring that calves get adequate colostrum.

FINANCIAL EVALUATION:

There is another dimension to dairy herd monitoring: the financial evaluation of a herd's status. Asking about biological status (days open, average somatic cell count, age at first calving) is the first step, asking what the problems cost is the second. A series of additional spreadsheets can help the practitioner in this arena by providing templates for partial budget evaluation of a herd's financial performance in several critical areas.

Reproduction:

Table 5 shows an estimation of the cost of an additional day open resulting from reduced milk and calf production. The spreadsheet uses regression coefficients for a five state region in the southeastern U.S. [24] The reproductive losses are substantial: $1.89 per day open beyond 100 days for milk and calves (Table 5), and $3.56 per day open including the high rate of culling for reproduction (Table 6). Table 6 also segments the reproductive losses by major category of cause. For the example herd, the major loss is in excess culling, emphasizing that culling one's way to a short calving interval may not be the most profitable route. The example herd's total yearly losses to reproduction (milk, calves, culls) adds up to $93 per cow per year or $21,930 lost for the herd as whole.

One possible way to improve on the herd's reproductive performance would be use prostaglandin to induce estrus. A decision tree model spreadsheet can estimate the profitability of such a decision. [25] The results show that use of prostaglandin (either adoption or continued use) would be a profitable intervention (Table 7). Each use to induce estrus could net between $29 and $47 for the dairyman, depending on the approach taken to insemination.

Mastitis:

A spreadsheet to calculate losses due to mastitis shows that mastitis is costing the example herd about $18,700 per year above a reasonable goal level of loss (Table 8). [26] Not surprisingly, the major avoidable loss is for treatment of clinical cases.

Youngstock:

The cost of the delayed calving for the example herd is very large. Table 9 estimates the annual loss to be $25,000, plus a one time gain of $72,000 that is available as the herd returns its average age at calving to 24 months. This is the leader for losses for the farm, particularly if one also were to factor in its effect on the level of production and the costs of mortality. This farm is like many dairies: the major economic strides could be made in the youngstock program while the major veterinary focus is often on reproduction.

These financial spreadsheets illustrate several important points about financial analyses. No financial analysis can take everything into account. The mastitis spreadsheet, for example, does not consider any premiums paid for reduced somatic cell counts. When using these spreadsheets, you have to ask yourself whether the major factors have been considered. Be careful not to over-interpret the precision of the estimates. The mastitis spreadsheet, for example, reports the loss to mastitis over goal as $18,708. You can probably be confident that the real loss is near $18,000, but you probably cannot be sure whether it is $18,800 or 18,600.

The most important point about these analyses is that they always start from some assumed baseline of comparison. The baseline for the cost of a day open was the goal of 100 days. For the value of prostaglandin, it was the cow given no drug. For mastitis, the baseline could either be a herd with no mastitis or a herd that had reached some reasonable and achievable goal level of mastitis. For mastitis, the latter seems a more reasonable baseline, since no herd will ever be entirely free of mastitis. While it may be more impressive to tell the dairyman that mastitis cost a total of $44,697 last year, it is more honest to say that the loss was $18,708 beyond what was possible. It is the losses beyond goal that the veterinarian and dairyman can address.

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Figure 1

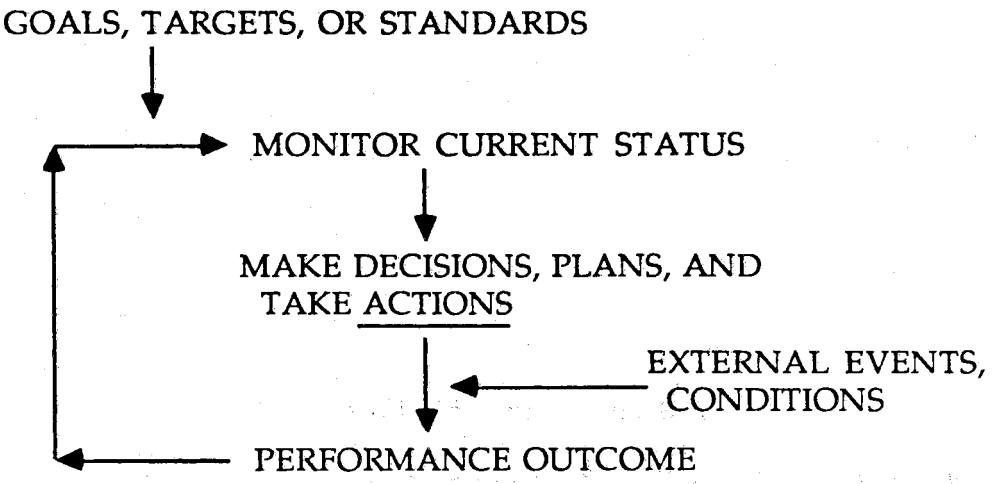

GOALS, TARGETS, OR STANDARDS
MONITOR CURRENT STATUS
MAKE DECISIONS, PLANS, AND
TAKE ACTIONS
EXTERNAL EVENTS,
CONDITIONS
PERFORMANCE OUTCOME

Figure 2

SPREADSHEET HELP SCREEN

ALT H	return to this table for help
ALT M	use the command menu
ALT D	go to the data and analysis section
HOME	go to the goals section
ALT S	go to the menu to move around the spreadsheet
ALT G	draw graphs using the menu approach
ALT R	print the results table
ALT P	print the goals table
ALT N	set up for a new month

HERD MONITOR
FARM SHEET
****

****) COMPLETE THE FRONT OF THIS SHEET DAILY!! (****

****

Herd:
Month:

() : usually completed at herd check) Animal's #

REPRODUCTION: Total

Cows calved: _____ : _____
_____ : _____
Dystocia in cows: _____ : _____
Heifers calved: _____ : _____
Dystocia in heifers: _____ : _____
Calves born dead or dead first day: _____ : _____

****

Retained Placenta: _____ : _____
)Treatment for uterine infection: _____ : _____
)Treatment for cysts: _____ : _____

****

Milking animals bred this month: _____
_____
_____
_____ : _____
)Pregnancy examinations this month: _____
_____
_____ : _____
) Animals not pregnant: _____ : _____
)Animals checked pregnant, now open _____ : _____
Visible abortions: _____ : _____

****

ADULT COW DISEASE:

Mastitis: clinical cases: _____ : _____
Udder edema: _____ : _____
Milk fever: _____ : _____
Ketosis, off feed: _____ : _____
Displaced abomasum: _____ : _____
Cow diarrhea: _____ : _____
Respiratory disease: _____ : _____
Lameness: _____ : _____
Other: _____ : _____

****

Cows: Voluntary culling: _____ : _____
Cows: Involuntary culling: _____ : _____

****

CALF AND HEIFER HEALTH:

Birth to weaning-Treated: _____ : _____
Birth to weaning-Dead: _____ : _____
Weaning to breeding-Treated: _____ : _____
Weaning to breeding-Dead: _____ : _____
Breeding to calving-Treated: _____ : _____
Breeding to calving-Dead: _____ : _____
Youngstock culled: _____ : _____

****

YOUNGSTOCK INVENTORY:

Birth to Weaning: _____
Weaning to breeding: _____
Breeding to calving: _____

Figure 3b

HERD MONITOR
FARM SHEET
****

BODY SCORE:

1 - 40 DAYS		41 - 100 DAYS		101 - DRY		DRY COWS	
ID	SCORE	ID	SCORE	ID	SCORE	ID	SCORE
1.		1.		1.		1.	
2.		2.		2.		2.	
3.		3.		3.		3.	
4.		4.		4.		4.	
5.		5.		5.		5.	
6.		6.		6.		6.	
7.		7.		7.		7.	
8.		8.		8.		8.	
9.		9.		9.		9.	
10.		10.		10.		10.	
11.		11.		11.		11.	
12.		12.		12.		12.	
13.		13.		13.		13.	
14.		14.		14.		14.	
15.		15.		15.		15.	
16.		16.		16.		16.	
17.		17.		17.		17.	
18.		18.		18.		18.	
19.		19.		19.		19.	
20.		20.		20.		20.	
TOTAL:							
AVERAGE:							

****

FEEDING PROGRAM:

BULK TANK: SCC_____

Total bacteria_____

Dry matter intake: _____

Total pathogens_____

****

HEIFER SIZE:

AT BREEDING:	
ID	SIZE
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	
TOTAL:	
AVERAGE:	

AT CALVING:	
ID	SIZE
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	
TOTAL:	
AVERAGE:	

DAIRY HERD MONITOR PAGE 1
EXAMPLE DAIRY

MONTH AND YEAR	AVERAGE MONTH	GOALS AV. MO	GOALS THIS MO	AUG 88	JULY 88	JUNE 88	MAY 88	APR 88	MAR 88	FEB 88	JAN 88	DEC 87	NOV 87	OCT 87	SEPT 87	AUG 87
PROD, NUTR, FEED PROGRAM																
ROLLING HERD MILK	15672	*18500	18500 *	16071	15661	15414	15432	15409	15265	15341	15482	15628	15850	16121	16387	16656
ROLLING HERD % FAT	3.93	- 3.8	3.8 -	3.80	3.90	3.90	3.90	3.90	3.90	4.00	4.00	4.00	4.00	4.00	3.90	3.90
HFR PROJ ME MILK	18357	*19256	19256 *	18853	19522	19349	19285	19377	18239	17584	17174	17443	17711	17806	17940	17855
2nd PROJ ME MILK	0	*19900	19900 *	0												
COW PROJ ME MILK	18356	*19925	19925 *	18898	18969	18684	18648	18597	18136	17665	17637	17894	18044	18505	18599	18627
% COWS IN MILK	85	* 88	88 -	90	86	83	86	92	89	89	86	76	78	80	81	79
AVE DAYS IN MILK	182	* 160	160 *	163	162	169	180	166	159	156	176	180	199	227	249	251
AVE DAYS DRY	67	* 65	65 *	74	72	70	70	70	69	67	66	64	63	61	61	60
MILK/COW/DAY	52.8	* 58.0	58.0 *	54.3	58.1	59.0	60.7	62.4	58.9	53.1	50.0	51.2	43.8	43.7	38.7	42.1
ADJ CORR MILK	60.5	* 62.6	62.6 *	58.5	62.2	66.8	67.8	64.9	61.7	56.9	56.3	57.4	52.6	56.9	54.9	56.1
% FAT D.O.T.	3.85	- 3.80	3.80 *	3.60	3.60	3.90	3.70	3.50	3.70	3.90	4.00	3.90	4.00	4.10	4.30	3.80
MILK BLEND PRICE	14.65	-12.00	12.00 -	14.65	14.65	14.65	14.65	14.65	14.65	14.65	14.65	14.65	14.65	14.65	14.65	14.65
VALUE OF PRODUCT	6.60	* 7.00	7.00 *	6.96	7.22	7.08	7.80	8.21	7.69	7.05	6.44	5.62	4.99	5.27	4.83	4.90
FEED COST/COW/DAY	3.20	* 3.00	3.00 -	2.85	2.80	3.12	3.12	3.10	3.10	3.47	3.47	3.47	3.47	3.40	3.05	3.40
FEED COST/INCOME	49%	* 43%	43%-	41%	39%	44%	40%	38%	40%	49%	54%	62%	70%	65%	63%	69%
HEIFER PEAK MILK	65.4	- 65	65 -	69	70	70	70	70	65	62	61	61	62	62	63	62
2ND LAC PEAK MILK	77.0	* 82	82 *	77												
COW PEAK MILK	78.4	* 87	87 *	81	81	81	79	78	77	75	75	76	77	80	81	81
HFR LBS/DAY (40	50.0	* 59	59 *	50												
HFR LBS/DY 41-100	54.3	* 63	63 *	61	58	57	60	68	63	51	60	54	47	24	48	48
HFR LBS/DY 101-199	53.3	* 55	55 *	51	59	61	63	64	58	56	34	48	48	48	49	44
HFR LBS/Dy 200-305	43.6	* 46	46 -	50	53	54	56	38	38	38	38	38	38	43	39	38
COW LBS/DAY (40	57.0	* 60	60 *	57												
COW LBS/DY 41-100	67.9	* 80	80 *	66	68	72	78	78	75	71	66	69	59	59	54	61
COW LBS/DY 101-199	61.8	* 66	66 *	60	67	67	72	73	63	55	53	59	59	63	50	55
COW LBS/DY 200-305	45.4	* 49	49 -	49	55	52	50	46	47	43	40	39	40	44	40	44
DRY MATTER INTAKE	45.2	* 48.0	48.0 *	40	45	45	47	47	46	46	46	46	46	46	42	44
FRESH (40 DAYS	3.25	- 3.50	3.50 -	3.25												
FRESH 40-100 DAYS	2.25	* 3.00	3.00 *	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.25	2.50
FRESH) 100 DAYS	2.75	* 3.50	3.50 *	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75	2.75
DRY COWS	3.25	* 4.00	4.00 *	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
INVENTORY																
1ST CALF HEIFERS	56	* 70	70 -	96	88	70	59	63	59	58	36	32	37	33	39	44
2ND AND OLD COWS	127	* 130	130 *	117	114	113	122	134	137	136	142	126	127	127	125	119
COWS MILKING	183	* 200	200 -	213	202	183	181	197	196	194	178	158	164	160	164	163
COWS DRY	33	- 30	30 *	24	33	37	30	17	25	23	29	55	47	41	38	43
COWS TOTAL	216	* 230	230 -	237	235	220	211	214	221	217	207	213	211	201	202	206
BIRTH TO WEANING	27	- 20	20 -	63	20	20	14	24	25	31	29	29	29	22	12	12
WEANING TO BREED	129	- 120	120 *	64	85	122	145	136	130	115	145	145	145	150	160	171
BREED TO CALVING	98	* 100	100 *	90	102	85	111	111	112	99	99	99	99	91	76	64
TOTAL YOUNGSTOCK	253	- 240	240 *	217	207	227	270	271	267	245	273	273	273	263	248	247
DOT ADULT VOL CULL	15	- 32.4		3	1	4	2	2	2	1	0	0	0	0	0	0
DOT ADLT INVOL CULL	72	* 32.4		10	3	7	3	13	5	16	1	6	0	4	4	2
TOTAL ADULT CULLS	87	* 64.7		13	4	11	5	15	7	17	1	6	0	4	4	2
custom item #1	0	- 0.0	0.0 -	0												
custom item #2	1	* 0.0	0.0 *	1												
custom item #3	1	* 0.0	0.0 *	1												
custom item #4	1	* 0.0	0.0 *	1												

Table 1b

DAIRY HERD MONITOR: PAGE 2
EXAMPLE FARM

Description	AVERAGE MONTH		GOALS AV. MO		GOALS THIS MO		AUG 88	JULY 88	JUNE 88	MAY 88	APR 88	MAR 88	FEB 88	JAN 88	DEC 87	NOV 87	OCT 87	SEPT 87	AUG 87
REPRODUCTION																			
COWS CALVED	12.8	*	17.3		19.0	*	14	16	9	1	12	4	13	20	16	18	14	16	10
COW DYSTOCIAS	0.1	-	0.6		0.7	-	0	0	0	0	0	0	0	0	0	0	0	1	0
HEIFERS CALVED	9.0	-	8.6		9.5	-	13	18	19	1	6	9	21	4	4	10	3	0	0
HEIFER DYSTOCIAS	0.3	-	0.9		1.3	-	0	0	0	1	0	1	1	0	0	0	0	0	0
CALF DEATH @ BIRTH	2.5	*	1.7		2.2	*	4	3	3	0	4	4	2	0	2	1	1	6	0
RET. PLACENTA	2.1	*	1.1		1.4	*	5	1	6	0	1	1	2	0	0	2	1	6	2
UTERINE TREATMENT	7.5	*	3.0		4.3	*	12	14	5	2	3	9	13	8	7	6	2	9	2
CYSTS	8.6	*	3.5		5.0	*	6	1	7	9	7	15	12	6	11	17	4	8	4
% HEATS BRED	48	*	60		60	*	51	53	57	62	57	52	49	46	45	42	34	33	35
DAYS TO 1ST BREED	89	*	65		65	*	75	76	73	76	76	82	85	91	97	108	112	112	109
% PROBLEM COWS	18	*	10		10	*	16	18	18	18	16	15	12	14	16	18	25	29	29
TOTAL BREEDINGS	64.0	-	20		20	-	40	32	37	61	85	65	74	70	105	79	47	73	29
TOTAL PREG CHECKS	34.2	-	10		10	-	17	15	37	50	24	66	27	37	24	60	9	44	69
OPEN AT PREG CHECK	16.3	*	5.1		2.6	*	6	6	12	13	16	36	14	14	11	24	8	35	26
PREG, NOW OPEN	1.4	*	1.1		1.2	-	1	2	1	1	1	1	3	2	0	2	0	3	0
VISIBLE ABORTIONS	0.3	-	1.1		1.2	-	1	0	2	0	0	0	1	0	0	0	0	0	1
1ST SERVICE C.R.	43	*	60		60	*	42	42	42	39	40	43	45	45	46	44	43	43	43
SRV/PREG:ALL COWS	3.1	*	2.5		2.5	*	3.3	3.2	3.1	3.3	3.2	3.1	3.1	3.0	2.9	3.0	2.9	2.9	2.8
SRV/PREG:PREG COW	2.6	*	2.0		2.0	*	2.5	2.5	2.6	2.6	2.7	2.9	2.9	2.9	2.7	2.5	2.3	2.1	2.2
PD DOLLARS SIRES	154	-	150		150	*	147	153	154	154	154	154	158	156	154	155	156	158	154
MIN AVE DAYS OPEN	157	*	100		100	*	126	136	135	134	132	149	157	167	180	189	192	185	173
MIN CALVING INT	14.4	*	12.5		12.5	*	13.4	13.7	13.7	13.6	13.5	14.1	14.4	14.7	15.1	15.4	15.5	15.3	14.9
custom item # 5	0.0	-	0.0		0.0	-	0												
MASTITIS AND DISEASE																			
AV CELL COUNT CODE	3.5	*	3.0		3.0	*	3.2	3.1	2.5	2.8	2.8	3.3	3.7	3.9	3.6	4.4	4.3	4.3	4.5
MASTITIS: CLINICAL	21.9	*	5.5		6.4	*	19	21	15	13	15	30	26	28	28	23	26	19	18
UDDER EDEMA	0.9	-	1.1		1.4	-	0	2	0	0	1	0	4	1	2	0	0	1	0
BULK TANK SAMPLES																			
SOMATIC CELL CNT	413	*	200		200	*	233	233	233	233	233	542	542	542	542	542	542	542	437
TOTAL BACTERIA	4100	-	5000		5000	-	4100	4100	4100	4100	4100	4100	4100	4100	4100	4100	4100	4100	8000
PATHOGENS	1300	*	1000		1000	*	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300	1300
custom item # 6	0.0	-	0.0		0.0	-	0												
MILK FEVER	0.8	*	0.6		0.7	-	0	0	0	0	1	0	3	2	0	1	1	1	0
KETOSIS, OFF FEED	0.0	-	1.3		1.8	-	0												
DISPLACED ABOMASUM	0.5	-	1.3		1.8	-	1	1	1	1	1	0	0	0	0	0	0	1	0
COW DIARRHEA	0.0	-	1.1		1.2	-	0	0	0	0	0	0	0	0	0	0	0	0	0
RESPIR DISEASE	0.0	-	1.1		1.2	-	0	0	0	0	0	0	0	0	0	0	0	0	0
LAMENESS	1.8	-	4.3		4.7	*	6	2	2	4	0	1	2	0	2	0	1	1	2
OTHER	0.3	-	4.3		4.7	-	1	1	1	0	1	0	0	0	0	0	0	0	0
CALF AND HEIFER HEALTH:																			
BIRTH - WEAN:TREAT	4.6	*	1.3		3.2	-	1	11	0	0	0	4	18	10	3	8	0	0	0
BIRTH - WEAN:DEAD	0.4	-	0.5		1.3	-	1	3	0	0	0	0	1	0	0	0	0	0	0
WEAN - BREED:TREAT	0.4	-	2.6		1.3	-	0	3	0	0	0	0	0	0	2	0	0	0	0
WEAN - BREED:DEAD	0.0	-	1.3		0.6	-	0	0	0	0	0	0	0	0	0	0	0	0	0
BREED-CALVNG:TREAT	0.0	-	1.0		0.9	-	0	0	0	0	0	0	0	0	0	0	0	0	0
BREED-CALVING:DEAD	0.0	-	1.0		0.9	-	0	0	0	0	0	0	0	0	0	0	0	0	0
YOUNGSTOCK CULLING	2	-	7.6				0	2	0	0	0	0	0	0	0	0	0	0	0
AGE AT 1st CALVING	31.1	*	24.0		24.0	*	32	32	32	31	31	31	31	31	31	31	30	30	30
DIFF IN M.E. MILK	-1	-	669		669	-	45	-553	-665	-637	-780	-103	81	463	451	333	699	659	772
custom item #7	0.0	-	0		0	-	0												

DAIRY HERD MONITOR: GOALS SECTION (use ALT H for help)
EXAMPLE DAIRY

Value	Description	Source
	PRODUCTIVITY, NUTRITION, FEEDING PROGRAM	
18500	ROLLING HERD MILK: LBS	DHIA
3.8	ROLLING HERD % FAT	DHIA
19256	1st CALF HEIFER PROJ M.E. MILK: LBS	DHIA
19900	2nd LACTATION PROJ M.E. MILK: LBS	DHIA
19925	COW PROJ M.E. MILK: LBS	DHIA
88	PERCENT OF COWS IN MILK	DHIA
160	AVERAGE DAYS IN MILK	DHIA
65	AVERAGE DAYS DRY	DHIA
58.0	MILK/COW/DAY: LBS (milking cows)	DHIA
62.6	ADJUSTED CORRECTED MILK (3.5% FAT; 35% HEIFERS)	CALCULATED
3.8	PERCENT FAT ON DAY OF TEST (& 150 DIM)	DHIA
12.00	MILK BLEND PRICE: $/CWT	DHIA
7.00	VALUE OF PRODUCT: $	DHIA
3.00	FEED COST/COW/DAY: %	DHIA
43%	FEED COST/INCOME: %	CALCULATED
65	HEIFER PEAK MILK av. highest test day lbs milk	DHIA
82	2nd LACTATION PEAK MILK av. high test day milk	DHIA
87	COW PEAK MILK av. highest test day lbs milk	DHIA
59	HEIFER LBS/DAY (40 days in milk	DHIA
63	HEIFER LBS/DAY 41-100 days in milk	DHIA
55	HEIFER LBS/DAY 101-199 days in milk	DHIA
46	HEIFER LBS/DAY 200-305 days in milk	DHIA
60	COW LBS/DAY (40 days in milk	DHIA
80	COW LBS/DAY 41-100 days in milk	DHIA
66	COW LBS/DAY 101-199 days in milk	DHIA
49	COW LBS/DAY 200-305 days in milk	DHIA
48	DRY MATTER INTAKE (lb/cow/day)	MONITOR
3.5	BODY SCORE: FRESH (40 DAYS	MONITOR
3.0	BODY SCORE: 40-100 DAYS (deviation of 0.25	MONITOR
3.5	BODY SCORE: FRESH) 100 DAYS is flagged)	MONITOR
4.0	BODY SCORE: DRY COWS	MONITOR
--------INVENTORY ----------		
70	FIRST CALF HEIFERS	DHIA
130	2ND AND OLDER LACATATIONS	CALCULATED
200	TOTAL COWS MILKING	DHIA
30	COWS DRY	CALCULATED
230	COWS TOTAL OF MILKING AGE	DHIA
20	BIRTH TO WEANING	MONITOR
120	WEANING TO BREEDING	MONITOR
100	BREEDING TO CALVING	MONITOR
240	TOTAL YOUNGSTOCK	CALCULATED
15	TOTAL ADULT VOLUNTARY CULLS (enter % here,	MONITOR
15	TOTAL ADULT INVOLUNTARY CULLS actuals # in data)	MONITOR
30	TOTAL CULLS % per year	CALCULATED
0	custom item #1	source
0	custom item #2	source
0	custom item #3	source
0	custom item #4	source

DAIRY HERD MONITOR: GOALS SECTION (use ALT H for help) PAGE 2
EXAMPLE FARM

Value	Description	Source
	REPRODUCTION	
8	COWS CALVED goal: % of herd per month	MONITOR
5	COW DYSTOCIAS goal: % of cows calving	MONITOR
4	HEIFERS CALVED goal: % of herd per month	MONITOR
10	HEIFER DYSTOCIAS goal: % of heifers calving	MONITOR
8	CALVES BORN DEAD OR DEAD DAY 1 goal % of calvings	MONITOR
5	RET. PLACENTA goal: % of calvings this month	MONITOR
7	TREATMENT FOR UTERINE INFECT:% calving last 2 mo	MONITOR
8	CYSTS goal: % of calvings 1 & 2 months ago	MONITOR
60	% HEATS BRED THIS MONTH	DHIA
65	DAYS TO 1ST BREEDING	DHIA
10	PROBLEM COWS: % OPEN) 100 DAYS	DHIA
20	TOTAL BREEDINGS THIS MONTH goal: #	MONITOR
10	TOTAL PREG. CHECKS goal: #	MONITOR
15	OPEN AT PREG. CHECK goal: % of preg checks	MONITOR
0.5	PREG, NOW OPEN goal: % of herd per month	MONITOR
0.5	VISIBLE ABORTIONS goal: % of herd per month	MONITOR
60	1ST SERVICE CONCEPTION RATE	DHIA
2.5	SERVICES PER PREGNANCY: ALL COWS	DHIA
2	SERVICES PER PREGNANCY: PREGNANT COWS	DHIA
150	PD DOLLARS SIRES IN USE	DHIA
100	MINIMUM AVERAGE DAYS OPEN	DHIA
12.5	MINIMUM CALVING INTERVAL	DHIA
0	custom item # 5	source
	MASTITIS AND DISEASES IN ADULT COWS	
3.0	AVERAGE LOG-LINEAR CELL COUNT CODE	DHIA
3	MASTITIS CLINICAL CASES: goal: % milking herd/mo	MONITOR
5	UDDER EDEMA goal: % of calvings	MONITOR
	BULK TANK SAMPLES	
200	SOMATIC CELL COUNT (thousands)	LAB
5000	TOTAL BACTERIA (CFU/ml)	LAB
1000	PATHOGENS (CFU/ml)	LAB
0	custom item # 6	source
5	MILK FEVER goal: % of cows (not heifers) calving	MONITOR
3	KETOSIS, OFF FEED: % calvings last 2 mo	MONITOR
3	DISPLACED ABOMASUMS goal: % of calvings last 2 mo	MONITOR
0.5	COW DIARRHEA goal: % of herd/mo	MONITOR
0.5	RESPIRATORY DISEASE goal: % of herd/mo	MONITOR
2	LAMENESS goal: % of herd/mo	MONITOR
2	OTHER goal: % of herd/mo	MONITOR
	CALF AND HEIFER HEALTH:	
5	BIRTH TO WEANING-TREATED goal: % of age group	MONITOR
2	BIRTH TO WEANING-DEAD goal: % of age group	MONITOR
2	WEANING TO BREEDING-TREATED goal: % of age group	MONITOR
1	WEANING TO BREEDING-DEAD goal: % of age group	MONITOR
1	BREEDING TO CALVING-TREATED goal: % of age group	MONITOR
1	BREEDING TO CALVING-DEAD goal: % of age group	MONITOR
3	YOUNGSTOCK CULLING: goal: % of all youngstock/yr	MONITOR
24	AVERAGE AGE AT FIRST CALVING (mo)	DHIA
669	DIFFERENCE BETWEEN ADULT AND HEIFER M.E. MILK	CALCULATED
0	custom item #7	source

Table 3

DAIRY HERD MONITOR: GOALS SECTION (use ALT H for help) PAGE 2
EXAMPLE FARM

Value	Description	Source
	REPRODUCTION	
8	COWS CALVED goal: % of herd per month	MONITOR
5	COW DYSTOCIAS goal: % of cows calving	MONITOR
4	HEIFERS CALVED goal: % of herd per month	MONITOR
10	HEIFER DYSTOCIAS goal: % of heifers calving	MONITOR
8	CALVES BORN DEAD OR DEAD DAY 1 goal % of calvings	MONITOR
5	RET. PLACENTA goal: % of calvings this month	MONITOR

DAIRY HERD MONITOR: PAGE 2
EXAMPLE FARM

Description	AVERAGE MONTH	GOALS AV. MO	GOALS THIS MO	AUG 88	JULY 88
REPRODUCTION					
COWS CALVED	12.8	* 17.3	19.0 *	14	16
COW DYSTOCIAS	0.1	- 0.6	0.7 -	0	0
HEIFERS CALVED	9.0	- 8.6	9.5 -	13	18
HEIFER DYSTOCIAS	0.3	- 0.9	1.3 -	0	0
CALF DEATH @ BIRTH	2.5	* 1.7	2.2 *	4	3
RET. PLACENTA	2.1	* 1.1	1.4 *	5	1

Table 4a

DHIA AVERAGES: DRPC PAGE 1
SUMMARY DATA BY PRODUCTION GROUP
HOLSTEIN HERDS

MONTH AND YEAR	AVERAGE HERD	GOALS AV. MO	GOALS THIS MO	)23 10	22-23 13	21-22 50	20-21 112	19-20 232	18-19 431	17-18 641	16-17 730	15-16 697	14-15 650	13-14 434	12-13 324	11-12 178
PROD, NUTR, FEED PROGRAM																
ROLLING HERD MILK	18079	-18079	18079 -	23918	22559	21488	20516	19515	18568	17559	16555	15546	14566	13581	12575	11674
ROLLING HERD % FAT	3.58	- 3.6	3.6 *	3.5	3.5	3.5	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6
HFR PROJ ME MILK	18650	-18650	18650 -	23031	21986	21902	21256	20464	19414	18521	17550	16625	15590	14779	13677	12702
2nd PROJ ME MILK	0	- 0	0 -	0	0	0	0	0	0	0	0	0	0	0	0	0
COW PROJ ME MILK	19314	-19314	19314 -	24019	22639	22421	21860	20992	20108	19011	18051	17138	16140	15208	14175	13294
% COWS IN MILK	87	- 87	87 -	90	89	89	88	88	88	88	87	87	86	85	84	84
AVE DAYS IN MILK	174	- 174	174 *	186	170	171	173	171	171	171	173	175	175	173	175	174
AVE DAYS DRY	65	- 65	65 -	57	60	60	62	62	63	64	65	68	69	71	74	76
MILK/COW/DAY	56.8	- 56.8	56.8 -	72.9	70.3	66.8	63.8	60.9	58.3	55.2	52.3	49.4	46.5	43.9	41.1	38.4
ADJ CORR MILK	62.0	- 62.0	62.0 -	81.9	75.8	71.4	70.4	66.7	63.4	60.2	57.3	54.2	51.0	46.9	44.9	41.8
% FAT D.O.T.	3.57	- 3.57	3.57 *	3.5	3.5	3.5	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.5	3.6	3.6
MILK BLEND PRICE	12.92	-12.92	12.92 *	12.83	12.70	12.40	12.75	12.74	12.79	12.90	13.02	13.16	13.27	13.24	13.26	13.32
VALUE OF PRODUCT	5.73	- 5.73	5.73 -	7.68	7.13	6.53	6.19	6.04	5.77	5.52	5.28	5.11	4.78	4.46	4.25	4.00
FEED COST/COW/DAY	2.34	* 2.34	2.34 *	2.65	2.60	2.82	2.44	2.44	2.38	2.26	2.25	2.15	2.08	2.03	1.93	1.89
FEED COST/INCOME	41%	- 41%	41%-	35%	36%	43%	39%	40%	41%	41%	43%	42%	44%	46%	45%	47%
HEIFER PEAK MILK	64.4	- 64.4	64.4 -	84	78	72	72	68	65	63	60	57	54	52	48	46
2ND LAC PEAK MILK	0.0	- 0	0 -	0	0	0	0	0	0	0	0	0	0	0	0	0
COW PEAK MILK	85.3	- 85.3	85.3 -	108	103	99	95	91	88	83	79	76	71	68	63	60
HFR LBS/DAY (40	0.0	- 0	0 -	0	0	0	0	0	0	0	0	0	0	0	0	0
HFR LBS/DY 41-100	57.8	- 57.8	57.8 -	78	72	66	62	60	58	56	53	51	48	45	44	41
HFR LBS/DY 101-199	54.2	- 54.2	54.2 -	70	67	62	61	58	56	53	50	47	45	42	39	37
HFR LBS/Dy 200-305	46.3	- 46.3	46.3 -	58	59	54	52	50	47	45	42	40	38	36	34	32
COW LBS/DAY (40	0.0	- 0	0 -	0	0	0	0	0	0	0	0	0	0	0	0	0
COW LBS/DY 41-100	74.1	- 74.1	74.1 -	92	87	87	81	79	77	73	69	66	63	59	56	52
COW LBS/DY 101-199	64.7	- 64.7	64.7 -	83	81	76	72	69	66	63	59	57	53	50	47	45
COW LBS/DY 200-305	48.8	- 48.8	48.8 -	65	61	57	54	52	50	47	44	42	40	37	36	34
DRY MATTER INTAKE	0.0	- 0.0	0.0 -	0	0	0	0	0	0	0	0	0	0	0	0	0
FRESH (40 DAYS	0.00	- 0.00	0.00 -	0	0	0	0	0	0	0	0	0	0	0	0	0
FRESH 40-100 DAYS	0.00	- 0.00	0.00 -	0	0	0	0	0	0	0	0	0	0	0	0	0
FRESH) 100 DAYS	0.00	- 0.00	0.00 -	0	0	0	0	0	0	0	0	0	0	0	0	0
DRY COWS	0.00	- 0.00	0.00 -	0	0	0	0	0	0	0	0	0	0	0	0	0
INVENTORY																
1ST CALF HEIFERS	36	-36.08	36.08 *	34	38	30	38	35	36	39	40	38	39	34	32	30
2ND AND OLD COWS	55	-54.83	54.83 *	45	49	48	50	48	56	57	60	62	65	61	57	55
COWS MILKING	91	-90.91	90.91 *	79	87	78	88	83	92	96	100	100	104	95	89	85
COWS DRY	14	-14.25	14.25 *	13	16	10	14	13	12	14	16	14	17	16	16	16
COWS TOTAL	105	-105.1	105.1 *	92	103	88	102	96	104	110	116	114	121	111	105	101
BIRTH TO WEANING	0	- 0	0 -	0	0	0	0	0	0	0	0	0	0	0	0	0
WEANING TO BREED	0	- 0	0 -	0	0	0	0	0	0	0	0	0	0	0	0	0
BREED TO CALVING	0	- 0	0 -	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL YOUNGSTOCK	0	- 0	0 -	0	0	0	0	0	0	0	0	0	0	0	0	0
TOT ADULT VOL CULL	11%	- 15%		8	15	10	12	10	14	12	11	13	12	12	10	10
TOT ADLT INVOL CULL	25%	* 15%		27	24	23	24	25	26	27	29	26	29	27	24	22
TOTAL ADULT CULLS	36%	* 30%		35	39	33	36	35	40	39	40	39	41	39	34	32
custom item #1	0	- 0.0	0.0 -	0												
custom item #2	0	- 0.0	0.0 -	0												
custom item #3	0	- 0.0	0.0 -	0												
custom item #4	0	- 0.0	0.0 -	0												

DAIRY HERD MONITOR: PAGE 2
EXAMPLE FARM

Description	AVERAGE HERD		GOALS AV. MO		GOALS THIS MO		>23 10	22-23 13	21-22 50	20-21 112	19-20 232	18-19 431	17-18 641	16-17 730	15-16 697	14-15 650	13-14 434	12-13 324	11-12 178
REPRODUCTION																			
COWS CALVED	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
COW DYSTOCIAS	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
HEIFERS CALVED	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
HEIFER DYSTOCIAS	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
CALF DEATH @ BIRTH	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
RET. PLACENTA	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
UTERINE TREATMENT	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
CYSTS	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
% HEATS BRED	35	-	35		35	-	38	49	42	41	42	38	36	35	32	28	24	19	18
DAYS TO 1ST BREED	87	*	87		87	*	96	88	85	87	87	87	85	86	85	88	86	87	89
% PROBLEM COWS	22	*	22		22	*	27	22	20	18	20	19	20	22	22	24	25	30	28
TOTAL BREEDINGS	0.0	-	0		0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL PREG CHECKS	0.0	-	0		0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
OPEN AT PREG CHECK	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
PREG, NOW OPEN	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
VISIBLE ABORTIONS	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
1ST SERVICE C.R.	51	*	51		51	*	46	46	50	49	50	50	51	51	51	52	53	58	60
SRV/PREG:ALL COWS	2.2	*	2.0		2.0	*	2.3	2.6	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.1	2.1	1.9	1.8
SRV/PREG:PREG COW	1.9	-	2.0		2.0	-	2	2.2	1.8	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.7	1.7
PD DOLLARS SIRES	109	-	109		109	-	112	111	116	117	114	113	112	110	108	104	97	98	96
MIN AVE DAYS OPEN	134	-	134		134	*	143	132	130	130	126	127	128	130	133	139	141	149	148
MIN CALVING INT	13.6	-	14.0		14.0	-	13.9	13.6	13.5	13.5	13.3	13.4	13.4	13.5	13.6	13.8	13.9	14.1	14.1
custom item # 5	0.0	-	0.0		0.0	-	0												
MASTITIS AND DISEASE																			
AV CELL COUNT CODE	3.4	-	3.4		3.4	*	3.5	3	3.1	2.9	3.1	3.3	3.4	3.5	3.5	3.7	3.8	4	4.2
MASTITIS: CLINICAL	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
UDDER EDEMA	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
BULK TANK SAMPLES																			
SOMATIC CELL CNT	0	-	0		0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL BACTERIA	0	-	0		0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
PATHOGENS	0	-	0		0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
custom item # 6	0.0	-	0.0		0.0	-	0												
MILK FEVER	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
KETOSIS, OFF FEED	0.0	-	0.0		0.0	-	0												
DISPLACED ABOMASUM	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
COW DIARRHEA	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
RESPIR DISEASE	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
LAMENESS	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
CALF AND HEIFER HEALTH:																			
BIRTH - WEAN:TREAT	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
BIRTH - WEAN:DEAD	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
WEAN - BREED:TREAT	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
WEAN - BREED:DEAD	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
BREED-CALVNG:TREAT	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
BREED-CALVING:DEAD	0.0	-	0.0		0.0	-	0	0	0	0	0	0	0	0	0	0	0	0	0
YOUNGSTOCK CULLING	0	-	0.0				0	0	0	0	0	0	0	0	0	0	0	0	0
AGE AT 1st CALVING	28.1	-	28.1		28.1	-	28	28	28	27	28	28	28	28	28	29	28	29	28
DIFF IN M.E. MILK	664	-	664		664	*	988	653	519	604	528	694	490	501	513	550	429	498	592
custom item #7	0.0	-	0		0	-	0												

LOSS IN INCOME OVER FEED COSTS FOR REPRODUCTIVE INEFFICIENCY
(losses for days open beyond the herd's goal)

EXAMPLE DAIRY

PER DAY OPEN				PER YEAR
$496		TOTAL FOR HERD		$12,887
		PER COW		
$1.60		LOST MILK PRODUCTION		$41.57
$0.30		LOST CALF VALUE		$7.69
	$0.24	heifers	$6.15	
	$0.06	bulls	$1.54	
$1.89		TOTAL PER COW		$49.26

INPUT FACTORS

261.6	CALVINGS PER YEAR
$14.65	PRICE OF MILK/CWT
$1,000	VALUE OF A HEIFER AT FIRST CALVING
$800	COST TO REAR HEIFER TO FIRST CALVING
$50	VALUE OF AN AVERAGE BULL CALF AT BIRTH
45%	PERCENT HEIFERS MILKING
126	DAYS OPEN, COWS: ACTUAL
126	DAYS OPEN, HEIFERS: ACTUAL
100	DAYS OPEN, COWS: GOAL
100	DAYS OPEN, HEIFERS: GOAL
59%	INCOME OVER FEED COSTS: PERCENT, COWS
59%	INCOME OVER FEED COSTS: PERCENT, HEIFERS
57.9	120th DAY MILK, COWS (lbs): ROLLING HERD AVE 16069
51.7	120th DAY MILK, HFRS (lbs): ROLLING HERD AVE 16071

adjust the 120th day mik figures until the rolling herd average on the right matches the herd's average.

CALCULATOR FOR THE CAUSE AND COST OF REPRODUCTIVE INEFFICIENCY:
Example Dairy: August, 1988

237	total cows in herd	$1.89	cost of day open
11%	cows culled for repro/yr	$10.00	cost of semen/breeding
5%	goal for repro culls	$1,000	cost of replacement
3.3	services/preg: all cows	$400	value of cull cow

days open added	GOALS		ACTUAL	days open added
50.0	50	days fresh when willing to breed	50	50.0
11.0	11	average days to wait for next estrus	11	11.0
21.0	2.0	services/pregnancy: pregnant cows	2.5	31.5
18.0	70%	percent of heats detected	61%	33.5
100		total days open		126
12.5		calving interval (months)		13.3

****

$3.56 Dollars per day open including culling

LOSS PER COW ABOVE GOAL (per year):

		% of loss
$30	due to conception failure (including semen)	32%
$26	due to failure to detect heats	28%
$37	due to excess culling	40%
$93	Total	100%

LOSS PER YEAR FOR ENTIRE HERD

$21,930

****

The value of using prostaglandin to induce estrus in dairy cows:

Example dairy, August, 1988

0.51	estrus detected, no PGF	$3.56	value of a day open
0.51	estrus detected, PGF	$10.00	cost of semen
0.81	ovulate with PGF	$3.00	cost of prostaglandin
0.42	concept. rate: detected estrus	0.2	timed breedings rebred
0.42	concept. rate: PGF, detect estrus	11	day of cycle at decision
0.32	concept. rate: PGF, timed insem.	50	start date for breeding
5	future cycles breedable	126	average days open

Profit Earned	Days Open Saved	
$ 29.89	9.2	Prostaglandin, breed if in heat
$ 47.85	15.3	Prostaglandin, timed insemination
$ 0	0	No prostaglandin (baseline, assumed zero)

Table 8

LOST MILK PRODUCTION DUE TO SUBCLINICAL MASTITIS:
EXAMPLE DAIRY

MILK PRICE/CWT $14.65

lbs. loss/day	CODE	goal %	%	cows	LOSSES PER DAY lbs.	total	over goal
0	1	20%	25%	53	0	$0	$0.00
0	2	25%	31%	66	0	$0	$0.00
1.5	3	25%	10%	22	33	$5	($6.87)
3	4	12%	8%	17	51	$7	($3.76)
4.5	5	8%	7%	14	63	$9	($2.00)
6	6	6%	7%	15	90	$13	$1.95
7.5	7	2%	6%	12	90	$13	$8.50
9	8	1%	5%	11	99	$15	$11.70
9	9	1%	1%	3	27	$4	$1.15
	---	---		---	---	---	---
AVG SCORE	3.2	100%	TOTALS:	213	453	$66.36	$10.66
GOAL AVG.	3.0						

	total	over goal
HERD LOSSES PER MONTH:	$2,019	$324
HERD LOSSES PER YEAR:	$24,223	$3,893

MASTITIS ECONOMICS
EXAMPLE DAIRY

	TOTAL LOSSES herd	cow	LOSSES ABOVE GOAL herd	cow	%
Subclinical mastitis milk loss	$24,223	$102	$3,893	$16	21%
Culling and death	$7,600	$32	$3,334	$14	18%
Clinical treatment	$12,874	$54	$11,481	$48	61%
TOTAL:	$44,697	$189	$18,708	$79	100%

16071	Rolling herd average
237	Total cows in the herd (lactating and dry)
11	Cows culled in the last year due to mastitis
1	Cows dead in the last year due to mastitis
263	Mastitis cases treated in the last year
1000	Average market price for a replacement animal
400	Average sale price of a cull cow
5	Ave. cost for treating a clinical case, incl. drugs & vet fee
7	Average days milk withdrawal, including treatment days
20%	Value of discard milk fed to calves: % of market milk's value
3%	Goal for mastitis culling: (%/year) Goal for death: 0%
1%	Goal for clinical cases of mastitis per month (% of herd/mo)

LOSSES DUE TO DELAYED FIRST CALVING EXAMPLE DAIRY

	GOALS	ACTUAL		COSTS GOALS	COSTS ACTUAL
Age at calving	24	32			
Weight at weaning	150	150	Avg heifer feed/month	$24	$24
Age at weaning	2	2	Overhead/month	$540	$540
Weight at calving	1200	1200	Overhead/head/month	$5.0	$5.0
Rate of gain (lbs/day)	1.59	1.17	Total cost/heifer/day	$0.95	$0.95

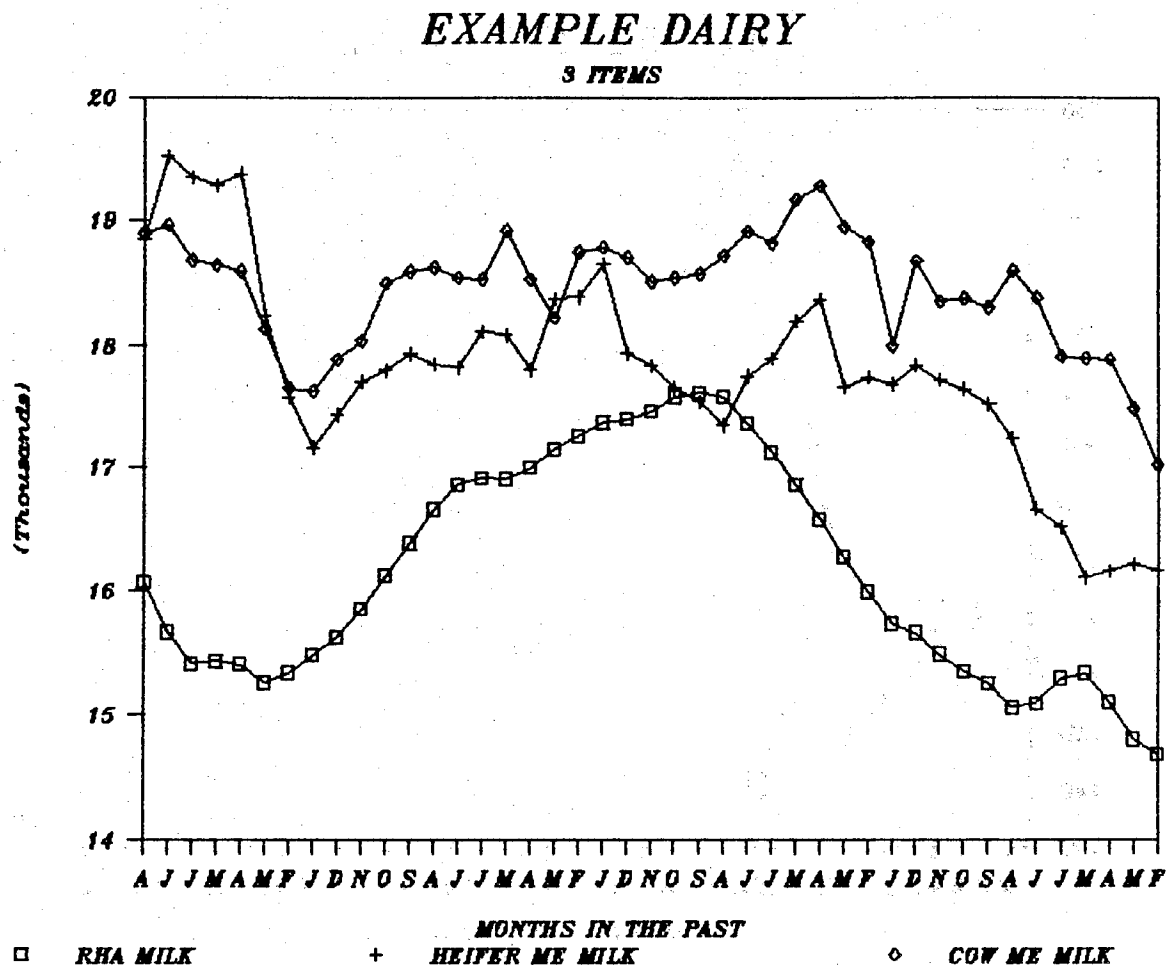
Price of springing heifer $1,000
Number of heifers calving/year 108

ANALYSIS -

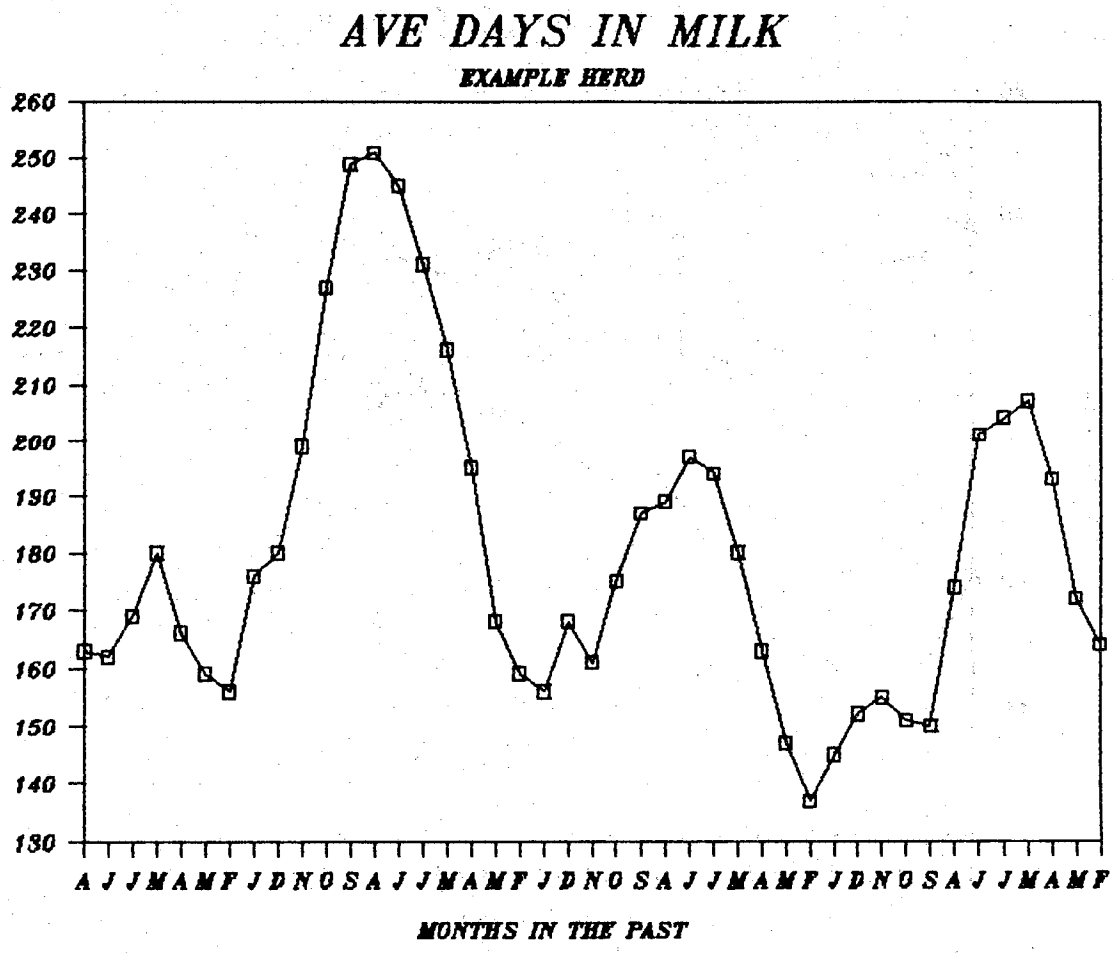
			Total loss avoidable per year
Loss avoidable per head	Feed:	$192	$25,056
	Overhead:	$40	
	Total per head:	$232	*********

Income available from transition to goal: $72,000
selling 72 extra heifers due to calve *********

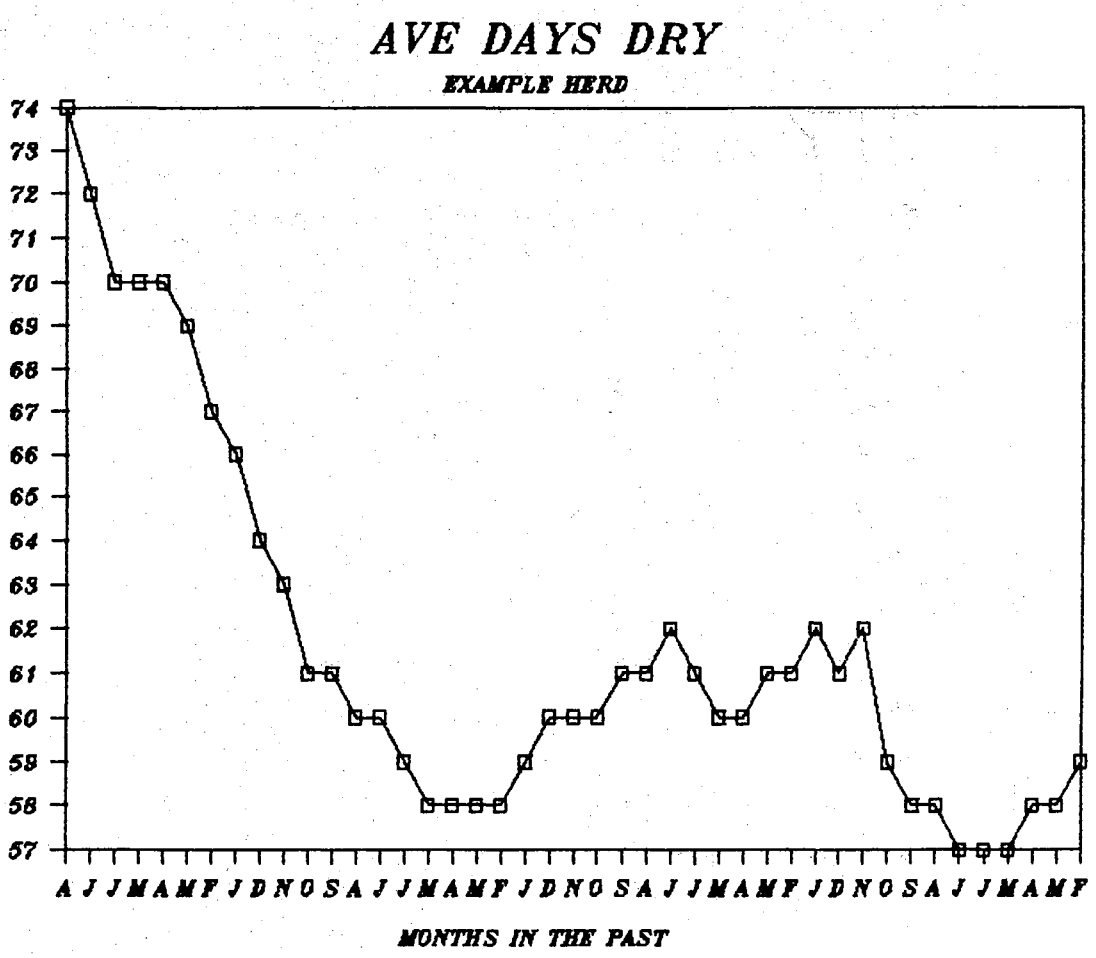
Graph 1


EXAMPLE DAIRY
3 ITEMS
20
19
18
17
16
15
14
(Thousands)
A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F
MONTHS IN THE PAST
RHA MILK
HEIFER ME MILK
COW ME MILK

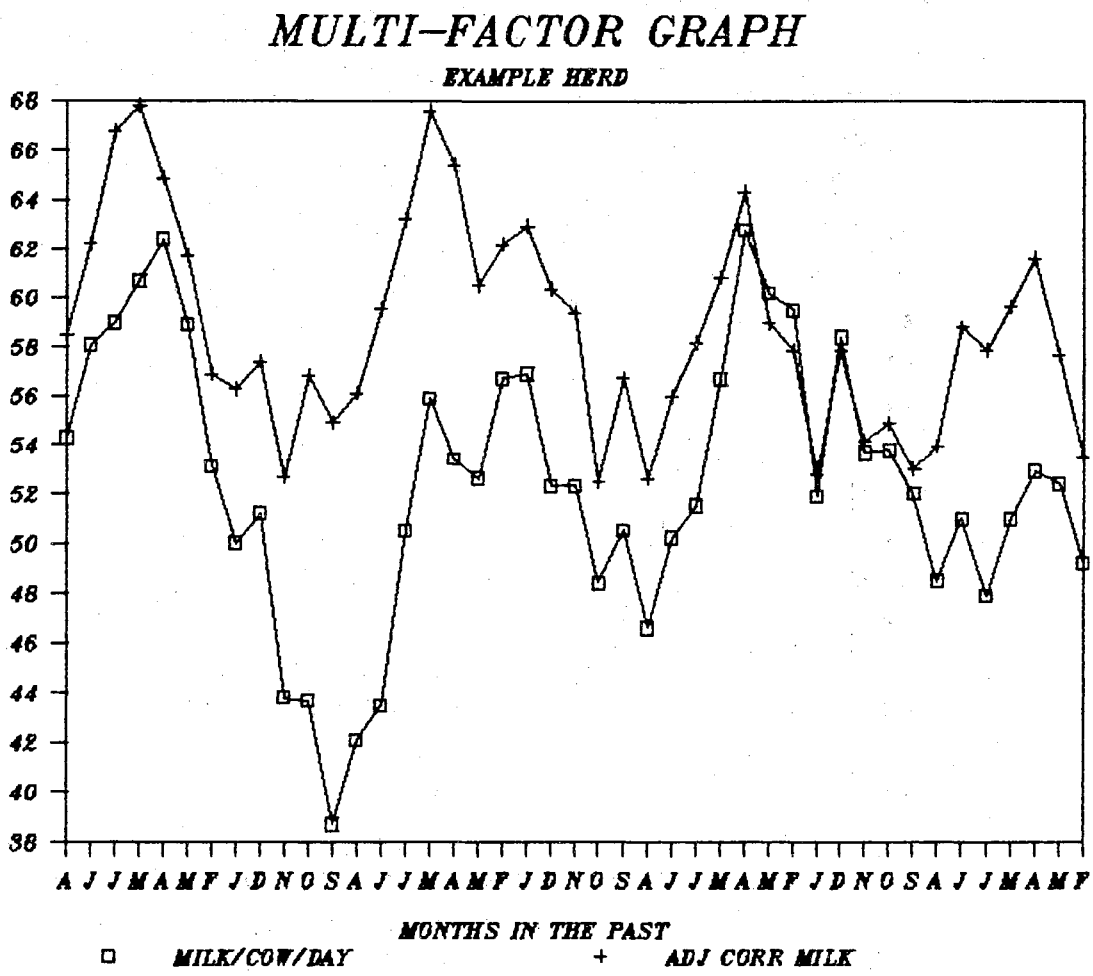
Graph 2


AVE DAYS IN MILK
EXAMPLE HERD
260
250
240
230
220
210
200
190
180
170
160
150
140
130
A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F
MONTHS IN THE PAST

Graph 3

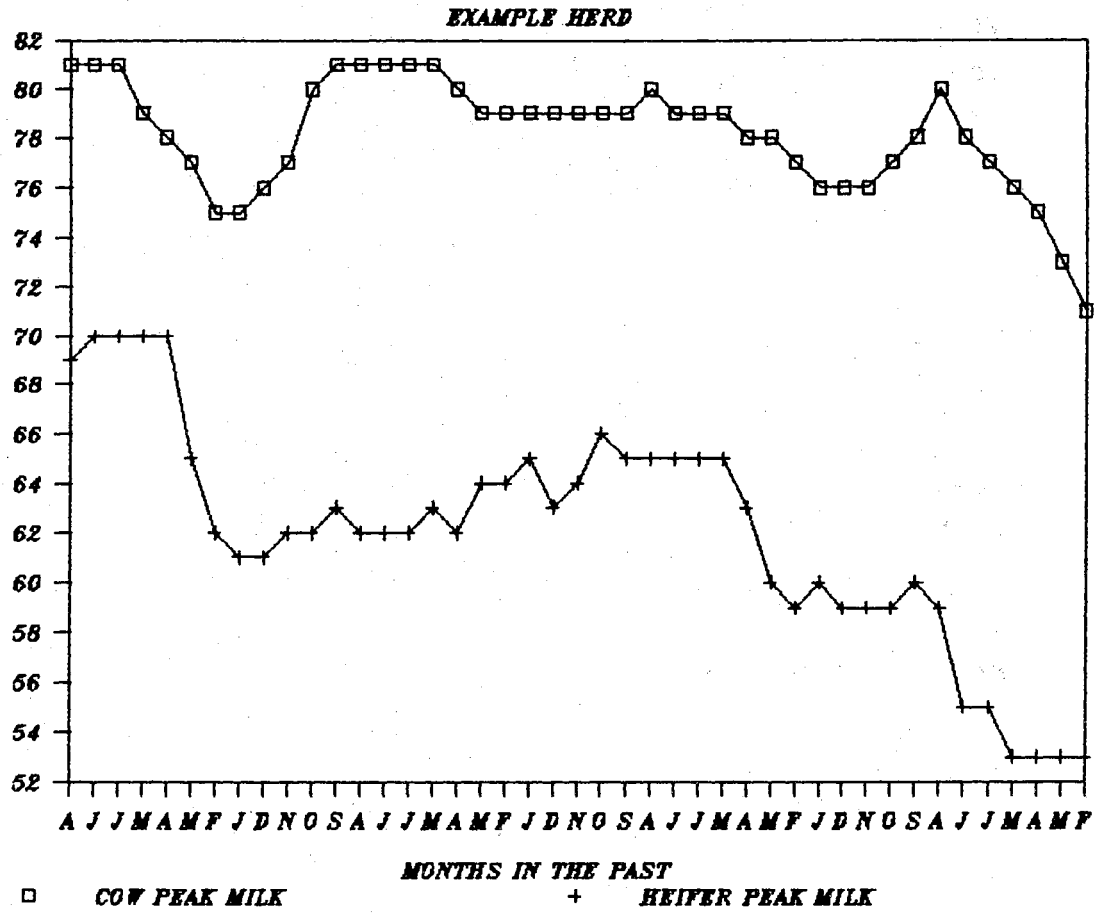

AVE DAYS DRY
EXAMPLE HERD
74
73
72
71
70
69
68
67
66
65
64
63
62
61
60
59
58
57
A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F
MONTHS IN THE PAST

Graph 4


MULTI–FACTOR GRAPH
EXAMPLE HERD
68
66
64
62
60
58
56
54
52
50
48
46
44
42
40
38
A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F
MONTHS IN THE PAST
MILK/COW/DAY
ADJ CORR MILK

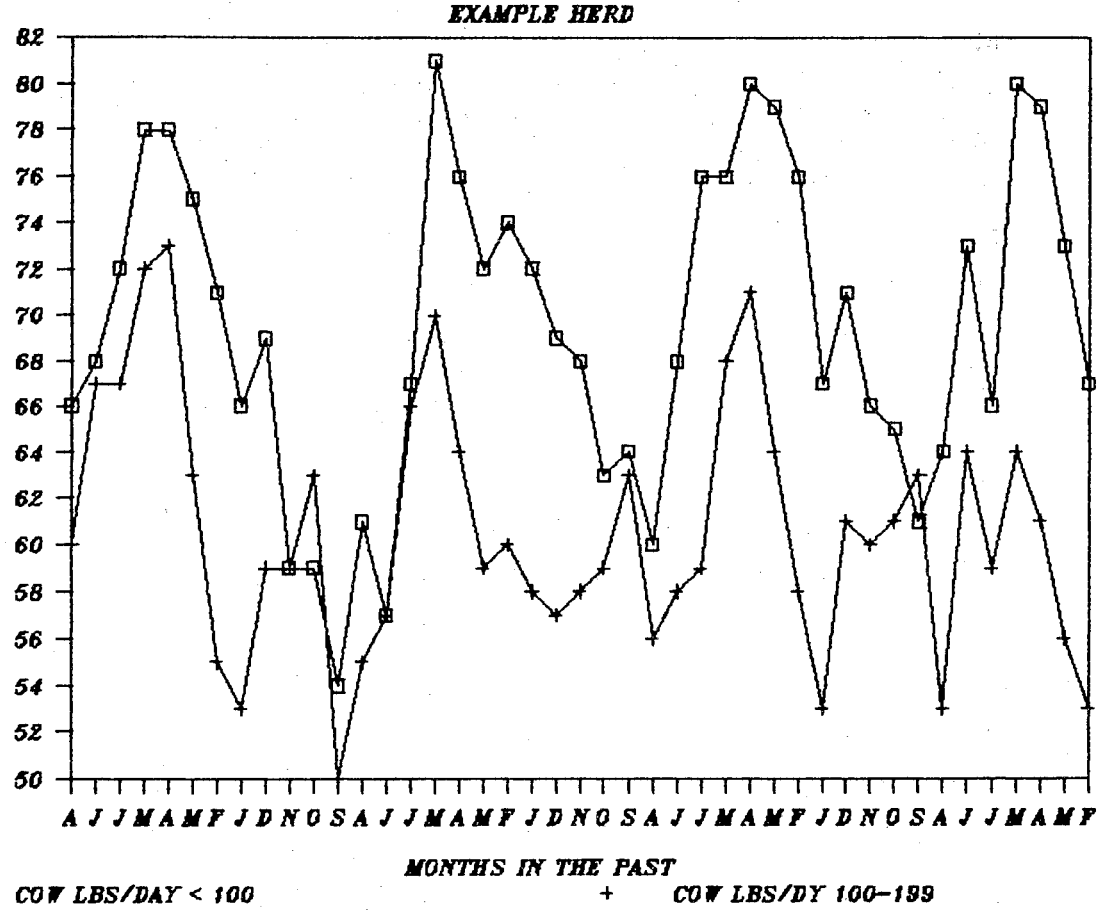
Graph 5

MULTI–FACTOR GRAPH

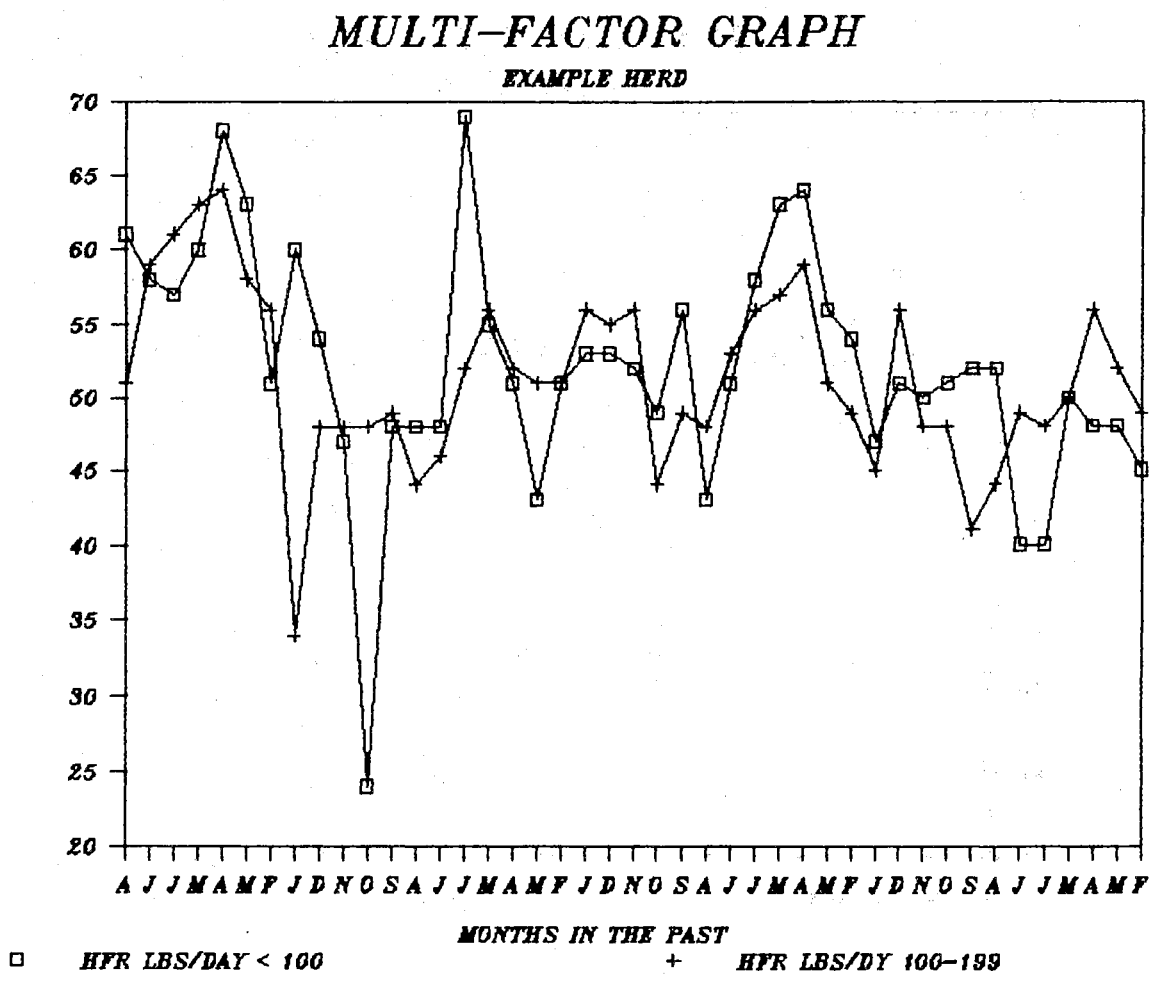


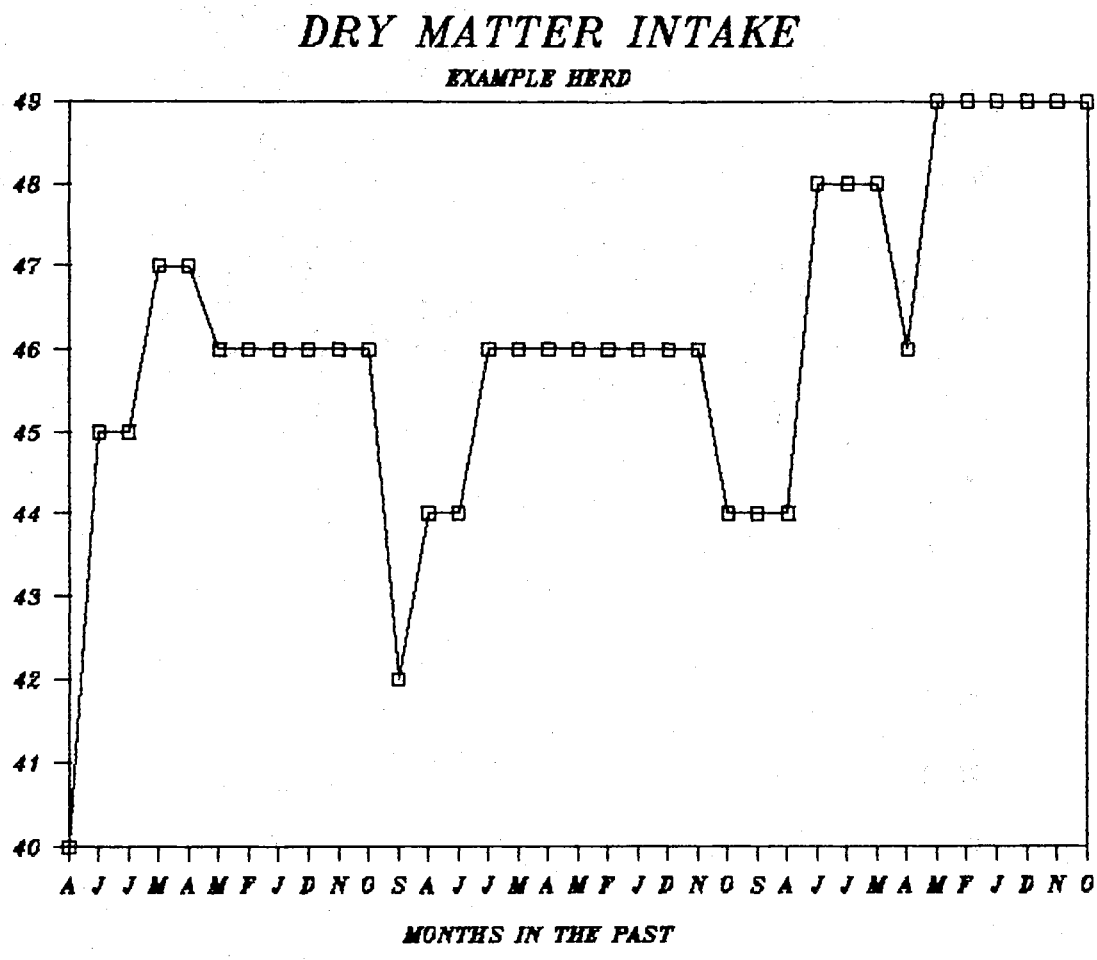
MULTI–FACTOR GRAPH

EXAMPLE HERD

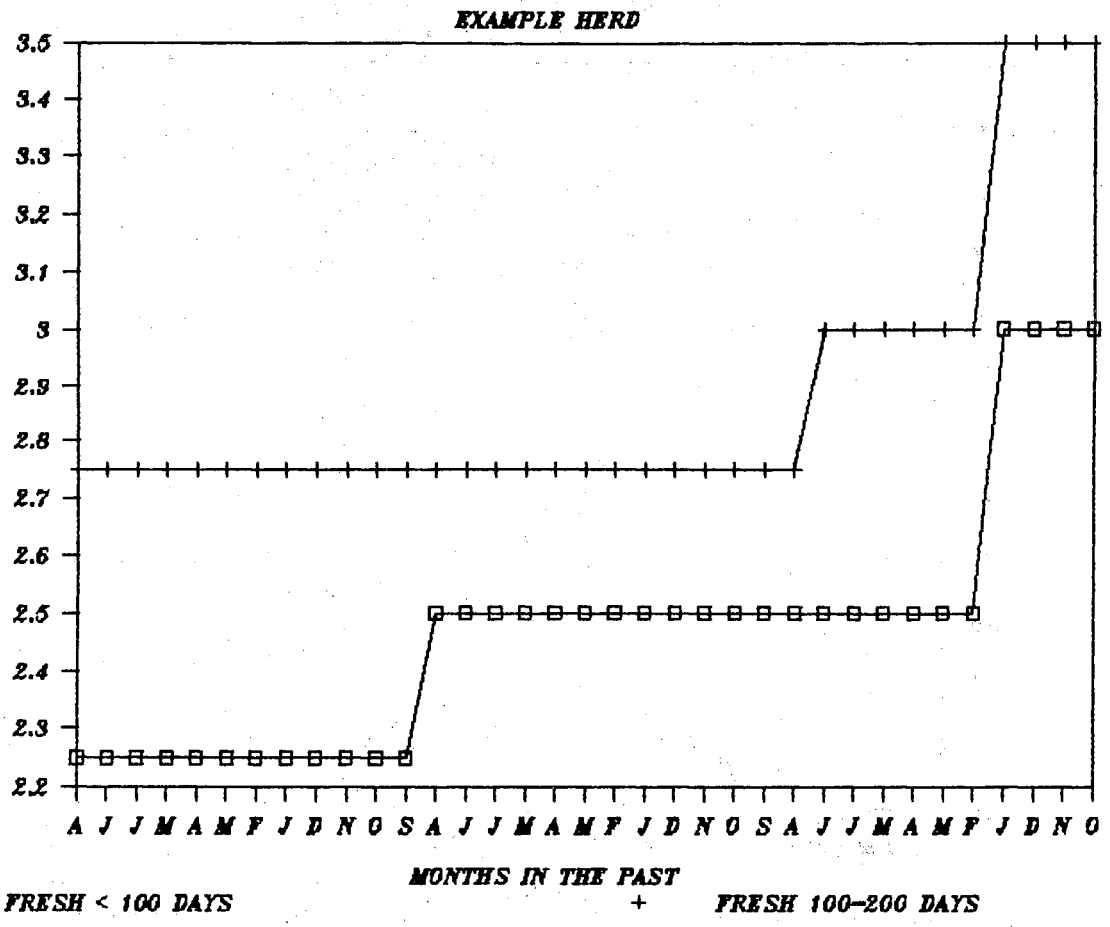


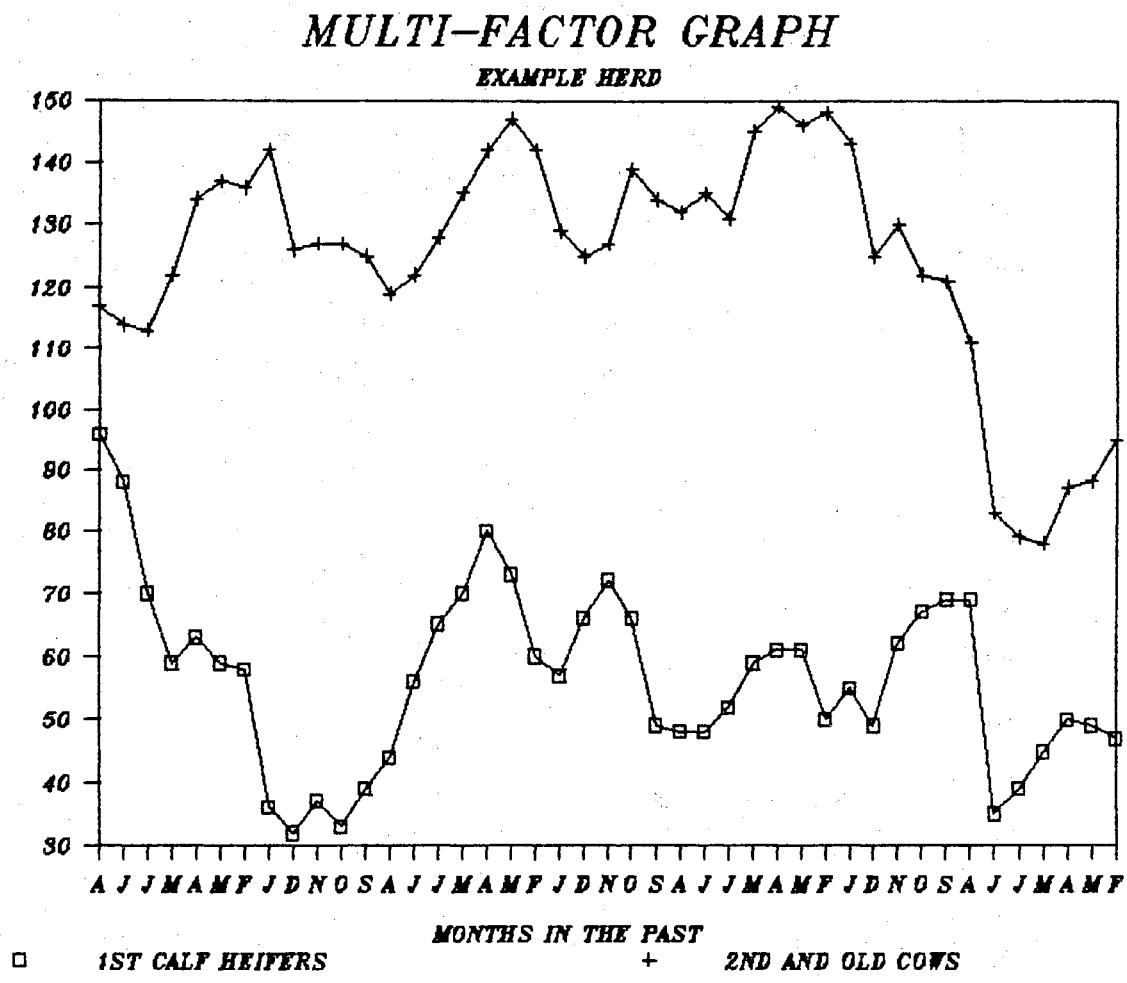
Graph 7


MULTI–FACTOR GRAPH
EXAMPLE HERD
70
65
60
55
50
45
40
35
30
25
20
A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F
MONTHS IN THE PAST
HFR LBS/DAY < 100
HFR LBS/DY 100–199

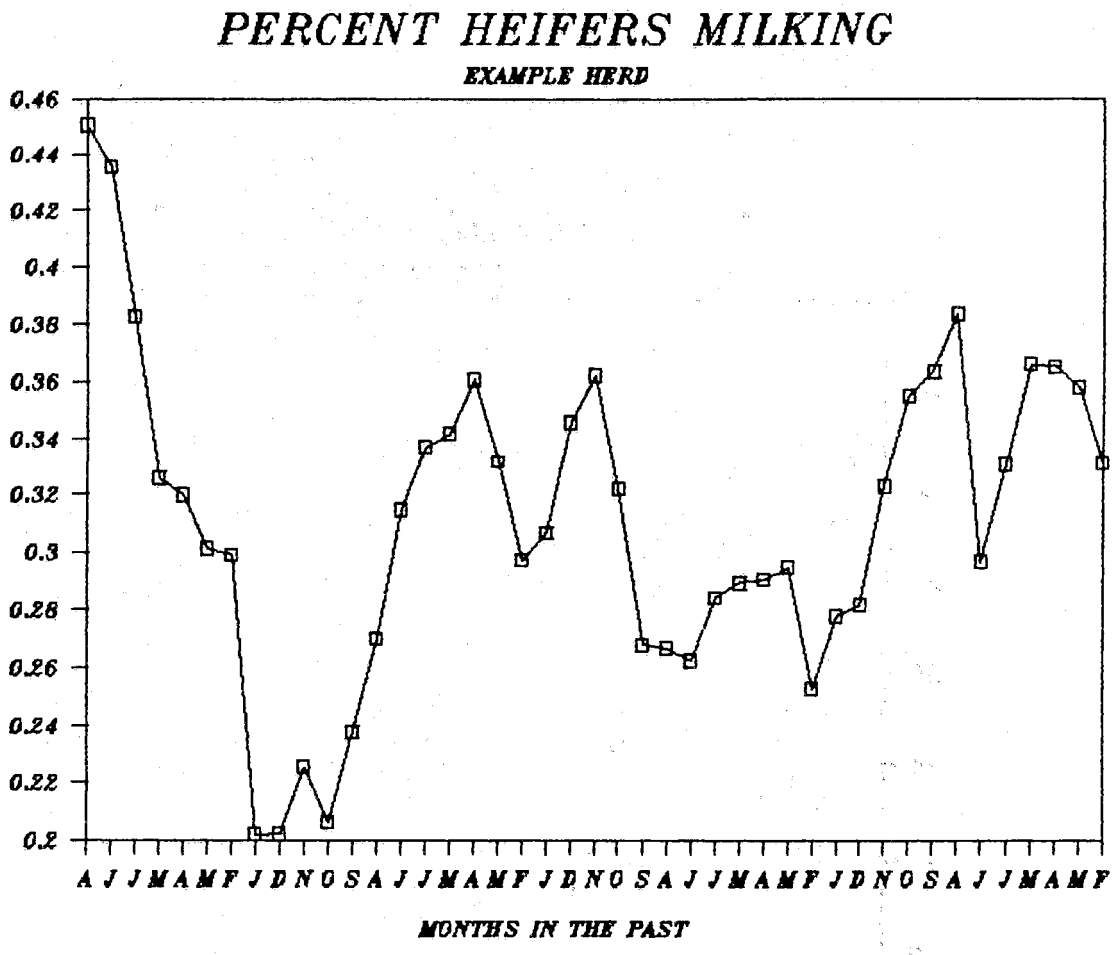

DRY MATTER INTAKE
EXAMPLE HERD
49
48
47
46
45
44
43
42
41
40
A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F J D N O
MONTHS IN THE PAST

MULTI–FACTOR GRAPH

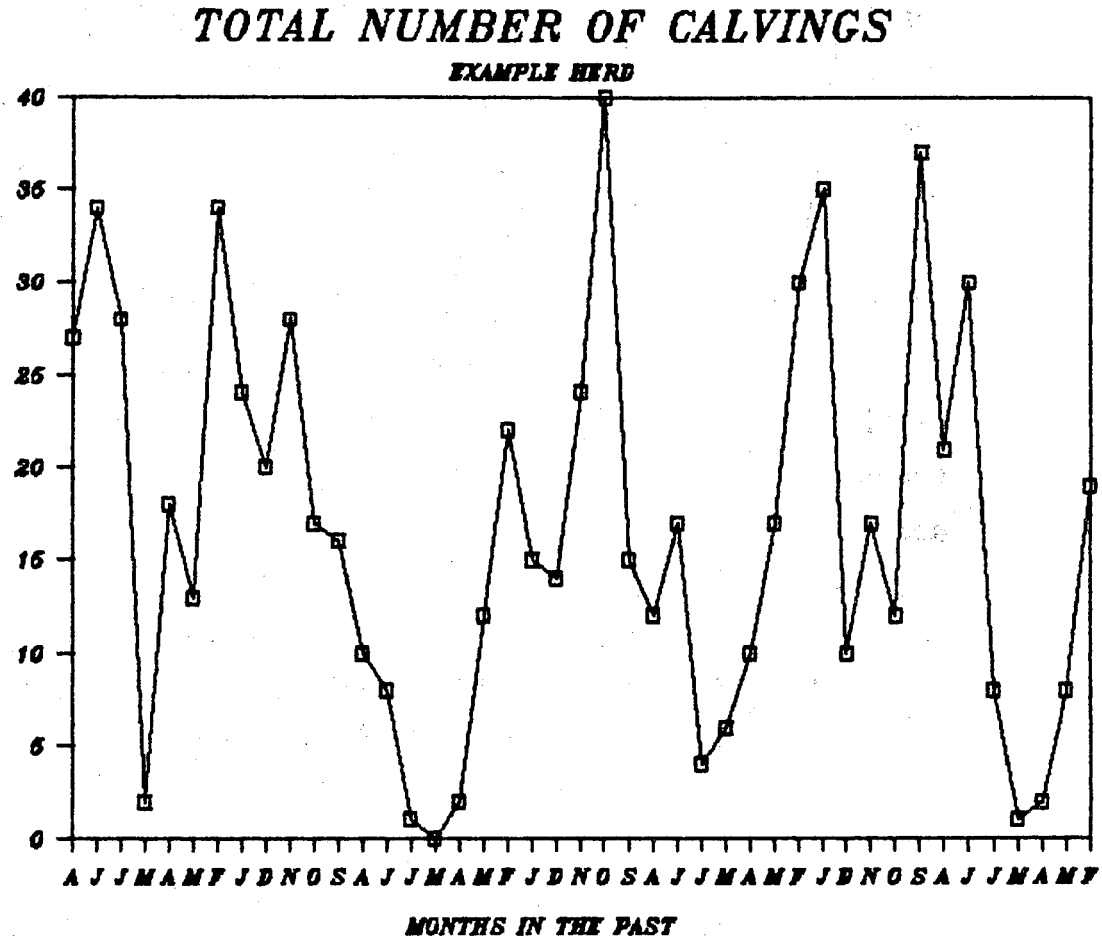



MULTI–FACTOR GRAPH
EXAMPLE HERD
150
140
130
120
110
100
90
80
70
60
50
40
30
A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F
MONTHS IN THE PAST
1ST CALF HEIFERS
2ND AND OLD COWS

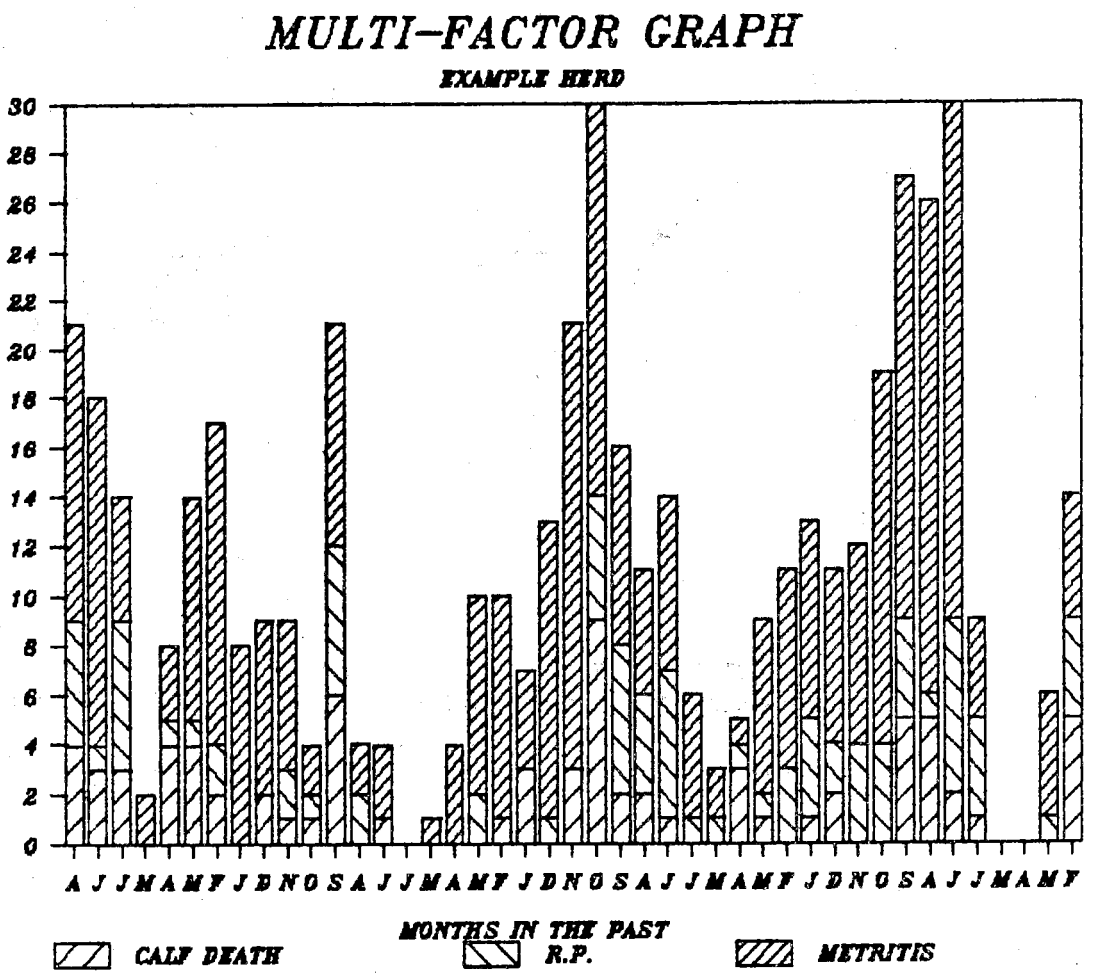
Graph 11


PERCENT HEIFERS MILKING
EXAMPLE HERD
0.46
0.44
0.42
0.4
0.38
0.36
0.34
0.32
0.3
0.28
0.26
0.24
0.22
0.2
A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F
MONTHS IN THE PAST

Graph 12

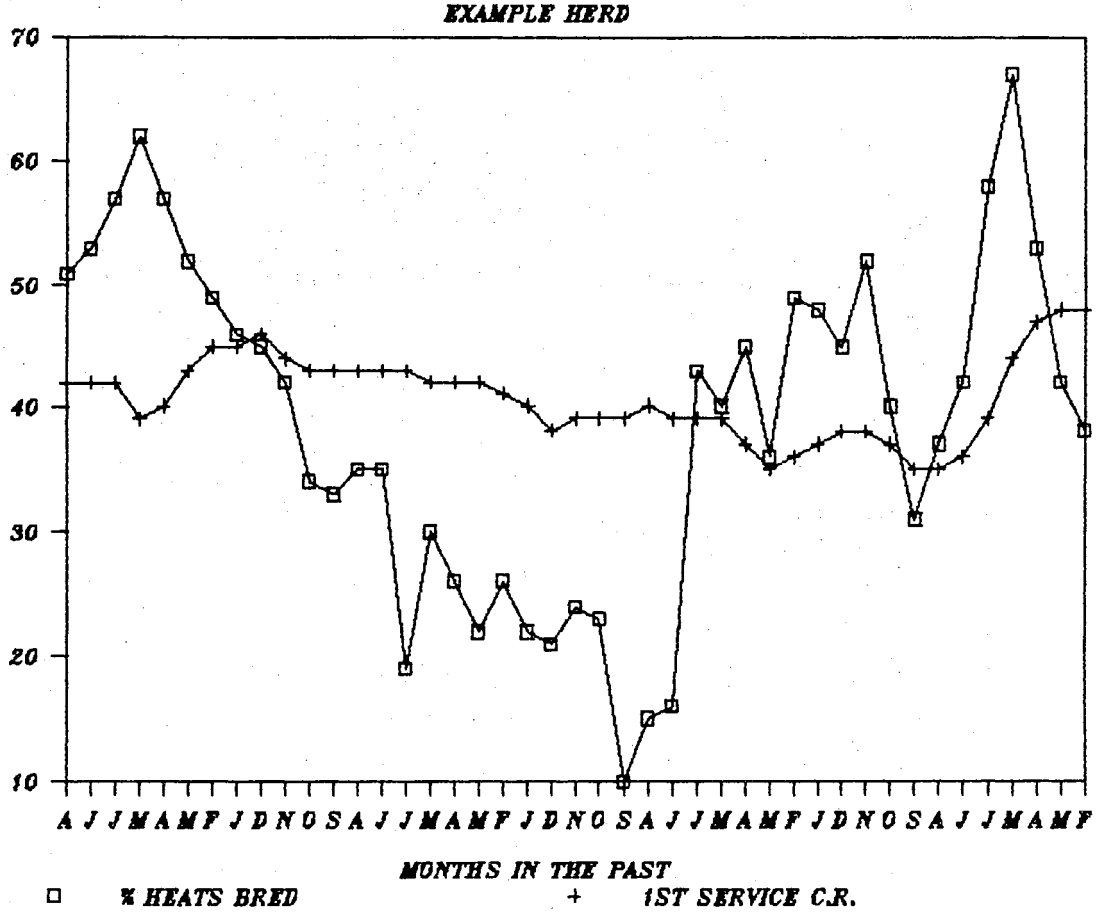

TOTAL NUMBER OF CALVINGS
EXAMPLE HERD
40
35
30
25
20
15
10
5
0
A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F
MONTHS IN THE PAST

Graph 13

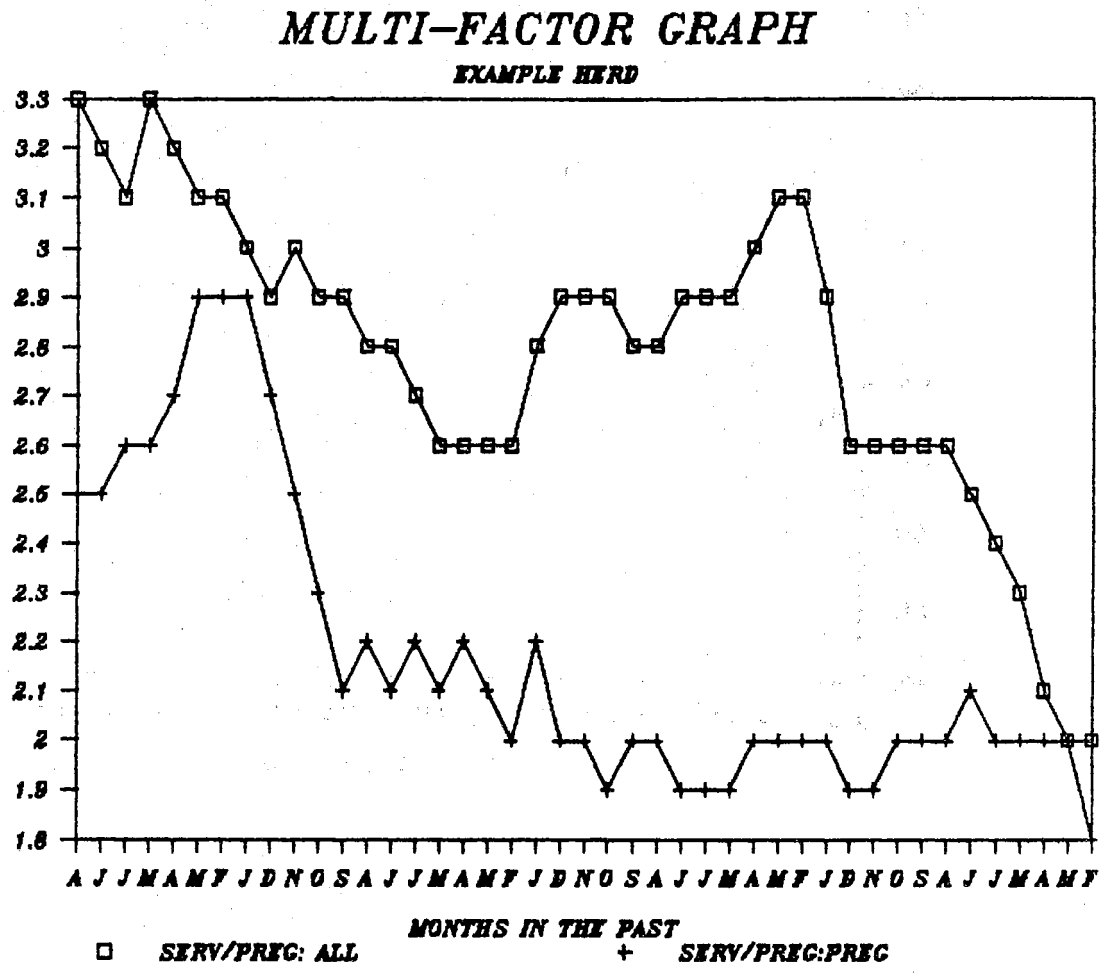

MULTI-FACTOR GRAPH
EXAMPLE HERD
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
0
A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F
MONTHS IN THE PAST
CALF DEATH
R.P.
METRITIS

MULTI–FACTOR GRAPH

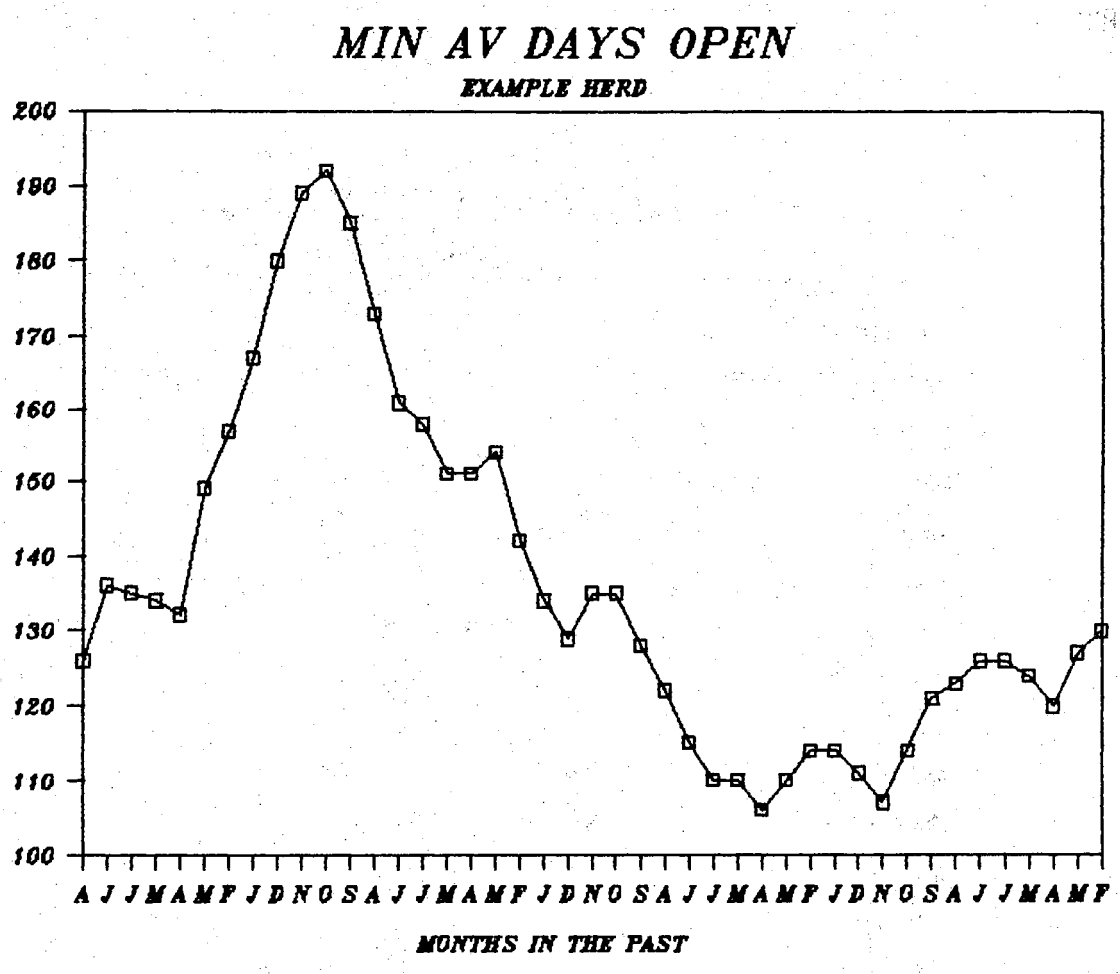
EXAMPLE HERD



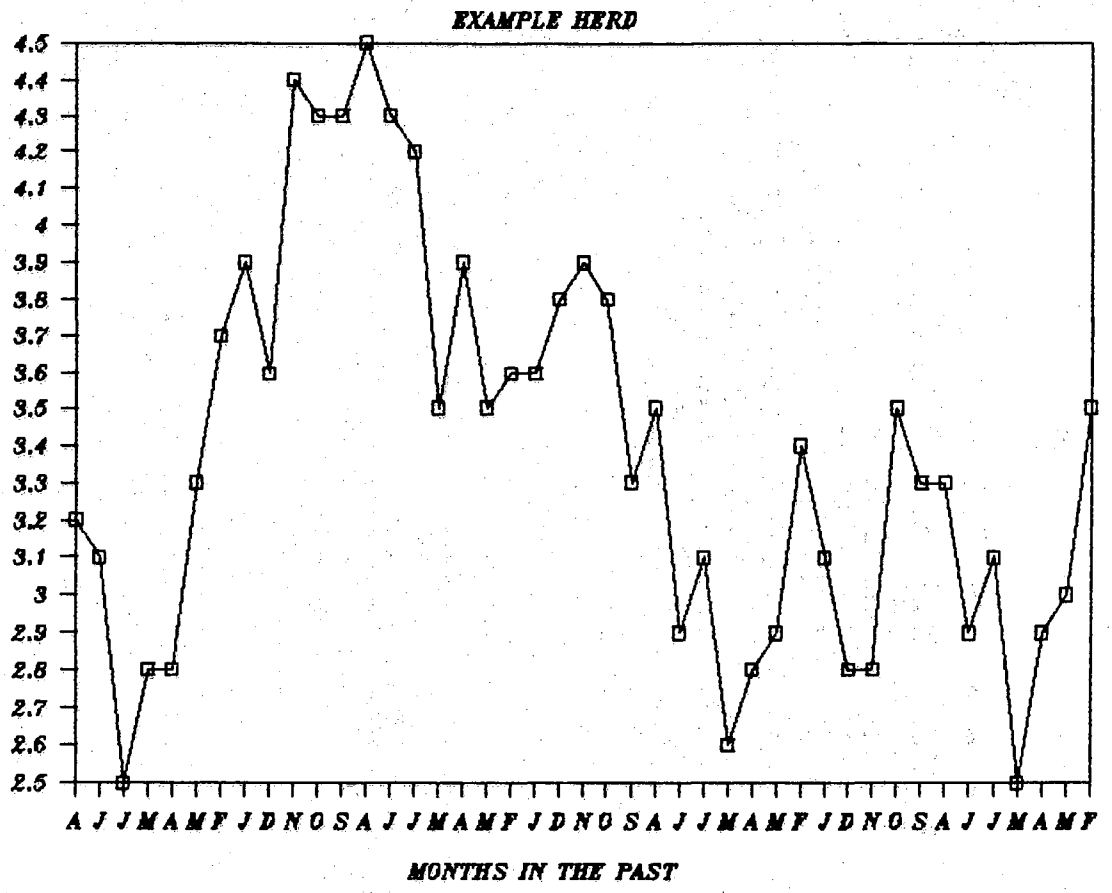
Graph 15


MULTI–FACTOR GRAPH
EXAMPLE HERD
3.3
3.2
3.1
3
2.9
2.8
2.7
2.6
2.5
2.4
2.3
2.2
2.1
2
1.9
1.8
A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F
MONTHS IN THE PAST
SERV/PREG: ALL
SERV/PREG:PREG

Graph 16

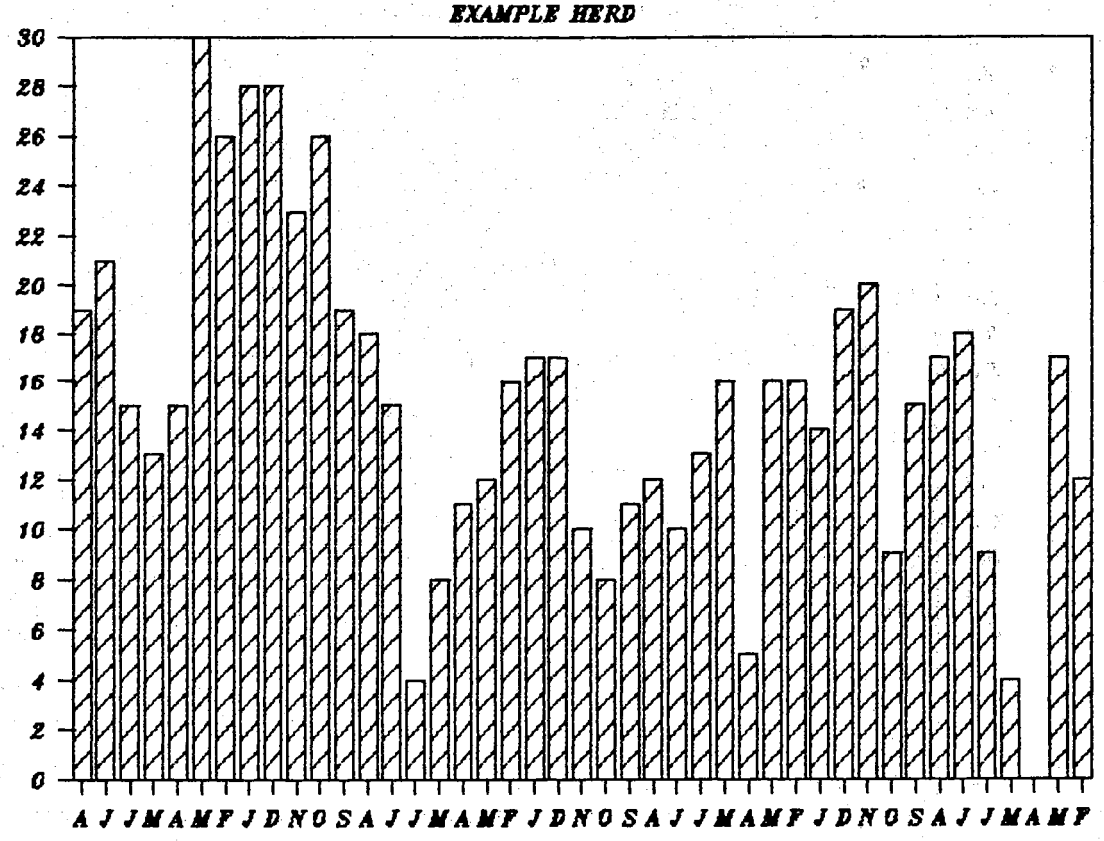

MIN AV DAYS OPEN
EXAMPLE HERD
200
190
180
170
160
150
140
130
120
110
100
A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F
MONTHS IN THE PAST

AV CELL COUNT CODE



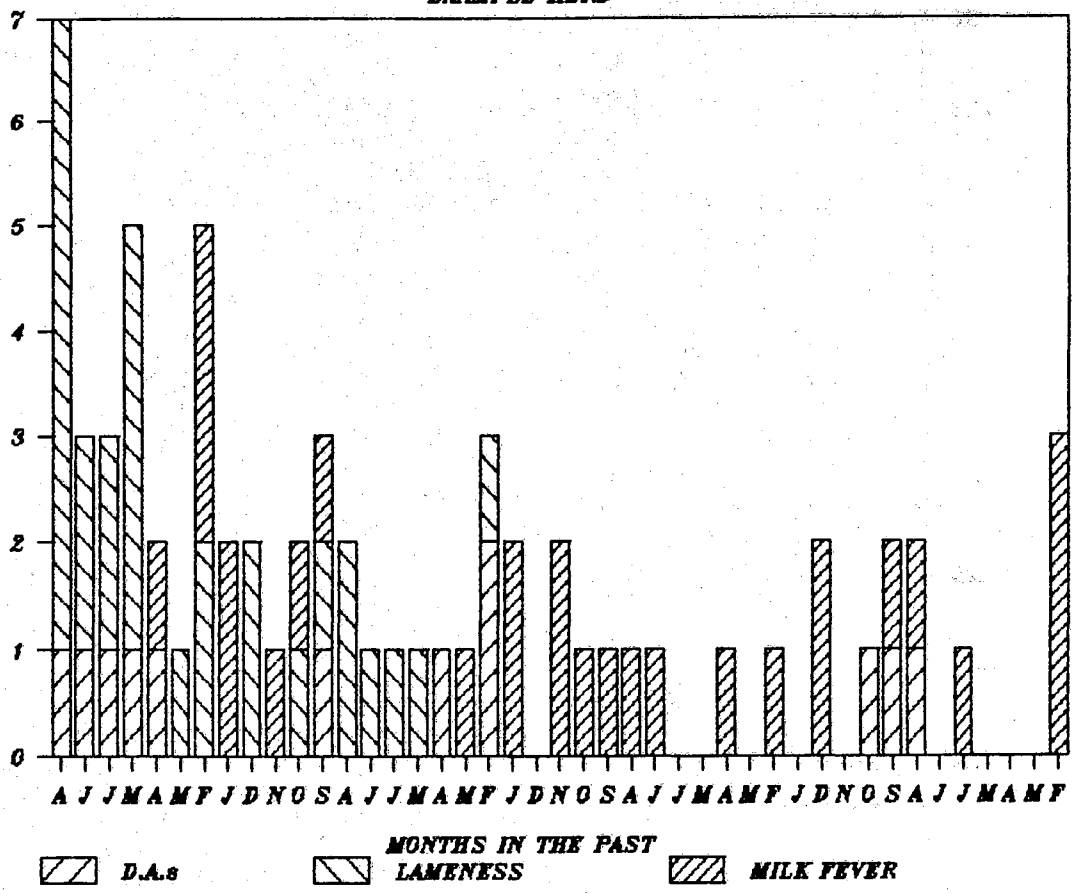
MASTITIS: CLINICAL

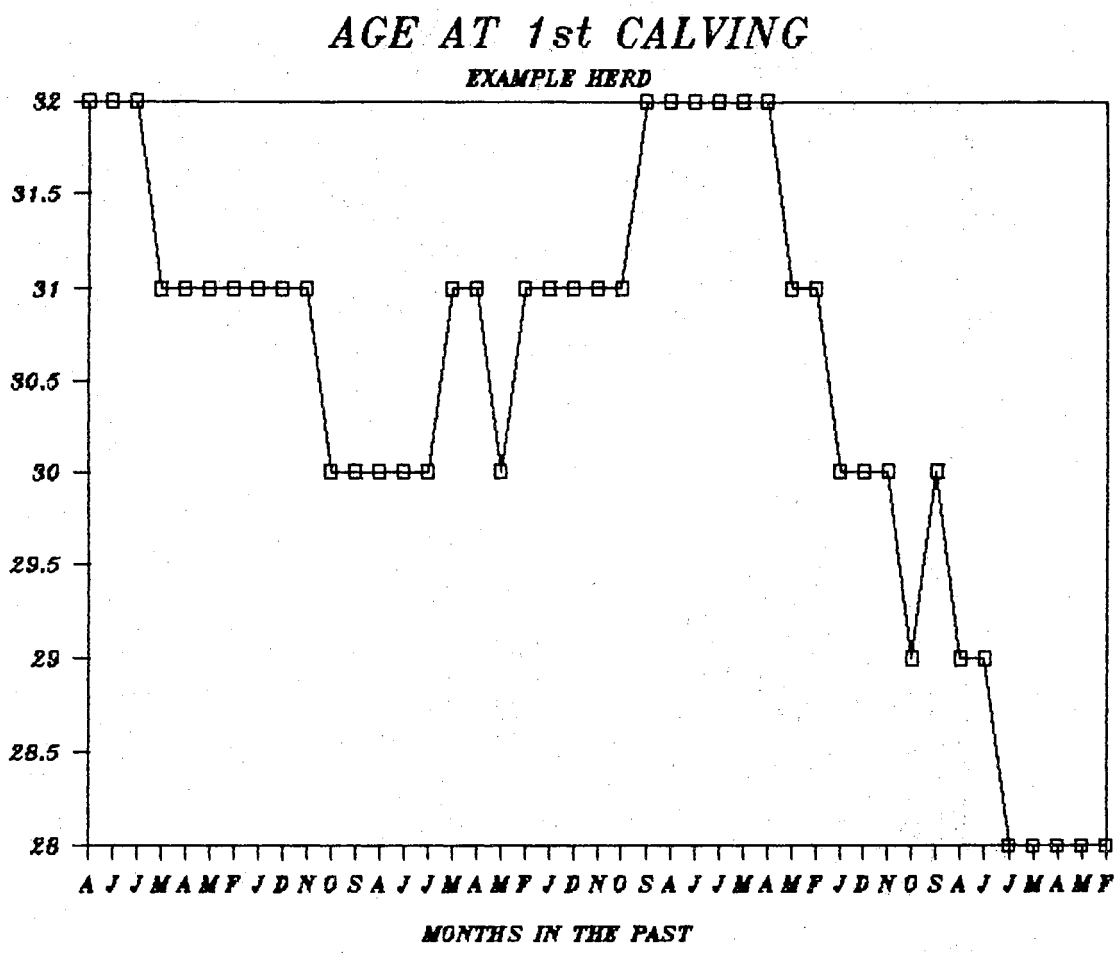
EXAMPLE HERD



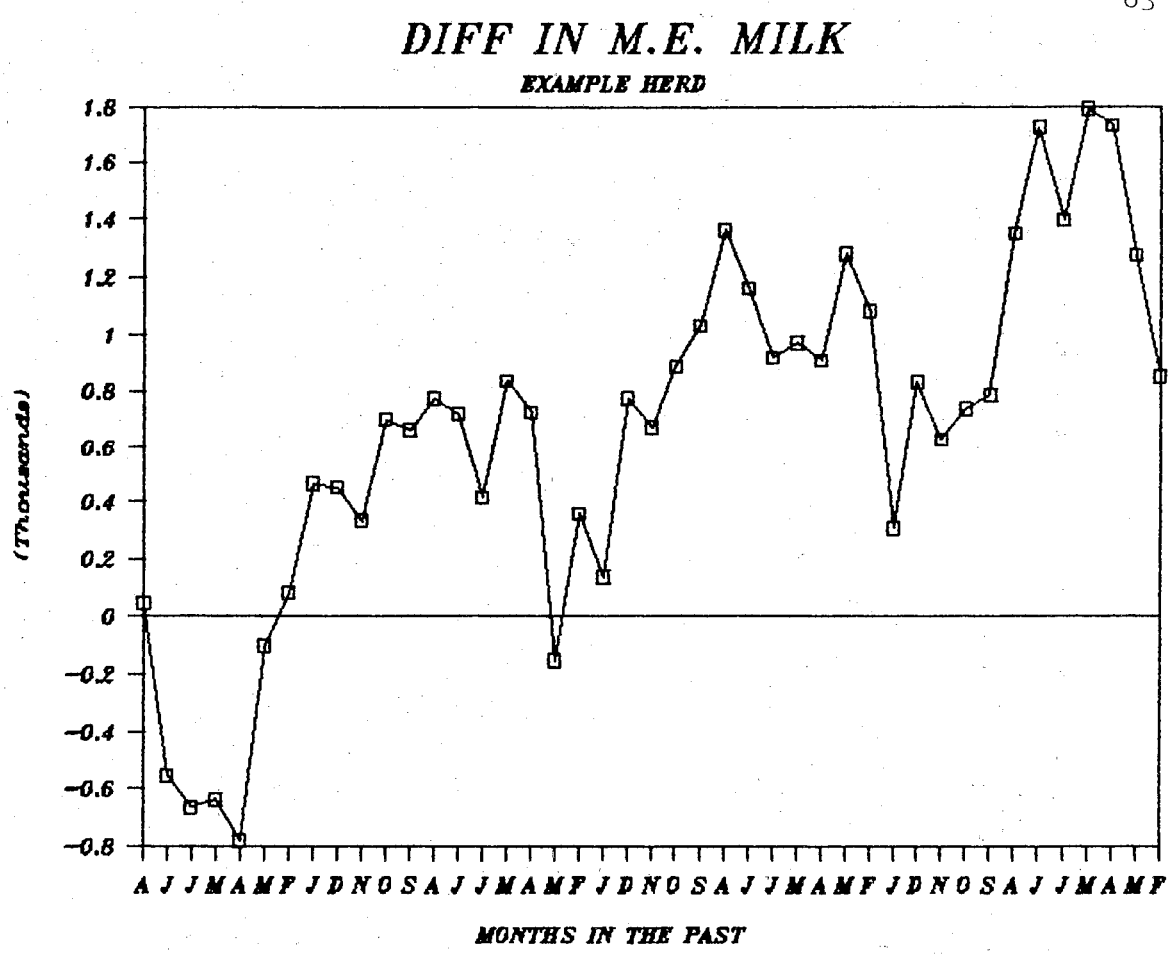
MULTI–FACTOR GRAPH

EXAMPLE HERD




AGE AT 1st CALVING
EXAMPLE HERD
32
31.5
31
30.5
30
29.5
29
28.5
28
A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F
MONTHS IN THE PAST

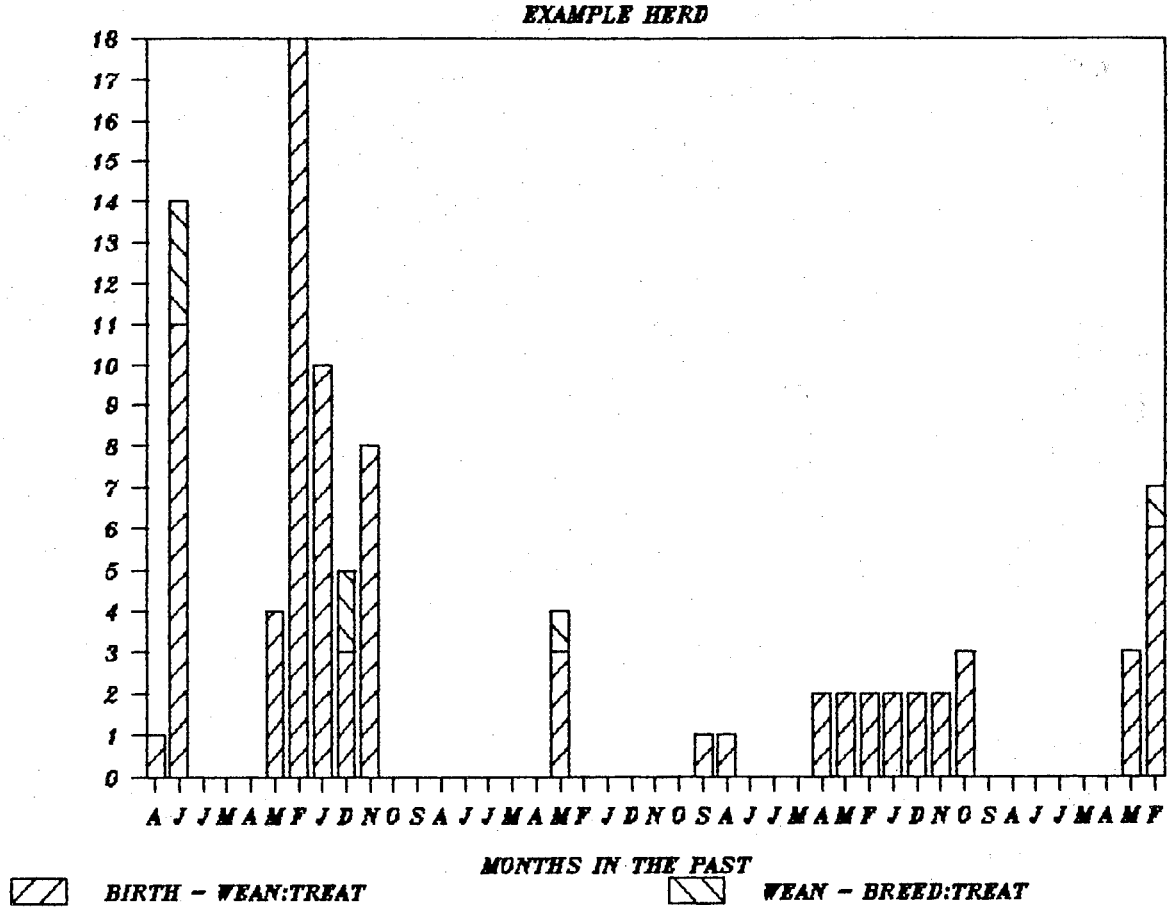
Graph 21


DIFF IN M.E. MILK
EXAMPLE HERD
(Thousands)
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F J D N O S A J J M A M F
MONTHS IN THE PAST

Graph 22

MULTI–FACTOR GRAPH

EXAMPLE HERD



The DairyCHAMP Program: A micro-computer based health and management program for dairy herds

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SUMMARY

The DairyCHAMP micro-computer based dairy health and management system is described. The program allows herd monitoring, problem diagnosis and provides aids to management. It is easy to operate, flexible and educational for the user. The program operates under the PC-DOS operating system standard. The dairy farm processes which this program addresses are control of reproduction, mastitis, nutrition, disease, herd replacements, and herd inventory management. The program deals with system control, animal records, herd test records, milk production and feed use records, education, financial management and interfacing with other programs. Data entry is via programs selected via menus. These allow selection of information for recording from on screen lists in English which are stored in the computer as code. Outputs may be viewed interactively or printed. They consist of periodic reports which allow key indices of milk production, disease, reproduction and heifer growth to be monitored. An evaluation report is for use in the analysis of clinical trials and comparative analysis of the performance of herds. It lists observations such as means, standard deviations, the number of observations ranges and confidence intervals for performance indices. Diagnostic reports allow performance to be analyzed in ways which allow causes for inadequate performance to be identified. The program has been designed to fit the operational needs of all types of dairy production systems around the world.

INTRODUCTION

The DairyCHAMP computer program is designed to support the operation of health and management programs on dairy farms. It supports herd management by providing management aid lists to farmers. It also encourages performance monitoring by calculating performance indices on the herd's demographics, production, reproduction, mastitis control performance, disease

occurrence, calf survival, heifer performance, and culling with analyses being calculated in a standard way. This allows comparison to targets and aids the identification and solution of problems or the identification of opportunities to improve. Goals in developing this system were to achieve speed and ease of use, informative and educational prompts, and complete, consistent, accurate records with maximum flexibility to meet circumstances in dairying around the world. A feature of the program is that the user can chose to enter information to the level of detail which they desire.

Health programs for dairy herds have been advocated for many years in association with recommendations to support them using computerized information systems. Adequate accurate information is essential to the function of health and management programs. Performance targets are set as goals to direct efforts towards improving herd management and disease control. Records allow a herd's current performance to be compared to targets and allow investigation of why target performance is not being achieved if it is not. Health and management programs address the limitations to dairy herd production imposed by managerial as well as disease constraints. They address subclinical disease and managerial production limits which in many cases have greater financial impact than clinical disease.

The advantages of micro-computers over mainframe computers have been discussed previously (Blood, 1984). Before developing the DairyCHAMP program, a number of micro-computer based dairy health programs had been evaluated and all had aspects which could be improved upon (Meek and Etherington, 1984). Evaluations of available programs at the University of Minnesota led to the conclusion that a more convenient and useful dairy program could be developed to meet our objectives for teaching veterinary students, research and helping farmers through extension programs and direct veterinary service.

Components of health management programs include control of reproduction, mastitis, nutrition, disease, herd replacements, herd management and financial management (Williamson, 1982), which should all be addressed by a computer support system. To adequately address these needs, milk production and quality records must also be kept.

MATERIALS AND METHODS

Micro-computers operating under the MS-DOS and PC-DOS operating systems were used with the Turbo-Pascal 5 computer language and program development system in the development of the DairyCHAMP program. Programming was directed at epidemiological and veterinary issues such as the correct definitions of animals to be included in populations for different analyses, algorithm development and defining criteria of normal performance for consistency and error checking.

Modular programming allowed for parts of the program to be planned and implemented by different developers with interest and expertise in particular program modules. Individual users can also chose which modules they wish to employ. Modules developed are a - system control module, animal record module, farm record module, herd test module and interface module. A milk and feed module, educational module, and financial management module are planned but not yet implemented.

Aspects of dairy enterprise performance required to allow adequate monitoring and management to occur were detailed early in the program's development. Emphasis was placed on animal health, feeding and breeding management. Codes were developed to support analyses in the performance areas identified. Codes allowed information about cows, their identification, location, parents, feed, production, diseases, and reproduction to be stored. The code list was sent to veterinarians and dairy experts in Asia, Australia, Europe and North America to determine if their needs and those of their clients for recording information about the dairy enterprise were being met. Their comments and suggestions were incorporated into the program.

RESULTS

Data Entry

General:

The DairyCHAMP program uses menu driven programs to capture animal and farm record data. A prompt line informs the user of the choices which are available and pressing the [F1] key shows a window on the screen which allows the selection of a valid choice. The default date is set to the current day but can be changed to past dates. A coded data storage structure is used to conserve

disk space, and a data dictionary approach makes the recorded information readily readable to the user. A program converts the dictionary data into the computer code which is stored on disk, or from stored code to English as data is retrieved. This methodology means that synonyms can be selected and used - thus, event names, disease and treatment names can be replaced by synonyms which may be used locally or may be the names in another language. Data integrity is therefore preserved, while allowing the ability to create terminology which is locally acceptable. Each farm may have its own data code list.

The data dictionary also allows the creation of codes for diseases, treatments and other data to be added by the user to the extensive initial choice. Thus, as new drugs are developed and released and as new syndromes are identified they can be added to the dictionary, but they remain distinguishable from the original codes. Routines have been developed which will allow the program to be modified to allow these added types of data to be analyzed. Thus if a new disease is added by a user, they may modify the disease list scanned to produce numbers for the periodic and evaluation reports so that the new disease is included.

Choices for a data entry field are displayed in a pop-up window by pressing the [F1] key or when an entry typed in is not unique or not recognized as a valid choice for the program. The appropriate entry can be selected using alphabetic keys, which jump the cursor to the first choice starting with the letter which is pressed or by scrolling through the alternatives using the cursor control keys. Pressing the return or right arrow key will move the selected entry into the records. Specific information may be added to dictionary selections from the data entry routines including animal identification, farm locations, farm of origin for purchased animals and the identification of semen which is used but not stored on the farm.

Program Modules

Animal Records:

Animal histories exist in the animal record module. They are stored in a form analogous to cow cards. A fixed length header component stores only a limited amount of specific data such as the cow's identification, parentage, lactation number, whether she is lactating or dry, reproductive status and location. Such

information is required to rapidly sort cows into logical groups for analytical purposes. Another variable length part of the record stores information on events which occur in the cow's life such as herd entry, calving, estrus, breeding, disease, treatments and other events and findings. The events are added to this record as they occur and the record grows as more events are added. Each lactation record for a cow is linked to the previous and next lactation record so that they become a single logical record.

Error checking in the program includes a logical consistency check in data entry which, for example, ensures that animal types are consistent with events which are recorded for them. Error checking for biological consistency also occurs. All added or edited events are checked against previous and when editing, subsequent histories to determine if the event to be added is biologically feasible.

The animal record stores information which is used in generating many reports and management aids such as histories, lists of cows requiring breeding, heat detection, drying off and the like.

Farm Records:

Farm records in the DairyCHAMP program store information which is pertinent to herd management but is farm level information and not individual cow information. Farm records include inventories of feed available on the farm, semen inventory and an on farm drug inventory. Another type of information which is stored in the farm data file is herd production levels as measured from bulk milk tank records and details regarding quality factors such as the somatic cell count, and butterfat percentage of the bulk milk shipped from the farm.

These records are used to manage and evaluate inventories and to produce reports regarding feed, drug and semen usage. Bulk tank milk records can be used to record and evaluate the milk being sold from the farm.

Herd Test Records:

This module stores information from herd testing organizations relating to individual cow's milk weight, composition and quality as indicated by somatic cell count. This information aids in managing the nutrition and mastitis control of cows. This milk production information can be linked with other health and management parameters to allow evaluation of their impact on herd production performance.

Interface Capabilities:

Since the DairyCHAMP program's database can potentially contain such complete records about cows and herds, and since many excellent software programs exist, facilities in the program allow the transfer of data from the DairyCHAMP program to other programs such as DairyORACLE (Optimization of Reproductive Activity in Commercial Livestock Enterprises), Lotus 123 spreadsheet programs and others in ASCII format. The DairyCHAMP program is capable of receiving code in ASCII format from other programs such as DHIA programs, automatic transponders measuring milk and feed, milk temperature, conductivity and from automatic electronic scales.

Educational Components:

To overcome the fear of users being overwhelmed by data without their knowing how to use it, the program was designed to have 3 levels of educational assistance. At the first level, consistency check routines contain helpful and educational messages which aid the user. This part of the program is already implemented. Other methods of education within the program are proposed.

Financial Components:

Records of feed supplies, drug and semen purchases in addition to the milk and animal production levels from the dairy herd provide a very large part of the necessary information for a dairy enterprize budget and for a dairy enterprize financial record system. The ability exists to develop such systems with the aid of agricultural economists to capture the information from this health and management production record modules and to integrate them with these financial functions in a financial module.

Output Formats

The function of the DairyCHAMP program's outputs are to aid with management, allow the identification and diagnosis of problems and opportunities for improvement, and to allow the performance of herds to be monitored in areas which are relevant to the aims of the producer managing the dairy enterprize and others serving the producer, such as veterinarians. Reports may be run on data which is nested by breed, location, lactational age, user defined group or mixes of

these classifiers. The ability to analyze performance in this way allows epidemiological risk factors to be considered when examining a herd's record for inadequate performance. Whole herd analyses may also be run and they would normally be used for herd monitoring.

Periodic Reports:

Periodic reports of key areas of herd performance including herd demographics, milk production, reproduction, mastitis, disease, heifer growth, calf survival and culling are produced. In these, the period under review can vary from 1 day to years. Up to 12 baseline periods are specified and they, along with their mean and performance in the current period are reported. In periodic reports, data are the latest available for the index being calculated. These reports therefore consider different populations for different indices. Periodic reports are management oriented reports which are tools in the day to day monitoring and management of the herd.

Evaluation Report:

This report is a 1 page output of key production related indices, all calculated on cohorts of animals defined as those calving or being born in a period. This report provides thorough descriptive statistics such as arithmetic and geometric means, binomial mean where appropriate, standard deviations, the number of observations, the range for observations and the confidence interval for the mean at a P level specified by the user. This report is for use in the evaluation of clinical trials and comparative analysis of the performance of herds.

Diagnostic Reports:

These provide measurements of herd performance in ways allowing causes of inadequate performance to be identified. Reports for mastitis provide indices for monitoring mastitis incidence, prevalence and infection elimination rates. The facility to graphically evaluate heifer growth performance against standard curves, to run cumulative sum graphs for conception efficiency, plot milk production curves with standards for herds and curves for individual cows allow problems and opportunities to be identified. Other diagnostic reports allow conception efficiency

to be calculated by inseminator and bull. Further reports will be developed as the need is demonstrated.

Data Base Applications:

A third type of reporting process allows the user to define and develop their own reports. These can be reports which are routinely required by managers but are not available as standard reports. Users may also require the ability to do data base searches when conducting a diagnostic problem analysis which is suggested after viewing a periodic report output or other monitoring report. Many pre-defined variable names have been included in the program to allow users to search the data base. These include items such as the identification of animals, their group, location, pen, feed group and other similar demographic information. Events and intervals such as days open are also available as data items which can be used in the database management system as well as production and treatment information.

Information can be defined by the use of a where clause which is an expression limiting the data to be displayed or analyzed. Where clauses can include variable names, arithmetic operators, relational operators, logical operators (AND, OR, NOT) and the functions EXISTS and FAILS. Dates can be used to set starting and ending periods for data searches.

Several styles of reports are available using the database applications procedure of the DairyCHAMP program. These include a facility to list data in a format of one record per line. Many variables may be listed on a line of output. A tally facility allows a count of the occurrence of discrete variables to be made. A frequency table and relative frequency histogram are displayed for each variable. The cross tabulation facility produces a contingency table with column and row variables being any discrete variable. A statistical option allows numbers of observations, arithmetic means, sums of squares, standard deviations and standard errors of means to be calculated. A histogram program allows histograms of continuous variables to be displayed. A scatter plot facility produces a scatter plot for pairs of variables. A time plot displays the relationship between a variable and a date variable.

CONCLUSIONS

The DairyCHAMP micro-computer based herd health and management program, offers a management facility for dairy herds regardless of size. It has a complete, convenient and helpful input format. The standard report designs provide management and monitoring information for herd managers and scientifically valid analytical formats for veterinarians and researchers working in dairy herds. The program has achieved simplicity and consistency of operation while retaining flexibility and speed.

The DairyCHAMP program will allow veterinarians around the world to work in cattle health and management programs in confidence that analyses are being conducted in an epidemiologically sound and consistent manner. The program has considerable complexity of design, but a simplicity of use which will make it valuable in a spectrum of situations in developed and developing countries. It gives the power to both practicing herd management veterinarians and research workers to study and document the relationship between health, efficient management and productivity.

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Williamson, N.B. (1982) Proc 12th World Congress on Diseases of Cattle. Amsterdam.

EVALUATING HERD REPRODUCTIVE STATUS USING THE DairyCHAMP PROGRAM

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INTRODUCTION

As veterinarians we have many skills which can help improve the performance of our clients' herds. We should fully use our skills and training to increase the efficiency and profitability of dairy herds and not limit ourselves to only those gains which can be made from controlling disease. Our value to clients is improved by using our skills in an organized way, encouraging and using available technologies. Computer use to monitor performance and aid in diagnosis is essential to efficient and timely veterinary herd health services. Herd reproductive performance limits herd production and profits. Recognition of this by dairy farmers has made reproductive herd health programs increasingly popular with them for 25 years. We must ensure that reproductive health programs continue to contribute to farm profits. To do this we must continually measure and monitor herd reproductive performance.

It is not good enough to continue to visit farms for regular reproductive examinations and treatments at so called herd health visits, if the examination and treatment of cows is all that occurs. This is nothing more than individual cow reproductive medicine being practiced on a number of cows at each visit. Although this is convenient and spreads call

overheads among a number of cows, it does not realize the potential gains possible from true **herd** health care delivery programs.

We must use reproductive records to select the cows which should be examined by veterinarians. They may be at risk or fail to meet targets. The DairyCHAMP program allows this to be done for predetermined categories of cows but we set the intervals used in their selection. Thus, expert palpators may select for pregnancy diagnosis at 30 days and occasional palpators may set the selection for 49 days.

We need to monitor herd performance by comparing reproductive indices to herd targets to identify opportunities to improve herd production efficiency. Many indices of reproductive performance have been described, so it may be difficult and confusing to decide which indices to use and how to use them. The DairyCHAMP program provides calculated indices which are derived in an epidemiologically correct and consistent manner to allow herd performance to be reliably monitored and evaluated.

This paper highlights some features of the DairyCHAMP program in the evaluation of reproductive performance in dairy herds. It considers reproductive indices and their use to monitor herd reproductive performance to keep herds profitable.

REPRODUCTIVE EVALUATION

The calving to calving interval and culling rate (especially reproductive culling rate) are critical production related indices of reproductive performance. They should always be considered together when evaluating herd reproductive performance since indices of calving interval which appear acceptable can result from culling all cows with long intervals. Information to evaluate the calving interval and culling rate are available in the Periodic Report of the DairyCHAMP program.

Bias to reproductive indices may be introduced if some cows are retained in herds for prolonged periods without a calving occurring. For example, a cow may calve in November of 1987 and not again until June of 1989. In an analysis of cows calving in 1988, the performance of this cow will not be included. The impact of such cows on herd performance indices and economics needs investigation. The demographics section of the DairyCHAMP report makes it obvious how many such cows are present in a herd so that their possible impact can be evaluated.

INDICES OF HERD REPRODUCTIVE PERFORMANCE

It is important to clearly define the population to be analyzed in producing indices of performance so that consistency and comparability can be achieved. Populations included in analyses may vary depending on whether the analysis is a monitor of recent performance or a long term evaluation of progress. The DairyCHAMP program analyses performance in 2 ways, one for each of these purposes. The periodic report is designed as a monitoring report to allow recent trends to be assessed. Different populations are used for different indices in this report. The evaluation report is used for purposes of within herd or between herd comparative analyses and is based on a single population which is defined as having calved or having been born in a specific time period.

In monitoring, it is important to get a picture of what has been happening recently in a herd. Thus an index may relate only to the events occurring in the last month, (e.g. pregnancy diagnoses in the last month), rather than all events for a year. This makes the measure current and reflective of recent performance, where an annual rolling average can (for example) mask a seasonal trend in an index and be much less sensitive in showing adverse changes in performance.

The periodic report of the DairyCHAMP program allows recent performance to be displayed, but also allows the user to define base periods (days, weeks, months or years) and displays up to 12 of these individual periods as well as the rolling average of these and the latest period. Thus time trends can be evaluated. The DairyCHAMP program also allows this analysis to be conducted based on the lactation number, location, breed or a combination of these factors so that associations of performance can be made with these epidemiological determinants.

When the object of the reproductive analysis is to document the performance for a herd to be used as a basis of comparison between years or a basis for comparison between herds, the population to be used should include all cows calving in a year which meet the criteria for analysis. This is what is done in the evaluation report of the DairyCHAMP program.

PRODUCTION RELATED INDICES

Calving interval and culling rate are two production-related indices of reproductive performance. Calving interval has limitations for monitoring herd reproductive performance because it is too retrospective. Usually calving interval measures the time from a previous calving to that of a recent calving. This reflects reproductive performance in the breeding period before the cow's most recent gestation. If improvements are occurring in herd reproductive performance, they may not show up in this index for over 12 months. The index may also be biased by the exclusion of cows which do not re-calve due to abortions or sale (1). These are generally the poorer performing cows. The calving interval is reported in the DairyCHAMP program's evaluation report since it is a performance related, rather than diagnostic index.

Calving to conception interval can replace calving to calving interval in monitoring because it measures essentially the same processes but is available much sooner (2). It also is less subject to the bias of excluded data due to cows being culled because of late conception and never having a calving interval occur. The median calving to conception intervals or geometric means are possibly more representative of true herd performance because they are not biased by the non-normal nature of the skewness of the distribution. Cows with very long intervals don't raise the average so much. Ideal calving to conception intervals are 83 to 85 days for individual cows and about 90 days for herds due to the skewness of the distribution. The DairyCHAMP program reports the calving to conception interval in both the periodic report for monitoring and the evaluation reports. In the periodic report the population analyzed is the cows just diagnosed pregnant, while in the evaluation report it is for cows calved in a period.

The proportion of a herd calving in a year is influenced by the number of heifers calving into a herd and also the number of cows which calve twice in a year. Some cows in a herd will not calve in the year for which performance is being analyzed. Since this index is not widely used yet it should be noted that a target of 110 to 120% of average herd size is attainable. The proportion of the herd not calving in a year may be as low as 0% but probably should not exceed 10%. Since the performance of these cows is not included in the evaluation of annual performance, its absence may represent a major source of bias in the annual reproductive indices of some herds. The proportion of the herd calving in a year can readily be obtained by using the periodic report where the numbers of cows and heifers in the herd and the numbers of those entering and leaving the herd are detailed.

Culling rate is readily calculated as the number of cows culled as a proportion of average herd size for any time period. The culling rate for the specified time period is

available in the DairyCHAMP program's periodic report culling summary.

Calving (or calving to conception) intervals, the proportion of the herd calving and culling rates reflect the final outcome of all of the factors influencing herd fertility. While they relate to productivity they do not aid in the identification of problems causing inadequate reproductive performance.

DIAGNOSTIC INDICES OF HERD REPRODUCTIVE PERFORMANCE

To document performance and identify problems beyond the level of excessive calving interval or excessive culling, other indices can be derived from herd records if adequate information is available.

The calving to first service interval gives a guide as to the importance of pre-breeding and post-breeding factors influencing reproductive efficiency. It is a useful starting point in the process of narrowing down causes of low reproductive performance. This interval depends on the occurrence and observation of estrus, the maintenance of records of estrus and breeding and the farmer's policy regarding breeding cows at observed heats.

If calving to service intervals are short, (65 day herd average or less) the occurrence, observation and recording of estrus and the breeding management policy are compatible with efficient reproduction. If inadequate reproductive efficiency exists, attention can be directed to factors operating at or after breeding. Long calving to first service intervals result from prolonged post-partum anestrus, inadequate early estrus detection or a failure to record observed heats.

Estrus detection may influence the calving to service interval considerably. An index of the observation of estrus is the estrus detection rate, defined as [(21 / average inter-

estral interval) x 100] (3). The target level of performance for this index is 85%. Another measure of estrus detection is the ratio of single to double inter-estral cycle lengths (4).

A measure of both the occurrence and detection of estrus is the proportion of cows in heat by 60 days after calving. A failure to cycle due to inadequate nutritional management is frequently observed as a number of cows with poor body condition and inactive ovaries. Where pre-breeding heats are not recorded, many cows are examined unnecessarily at a cost to farmers. Recording of pre-breeding heats helps to establish whether normal cycling is occurring without the expense to the farmer of veterinary palpation.

The influence of a farmer's decision to delay breeding can be measured and documented as the mean interval from a heat detected at a time when service is reasonable (> 50 days postpartum) until service is given. This delay is due to management policy and is called the deferral interval by the author. It can contribute significantly to calving interval in some herds. This is the saving that could be made in calving interval by convincing farmers to breed at every heat beyond 50 days which they already detect and note. The number of deferral days is reported in the DairyCHAMP periodic report.

Satisfactory intervals to service with long intervals to conception indicate that there are conception problems or a failure to re-breed previously bred cows. A low proportion of cows pregnant at pregnancy diagnosis, where cows are normal and cycling on examination, indicates estrus detection problems after breeding (11). The 20 CHAMP herds had 75.0% of cows pregnant at pregnancy diagnosis. A suitable target level is over 85%.

Conception rate (or really diagnosed pregnancy rate) measures the outcome of breeding. It is influenced by cow factors like disease, conformation and nutritional status.

Nutritional inadequacies are generally associated with low production and excessive bodyweight changes. Infections may be involved and histories should be checked regarding calving hygiene, diagnosed uterine infections or vaginal discharges and vaccination status. Analysis of conception status by breed, group and age may help to define problems and guide diagnostic efforts. This can of course be done within the DairyCHAMP program. Low conception rates in association with anestrus in early post-partum cows constitute strong evidence of nutritional inadequacy.

Bull factors include the variation in fertility which occurs between different sires and between inseminators. Other bull factors are semen handling variations, artificial breeding technique and semen batch. Low conception rate associated with 1 or 2 of these variables indicates a problem due to this factor. First service conception rate provides the least biased estimation of bull factors. Overall conception rates can be biased due to a large number of unsuccessful services being given to a few cows. This may make conception rates look low, but have little impact on overall herd reproductive efficiency. This possible bias is avoided when first service conception rates are used. Conception efficiency can be analyzed by bull or inseminator using the conception rate analysis of the program. The program also provides a conception efficiency cumulative sum graph.

The interval from calving to service (6) and the interval from heat detection to breeding are 2 management factors which influence conception rate. The DairyCHAMP program has the ability to store the interval from first heat observation to breeding in the breeding event so that fine tuning of breeding policy can be undertaken to improve fertility. The program also allows the identity of the inseminator and that of the person detecting heat to be recorded so that the influence of these factors on herd fertility can be evaluated.

Sometimes farmers complain of conception rate problems in their herds which can be solely explained on the basis of early breeding after calving. Environmental factors also influence fertility. The results of a Minnesota study (3) indicate that fertility is depressed when high or low ambient temperatures occur. The major depression of fertility occurred in August in Minnesota which is the hottest month.

CONCLUSION

Dairy herd reproduction is related to production efficiency and farm economic performance in several ways. A few reproductive indices reflect the economically important aspects of reproduction in dairy cows. Performance targets can be set and compared to observed indices. When performance in economically related indices falls below accepted target levels, diagnostic indices can then be used to determine the management functions and reproductive processes which need to be improved.

The evaluation of herd reproductive performance and status requires that a planned and systematic consideration of indices which reflect key components in the reproductive process occurs. Indices reflecting the occurrence of estrus, its observation, the breeding of cows at estrus, and the outcome of breeding are all defined. A comparison of the value of these indices with expected performance levels can indicate where deficiencies occur and where opportunities for improvement exist.

The new DairyCHAMP program which runs on a personal micro-computer allows the key reproductive performance indices described above to be calculated routinely in a consistent and correct fashion with a minimum of effort on the part of a user of the program. It also provides the flexibility to allow a user to conduct their own directed investigation of the database of stored cow records in unique ways that may help in

investigating herd fertility problems or in managing reproduction in a herd.

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THE HERD HEALTH MONITORING SYSTEM

By Charles E. Rinehimer V.M.D.

PART 1: THE WHY

Why bother? Who needs reams of additional paperwork, hours of staring at a boring screen that never even breaks for a beer commercial, and the aggravation of setting up farmer's meetings and writing monthly progress reports? Well, maybe we all do.

In our area we are finding that farmers are falling into two distinct groups, those that are becoming good small businessmen as well as good dairymen, and those that are selling out to the first developer that comes along. Decreasing milk prices and increasing equipment and service costs have taken a great toll in the numbers of dairies in our area. Nation wide, modern dairymen are beginning to use words like cost effectiveness, and return per dollar spent. They are seeing that the secret to making more profit is not to run to the auction and buy more cows, but to get the most milk from the cows they have, at the least cost. They are beginning to cleave a sharp separation between their assets and their liabilities, and you can bet that if about the only time you show up on the farm is when that guy has trouble, you are a liability in his eyes. Don't believe it? Try this some time. Next time you get a call for a prolapsed uterus walk into the barn with a big smile on your face and ask the farmer just how much of a benefit he feels you are to the increase in his cash flow. WARNING! Make sure your Burdizzo is locked safely in your truck before trying this experiment.

But maybe you are already doing a good job of total herd health care. You may have the farmer on a regular herd check schedule, be doing mastitis control programs, and helping him with his ration. In reality you are an asset to him. But does he know it? Probably the only thing he gets from you showing him what you have done, is your bill. And so, and about time, we come to the Monitor.

The Monitor is simply a way of letting you and the farmer keep track of what is happening on the dairy on a month to month basis. It shows developing trends in the areas of production, mastitis control, reproduction, health care, and heifer management. On the outside it is just another list of numbers like a DHIA report, and in reality it is just another report. There is nothing extremely complex or

magical about it (my apologies to Wizard John). It's power lies when you use it as a tool to establish yourself as an essential part of the management of the dairy operation.

PART TWO: GETTING STARTED

Getting a monitor program started in your practice can be a frustrating and time consuming project. If you and your staff are computer virgins count on some late nights with some monumental headaches, and be prepared to have some "canned" apologies ready for all those folks who's heads you've removed when they told you to "have a nice day". But don't get discouraged. Remember, the competitor down the road has a twelve year old that's a whiz at this and he was at this meeting too!

Once you can run the computer well enough to get the program loaded you are ready to start a pilot program. Pick two herds in your area that are representative of your major farm type, (ex. one stanchion, one free stall) and offer them the program for four to six months on a no charge basis. RELAX, I'll later show you how even these pilot herds will be generating more income. Sticking fairly closely to the following outline should get you through the calving and heifer stage of the program, from there on you're on your own.

PART THREE: THE PILOT PROJECT

I. The Pilot Herd

- A. Pick your victim carefully.
  1. Should be representative of major type farm in your area.
  2. Should be well respected farmer in not the best or the worst herd.
  3. Farmer should have relatively big mouth.
  4. Farmer should be the type that is looking for help. Often young farm owner trying to keep his head above water, or herdsman trying to show he knows his business.
- B. Look for glaring problems

C. SHOW YOU KNOW SOMETHING!

1. Set easily obtainable goals.
2. Write recommendations down and send to farmer.
3. Stop by farm to discuss problems and encourage good record keeping.
4. Take time to write recommendations and comments on monitor sheets each month. Use colored pencils!
5. If after a few months farmer isn't keeping up with work dump him fast and flat.
6. Emphasize any progress. Use economic evaluations to make your point in dollars and cents.
7. Continue pilot for at least four months.

II. Spread the Word

A. Send newsletter with bills

B. Call farmers meeting

1. Keep meeting friendly and informal.
2. Ask permission and use pilot herd for demonstration.
3. Keep group small so you can use the actual computer to illustrate graphs and worksheets.
4. Don't hard sell. Let the monitor and your economic evaluations speak for themselves.
5. ACT INTERESTED IN FARMS FUTURE.
6. Consider incentives to get farmers started.
7. Get as many to sign up that night as possible.

III. Setting the Foundation

A. Make certain farmer knows what he is expected to fill out each month and don't let him get lazy.

B. Herd Check Day

1. Set policy of discussing monitor before actual work begins.
2. Body score cows every month.
3. Tape calves and heifers as much as possible.
4. Get bulk tank sample.

5. Establish easiest way for farmer to get barn sheet and DHIA reports into your hands.
6. Stress the importance of at least a monthly herd check visit to collect data.

C. Homework

1. Keep reports current. If you don't get adequate info BITCH.
2. Make numerous comments on report. Use colored pens.
3. Use economic evaluation programs to emphasize points.
4. Write letters if problem seems severe enough. Make phone calls.
5. Call farmer into office if possible to set goals.
6. Pick out major problems and provide step by step solutions that appeal both to you and to the farmer. Bend a little! Get involved.

PART FOUR: KEEPING THE SPARK

O.K. So now you've got your better clients locked into a monitoring program. You've wiped out all the Strep. ag., fattened up the late lactation cows, and got them using calf hutches. Your competition has taken up small animal medicine and even the animal medic salesman can't compete with you. Now the tough part, keeping the farmers interested. Suddenly their herd averages are leveling off and there aren't any glaring problems to fix. You begin to get discouraged. DON'T DO IT! The success of the program depends on how the farmers see it, not how you perceive it. Call periodic monitor meetings and invite just the herds on the monitor to your clinic. We have always been amazed how many show up. At our last meeting of 15 local herds on the monitor 12 farmers showed up. And we weren't even serving lunch! Getting that kind of a turnout will pump you up even more that it will them, and you'll be surprised at the positive discussions the farmers will get into using stats from their monitors as examples. You will also be surprised the next week when the herds that came out on the bottom of the Master Monitor graphs jump all over you to do something about their problems 'cause they know they have as good of cows

as old "so and so". So now that you're confidence is back in the program use the following outline to keep things going.

A. Master Monitor Meetings
   1. Make master monitor form and several graphs. Keep herd data confidential.
   2. Discuss problems of interest.
   3. Encourage farmer interaction. Try to get them to feel like they belong to a special program.
   4. Present any new programs you might be wanting to establish.
   5. Ask for comments and criticisms.

B. Generate quarterly reports on the progress or lack of progress of the herd. Use dollars and cents. Draw graphs.

C. Get to meetings where other practitioners are using similar programs to get the "spark" back.

D. If a program works take every opportunity to drill it home that your expertise and the monitors information had a great deal to do with its success.

PART FIVE: MAKING THE BUCK

But unless you are a hopeless idealist or a new Cornell grad you might wonder what's in this for me. It's obvious how this will get you deeper into your clients dairy operations, but how will it get you deeper out of debt. This is the real world where time is money, and that's the answer. If you are using a program like this you almost have to use an hourly rate as the basis of your billing. The increase in income that you will see from the monitor is due to the increase in time you will spend doing production medicine type activities. Initially this will be the added time you will spend on herd check day body scoring cows, taping heifers, and getting bulk tank samples. As problem areas become clear you begin to spend more time doing nutritional workups, mastitis control, and young stock programs. You should begin to charge for additional time you spend in front of the computer doing lactation

curves, nutrition, or economic evaluations. If this seems difficult for you to swallow start by finding time when you and the farmer can sit down in front of the computer while you're working on his herd. Not only are most farmers fascinated by the computer, they will see the amount of time and effort you are spending to generate the reports. Hopefully that will make that bill for computer time easier for you to send and for them to swallow.

Because we want farmers to try the monitor, and because we feel we make our money on time spent on the farm, we charge $10.00 per month plus 10 cents per cow to generate the paper work. Since all of this time is by a technician, in our case the kennel girl, there is little expense. In our practice our charges per call rose from $71.54 in Jan. '87 when we began the program to $79.94 in Jan '88 with nearly 10% fewer farms. That's an average increase of $8.40 per call without any fee increase. The average charge for Jan. '89 has risen to $88.25 with only a dollar increase in call fees. Also, although we are losing farms at an alarming rate, only two farms on the monitor have gone out of business, one because the farmer died, and the other because the board of directors that owned it wanted to get into other investments. To make it easy follow this outline and I think you will see an increase in income to go along with your more solid client base.

1. Charge all herd work on an hourly basis.
    a. Use on farm, and on clock, time to discuss the monitor report.
    b. Bill for increased herd visit time due to time spent body scoring cows, taping calves, getting bulk tank samples, etc.
2. Begin to expand services as needs become apparent.
    a. Bill hourly for time spent off farm on nutrition reports, DHIA special computer reports, etc.
    b. See increase in drug revenue do to expanded vaccination and mastitis control programs.
    c. Offer educational programs to the farmers such as insemination labs, and dairy improvement seminars.
    d. Offer your computer and herd evaluation to other practitioners who may not have the inclination or time to start such programs.

LETTERS TO CLIENTS

ADDENDUM

TO

DR. CHARLES E. RINEHIMER'S PROCEEDINGS

September 23, 1986

Paul Smith
RD 1, Box 512
Mt. Bethel, PA 18343

Dear Paul,

Here is the first report from the Progressive Herd Health Plan Program. I think you will find it very informative.

The monitor is designed to provide information on trends occurring in several different aspects of the herd such as reproduction, mastitis, and production. It also allows you to set goals for your herd and then measures the actual monthly and yearly data against these goals. I would like you to come over some night and put these goals in the program. As the monitor stands now the only column that pertains to your herd is the one labeled Aug. 86.

We will send you a report and a summary letter every month as soon as possible after we get the information. The circled red areas on the sheet are items that need immediate attention, and items in green are things that are progressing well.

Starting with productivity the rolling herd milk at 16000 is not that great, especially when you look down at the cow projected average of 17600. This means that some factor or factors are keeping the cows from reaching their potential milk production. This problem is again shown in the 50 lb milk/cow/day figure. It is important to note that with current milk prices this means that your cows are only grossing you $5.58 per day, around $6.50 would be better. If your feed cost/cow/day is accurate it is very good and so still gives you a fairly good feed cost over income ratio, (a measure of profit), but if your new feed costs are higher that is bad news. The heifer projected M.E. milk of 1986 is excellent, and since it is higher than the cows projected figure it means that your herd has the potential to greatly improve in the future.

In nutrition and feeding the milk cow ration checked out O.K. on our computer but it seems like you aren't top dressing very much grain, possibly because your forages are very good. There also is no dry cow ration included. It is interesting to note that your cows start out milking well, ave. 71 pounds for cows less than 100 days fresh but then seems to drop off rapidly during the lactation. Heifers, on the other hand start off good and maintain their production. We will try to explain this later.

Moving to page two the days to first breeding of 88 is high, 65 would be better. This means that either the cows are not getting back into shape quickly after freshening or you aren't seeing those early heats. In August, however the number of cows that had been fresh over 100 days and had not been bred was 0, and that is very good. The bad news for the month was that 55% of the cows you bred were already open more than 100 days. This means that for the month you did see those early heats but the cows did not conceive. This is again shown further down the sheet when 71% of the cows we checked for pregnancy were not bred. The section marked total herd shows the

reproduction performance of the herd for the year, not just the month. Here again we see too many cows open greater than 100 days at first service, and a first service success rate of only 22%. The services per conception of 2 is very good. This means that it took you an average of 2 breedings to get a cow pregnant, however since there are cows that still aren't pregnant and have been bred many more than 2 times the services per pregnancy is 3.7 and this is high. If that sounds confusing it did to me at first too. We'll talk about it later. What it boils down to is that there are a lot of problem cows in the herd right now. This is a cow that is more than 100 days fresh and not yet bred, or more than 140 days fresh and not confirmed pregnant. This is 17% of the herd. The cows are 227, 250, 171, 258, 267, 259, 276, 6, 233, 178, 268. I think these are the cows that are costing you the most reproductively. Studies have shown that the dairyman loses between two and four dollars a day per cow for every day over 100 days fresh that the animal is not bred. Since your average days open is 51 days over 100 days, and 74 cows, you are losing as much as $7500 a year due to cows standing dry too many days.

Finally, and probably most importantly is the mastitis problem in the herd. Although the second culture in September (not shown on the monitor) was not as high as the first there was still a significant number of Strep. ag bacteria present in the sample. This culture coupled with a 600,000 somatic cell count indicates a high level of subclinical mastitis in the herd. Subclinical mastitis is an infection that often does not show up as clots or off color milk. Even though you can't see the bad milk the mastitis is causing a major loss of production. The last page of the report estimates how much milk and money are lost to subclinical mastitis in a herd where the cows fall into the codes like your cows. These numbers are not entirely realistic since you will never get all of the mastitis out of a herd, but they do give you an idea of what can be achieved by a subclinical control program. I also think that this mastitis is the reason that your cows start out milking O.K. but tend to tail off around 200 days in milk, while the heifers maintain their production throughout their first lactation. Most of the heifers have very low somatic cell codes and are probably not yet infected with the bacteria. Controlling the problem should therefore not only raise production peaks but should also keep the cows producing longer at a higher level.

So, as you can see we have pinpointed some real problems in the herd this first month. Before we go to what we should do about them I would like to thank you for working with us in getting this program started. I realize it means added time for you and I hope the benefits will be worth the trouble. Please don't think I'm criticizing you when we point out problems in the herd. It is a credit to you that you are trying to make your herds better and all the work we do in this regard is strictly confidential.

What we suggest we do for the reproduction problem is to begin by looking closely at those problem cows. I would like to do rectal exams on all of those problem cows. I would like to do rectal exams on all of those listed during our next herd exam day. I think we should also use more lutalyse in cows that are getting over that 100 days open mark and check quiet heat cows with milk progesterone tests before breeding. We can talk about this during our next visit.

For the mastitis problem I think you should have your milking machine and your milking techniques checked out. Strep ag. is only found in the bovine udder and can only be spread from cow to cow during the milking process, so milking technique is very important in Strep. ag. control.

To get rid of the bacteria there are two different approaches, one direct and one conservative. The conservative approach involves several of the things you've already begun such as pre-dipping, post dipping and dry cow treatment. This program has the advantage of being somewhat lower in cost and there is no loss of milk due to antibiotics. Its disadvantage is that it is very slow and may take three years to eradicate the bacteria from the herd. The direct approach involves a lot more initial cost but gets rid of the problem in a lot shorter period of time. It would involve collecting a mixed sample from all four quarters on each cow and culturing it for bacteria. All affected cows would then be treated twice with a penicillin or cloxicillin teat tube. This should rapidly eradicate the bacteria from the herd and so quickly reduce those subclinical mastitis losses. The disadvantage is cost and lost milk. To start the cultures would cost one dollar per cow, $54.00 for the current milking herd. I feel that we will find bacteria in 40-50% of the cows so you will be treating lets say 20 cows. For two treatments of all four quarters this would cost around $95.00. You would also have to dump milk for 48 hrs. (cloxicillin) or two days. Using the $5.58 per day value of the product figure this comes to $223.20. The total cost of the program would be around $375.00. This sounds like a lot but it has to be weighed against those subclinical mastitis losses.

Whichever way you chose we think we have to make Strep. ag. control a top priority in the herd and we will be happy to work with you in either approach.

So we hope we have helped to define some of the problems in this first letter and we are looking forward to following the progress of the herd in future months.

Sincerely,

Charles Rinehimer

December 5, 1986

Paul Smith
RD 1, Box 512
Mt. Bethel, PA 18343

Dear Paul,

Even though I don't have all of the data from you for November yet, the DHIA data for October and November was striking enough to warrant a quick letter. In the four months that you have been on the monitor your production has dropped from 15896 to 14907, (see graph). What is really disturbing is that I accidentally picked up your November 1984 DHIA sheet the other day and your production at that time was 17828 lbs with a 3.4 fat. Also your cow projected ME values have dropped in November which means your rolling herd will probably be even lower next month.

If you look at the ME values for the heifers and the cows you can see that the animals have the potential when they freshen to produce a lot more milk. The production breakdown by stage of lactation shows that initially the cows do very well, 73.8 lbs. for cows less than 100 days fresh. After this initial period they crash to 49.2 pounds even though they are only between 100 and 200 days in milk. The heifers on the other hand tend to hold their production much more stable throughout their lactation. I feel that this drop in production in the cows can only be due to a nutritional problem or mastitis.

We looked at your feeding program in August and it appeared O.K. It wouldn't hurt to take another look at it but I'll bet it's O.K. Since I noticed that your hired men often do the feeding I would check to be sure the cows are getting just what the program calls for. I would also check your feed cart to see if it is delivering what it is supposed to on a weight basis.

I think the major part of your problem is subclinical mastitis. Your bulk tank samples are getting higher every month and a large percentage of the organisms are Strep. Ag., a bacteria only found in the udder and one that can be transmitted cow to cow. I am willing to bet that as many as 70% of your cows are infected with this bacteria. This is the reason they start out fine and quickly crash. Since your heifers aren't infected yet, (notice I said yet), they are milking fairly well, but unless you take action fast I am sure they won't continue to milk as they are during their second lactations. Using the cell count and code from your DHIA for November I worked out the production losses (see the last page). You are losing 195 lbs of milk a day to mastitis. If you have 62 cows that comes to 3.15 lbs/cow/day. If we look at this over a 305 day lactation it comes to a loss of 959 lbs. per cow per lactation. There is 1000 lbs of that loss from 1984. You can also see what that comes to in dollars!

My recommendations are to culture every cow as quickly as possible to find the Strep. Ag. infected animals. I can show you how to get the samples so that there will be no vet time charges involved. The cost to run the samples will be $1.00/cow. Once we know which cows are infected they should be milked last. A program should be started to treat the infected cows and then efforts should be made to keep them free of infection. All heifers should be milked first until we get the culture results. Milkers should be very careful about spreading infection cow to cow and the use of individual towels to wash and dry udders, and teat dip after milking is a must. We should talk about a pre-dipping program at next herd visit, as well as the type of teat dip you are using. I am sure we can turn the herd around with a program like I've outlined, call me if you're interested.

Reproductively the herd is doing O.K. Calving interval has dropped below 14 months and the days to first service and the number of cows fresh greater than 100 days at first service are dropping nicely, although for the month the cows 100 days open and not serviced did go up, probably due to the new hired man situation. I have listed the problem cows and I think some of them may still be do to DHIA mix ups, please check for me.

Hope to hear from you soon.

Sincerely,

Charles E. Rinehimer V.M.D.

August 31, 1987

Paul Smith
RD 1, Box 512
Mt. Bethel, PA 18343

Dear Paul,

As I am sure you are aware the changes in the herd in these last twelve months have been dramatic. Great improvement has been made in every aspect of the herd health program and I congratulate you on the efforts you have made in turning the herd around.

In the production area there has been a great improvement, especially in the production of the cows. Once we started to make changes the rolling herd average began to climb sharply (see Fig. 1). Since this figure is an indicator of the herd average for a twelve month period it is not as immediately sensitive to changes as are some of the others. If we look at the adjusted corrected milk (see Fig. 2), which is a far better indicator of present production we see a nice rise up until last month when I think the weather played a big part in the drop. On an average the cows on an adjusted basis are giving around ten pounds more per cow than they did last year. Having just looked at the improvements in the past and the present, we can also see a bright future by looking at the projected M.E. values (see Fig. 3). The changes that were made in both the Strep. ag. problem and the nutrition problem greatly improved the cow projected values, but after a nice initial rise the heifers started to drop in March and have continued to do so. This may be due simply to a bad batch of heifers freshening or might be related to the nutrition program. We should talk about this next herd check. In any case the cows are projected to increase 2,000 lbs. per cow and if we continue our 10 lb. per cow increase in Adjusted Corrected Milk over a 300 day lactation this should be a little on the low side.

The nice thing about the increase is that with the exception of July the feed cost over income has not changed all that much (see Fig. 4).

Reproductive performance has also greatly improved. Cows are getting bred sooner after freshening and the number of breedings necessary to get them pregnant has decreased (see Fig. 5 and 6). The percentage of cows that are bred after 100 days fresh has also dropped dramatically indicating that a larger percentage of the herd are falling into that ideal 100 day open period category. The calving interval has also dropped by .9 months which is very good.

Milk quality has greatly improved with the eradication of Strep. ag. from the herd and a drop in somatic cell count from 663,000 to 290,000. This drop

alone is probably responsible for three to five pounds more milk per cow (see Fig. 7 and 8).

The heifer raising program is doing well and the calf losses are very low.

On a whole the herd has really improved over the last year but I think there is still a lot of growth possible. In the next year I would like to see the rolling herd average hit 17,500 or above, with both cow and heifers projected values averaging in the 19,000 to 20,000 range. I would like to see the adjust figure stay closer to 60 lbs. per cow per day. In reproduction I think we can get the calving interval down around 12.6 average and the days open around 120. Even though the services per pregnancy has gotten much lower the services per conception has not changed much, indicating that there are still a fair number of problem cows in the herd, 14% in July. As good heifers come fresh I think you should consider getting rid of these chronic repeat breeders. In mastitis control I would like to see the somatic cell count stay around the 250,000 or below mark. I feel that by keeping a careful eye on the herd with the monitor and carefully watching the nutrition program and milking practices we can achieve these goals in the next year.

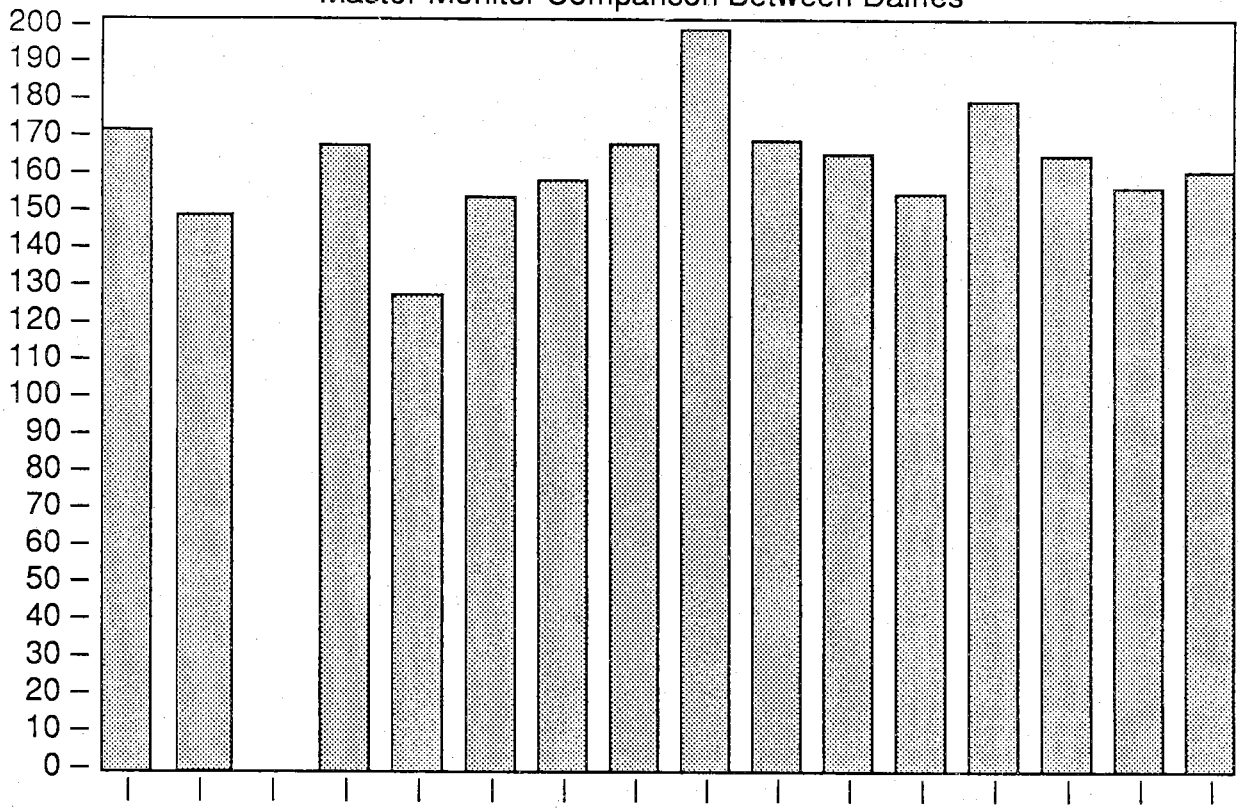
Sincerely,

Charles E. Rinehimer V.M.D.

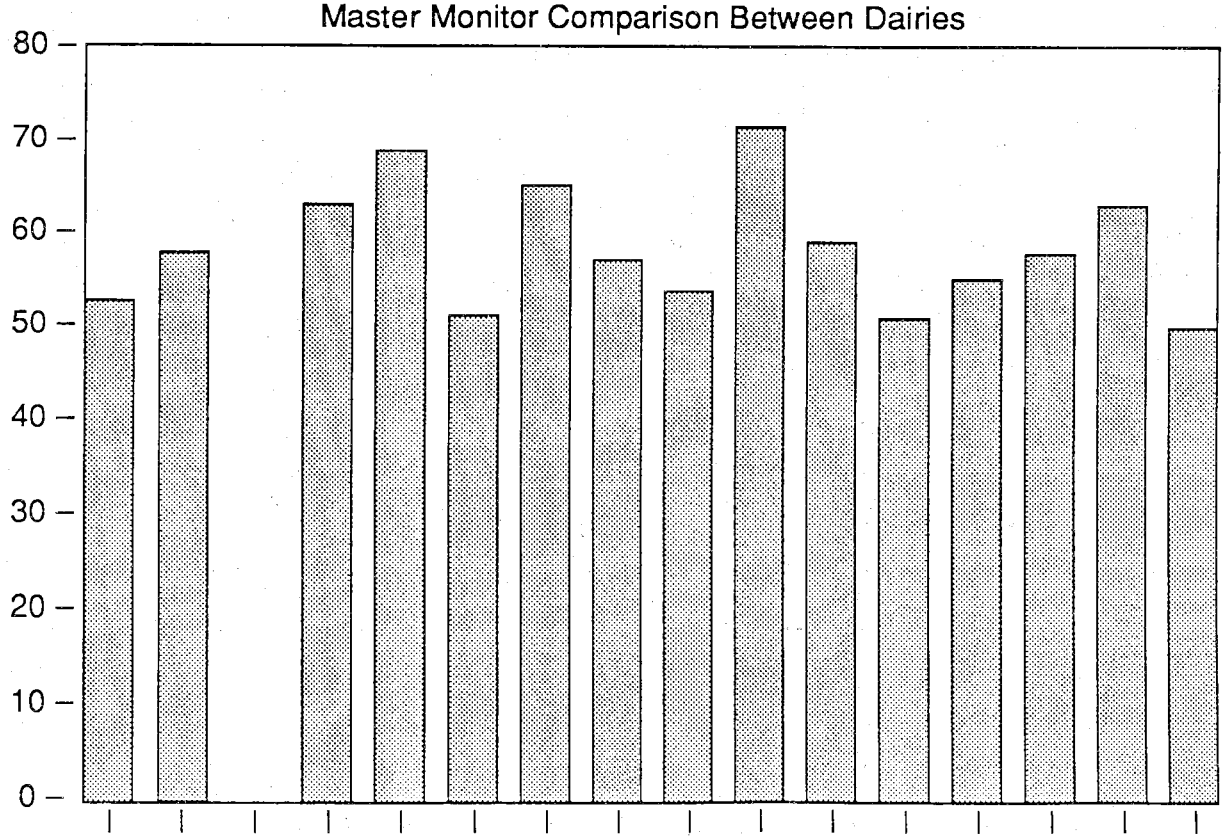
DAIRY HERD MONITOR: PAGE 1
MASTER MONITOR: COMPARISONS BETWEEN DAIRIES
(use ALT H for help)

MONTH AND YEAR	PAST YEAR'S AVERAGE	GOALS AV. MO	GOALS THIS MO	EACH COLUMN IS A SEPARATE DAIRY 1	2	3	4	5	6	7	8	9	10	11	12	13
PRODUCTIVITY:																
ROLLING HERD MILK	14574	*19000	19000 *	15654	17456	NA	18836	20318	17054	20122	16771	15345	NA	18212	15117	16092
ROLLING HERD % FAT	3.02	* 3.6	3.6 *	3.2	3.5	NA	3.9	3.8	3.7	3.6	3.3	3.7	NA	3.9	3.6	3.5
HFR PROJ ME MILK	19534	-19200	19200 -	19257	17776	18360	20492	22242	19258	22138	19629	17267	19807	21177	17008	18893
HFR PROJ ME FAT	713	* 730	730 *	659	624	628	813	839	734	814	679	630	776	751	610	629
COW PROJ ME MILK	18350	*19700	19700 *	16639	18157	16205	18832	21728	18126	21580	18003	16523	20841	17831	15736	17971
COW PROJ ME FAT	657	* 750	750 *	560	631	552	726	796	656	738	576	606	799	683	560	620
% COWS IN MILK	83	* 85	85 *	78	79	80	91	87	83	85	76	86	86	83	84	87
AVE DAYS IN MILK	148	- 150	150 *	171	149	NA	168	127	152	161	169	197	165	164	155	180
AVE DAYS DRY	22	- 60	60 *	na	NA	63	NA	na	NA	na	na	71	65	65	NA	na
MILK/COW/DAY	55	* 70.4	70.4 *	46.7	58.6	50.2	55.5	70.0	47.8	63.6	51.1	44.1	61.6	54.7	52.2	49.3
% FAT	3.78	* 3.8	3.8 *	3.8	3.4	3.5	4.1	4.0	3.9	3.5	3.6	3.9	4.3	3.9	3.5	3.6
ADJ CORR MILK	56.5	* 74.4	74.4 *	52.2	56.4	ERR	62.0	69.1	51.9	65.0	56.6	52.7	72.2	58.8	51.2	54.1
MILK BLEND PRICE	10.60	*14.00	14.00 *	12.80	12.22	NA	12.50	12.50	12.30	12.94	12.21	?	15.18	12.35	12.22	12.93
VALUE OF PRODUCT	6.97	* 7.50	7.50 *	6.03	7.15	5.46	7.53	9.29	6.23	8.28	6.35	5.83	7.94	7.10	6.39	4.37
FEED COST/COW/DAY	2.22	- 3.00	3.00 -	2.13	2.46	NA	2.59	2.85	2.06	2.75	2.57	2.23	2.35	2.19	2.45	2.37
FEED COST/INCOME	32%	- 40%	40%-	35%	34%	ERR	34%	31%	33%	33%	40%	38%	30%	31%	38%	54%
NUTRITION & FEEDING																
PERSISTENCY	16	* 100	100 *	na	NA	NA	na	na	NA	na	na	84	103	NA	NA	na
COW PEAK MILK	13.4	* 95	95 *	na	NA	NA	na	na	NA	na	na	74	87	NA	NA	na
COW LBS/DAY < 100	70.6	* 90	90 *	54.5	74.8	67.7	77.1	77	62.1	81	72.1	61.6	88	73	58	76.9
COW LBS/DY 100-199	60.0	* 75	75 *	51.4	72.2	56.3	57.1	75.6	41.6	76.9	52.5	55.4	73	54.1	54.4	47.2
COW LBS/DY 200-300	44.5	* 55	55 *	45	42.3	51.1	44.8	57.3	42.3	46.2	37.6	34.2	41	42.3	49.3	36.1
COW LBS/DAY > 305	33.0	* 40	40 *	36	37.3	NA	34.8	52.3	31.2	29	40.3	23	39	37.2	35.9	32.6
HEIFER PEAK MILK	10.1	* 75	75 *	na	NA	NA	na	na	na	na		57	64	NA	NA	
HFR LBS/DAY < 100	52.1	* 60	60 *	44.9	60.2	45.2	54.4	63.7	43.6	63.4	56.3	50.4	41	55.5	47	58.9
HFR LB/DAY 100-199	50.9	- 50	50 *	46.6	54.6	47.7	52.9	60.7	46.8	61.7	45.7	48.4	55	45	45.4	52
HFR LB/DAY 200-305	37.9	* 40	40 *	38.2	47.3	37.5	40.1	NA	32.7	39.5	42.6	34.5	51	48.8	42.3	42.3
HFR LBS/DAY > 305	26.1	* 30	30 -	38.7	16.4	NA	34	41.5	20.5	26	30.2	34.4	42	29.5	NA	36.9
HFR LB/DAY 200-305	ERR	* 40	40 *													
BODY SCORING:																
FRESH < 100 DAYS	1.59	* 2.75	2.75 -	2.7	NA	2.5	2.5	2.8	NA	2.65	2.95	NA	3	NA	NA	2.3
FRESH 100-200 DAY	1.68	* 3.00	3.00 *	2.5	NA	2.6	3	3	NA	2.75	2.85	NA	3.5	NA	NA	2.75
FRESH > 200 DAYS	1.78	* 3.25	3.25 *	2.65	NA	2.8	3.3	3	NA	3	2.83	NA	3.75	NA	NA	2.9
DRY COWS	1.64	* 3.50	3.50 *	3	NA	3	2.9	NA	NA	3.5	3.50	NA	3.75	NA	NA	3
PREGNANT HEIFERS	0.54	* 3.00	3.00 *	na	NA	NA		NA	NA	NA	4.00	NA	2.5	NA	NA	na
BREEDING HEIFERS	0.55	* 3.00	3.00 *	na	NA	NA		NA	NA	NA	4.00	NA	2.6	NA	NA	
GROWING HEIFERS	0.24	* 3.00	3.00 *	na	NA	NA		NA	NA	NA	NA	NA	2.9	NA	NA	
DRY MATTER INTAKE	23.9	* 48.0	48.0 *	na	49	NA	NA		NA	42	NA	50.4	47.3	49	NA	49	na
ROUGHAGE/CONCENTR.	0.65	- 1.00	1.00 *	na	1	NA	1		NA	1.25	NA	1.5	1	1	NA	1	na
COW INVENTORY:																
1ST CALF HEIFERS	23	* 35	35 -	44	13	13	8	19	20	19	21	75	29	10	10	19
2ND & OLDER COWS	56	* 56	56 -	72	36	51	32	58	28	43	21	185	61	39	41	41
COWS MILKING	79	* 91	91 -	116	49	64	40	77	48	62	42	260	90	48	51	60
COWS DRY	19	- 31	31 *	32	16	19	4	12	10	11	20	69	10	10	11	8
COWS TOTAL	98	* 122	122 -	148	65	83	44	89	58	73	62	329	100	58	62	68

AVERAGE DAYS IN MILK
Master Monitor Comparison Between Dairies



ADJUSTED CORRELATED MILK
Master Monitor Comparison Between Dairies



HOW DO YOU GET INTO YOUNGSTOCK HEALTH MANAGEMENT PROGRAMS

Andrew P. Johnson, DVM
Total Herd Management Services
824 Woodside Drive
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Veterinarians over the years have taken a firm position in agriculture as people that can take care of sick animals and prevent diseases. The past 20 or more years veterinarians have also been recognized as reproductive specialists. If you stop to think about it, these are two very small areas and our profession is not making a major impact on the dairy industry.

Veterinarians must change this image and market their services and let the dairy industry know that we are key components in any dairy operation. Our services can go much further than the traditional medicine that we are known for. One of these areas in which we can make a significant contribution to the dairy industry and the profitability of the dairy operation is heifer management programs.

HEIFER HEALTH MANAGEMENT PROGRAM

Heifer raising is the most neglected facet of any dairy operation. Everyone is so busy watching the milk cows and never take the time to watch the heifers. I have found that significant economic changes can be made on a dairy farm by implementing a heifer management program. In the vast majority of dairy operations, heifers are the biggest economic loss on that farm. Yet no one even realizes it. Getting involved in heifer management is simple. Just find the time and do it. Farmers rarely say they aren't interested in improving the future of their herd. Their biggest question is when are you going to start the program. I have found that the best way to implement this program is by showing the farmer certain data that will make them think. I call it planting the seed and then harvesting the crop. I always let the farmer finally decide that the heifer management program is what they

want and have them ask me to implement it rather than trying to talk them into starting one. I have always found that if the farmers don't want it, it won't work.

RECORD SYSTEM

I have a record system that I keep for my dairy clients to be sure that heifers get the proper care they require. I have found that most farmers will not take the time to keep a good record system on heifers and if I do it for them, the program is done and is more successful. I have enclosed a copy of my heifer record sheet (figure 1) that I use in my practice. The farmers have found this simple sheet to meet their needs.

"HEIFER HUSTLE" PROGRAM

I approach heifer management in several ways. The one that has worked the best is the "Heifer Hustle" program. This program will quickly point out the weaknesses of the program or provide the information needed to show the farmer that they are maximizing heifer performance. To market the heifer hustle program is easy. I usually take one or two calves from each group and measure them for free. I plot this information on the graph (figure 2) and leave it with the farmer. In most cases it doesn't take long for the farmer to call and ask you to do all the heifers.

MONITORING HEIFER GROWTH

The best way to monitor heifer growth is to measure both the weight and height of the heifers. Many people only take the time to do the weight but I find that the results are less than desirable. Many herds will meet the weight line without much effort but still be far short of height. I feel we are grossly negligent to not do a proper job and our performance falls far short of anyone's expectations. If one is not going to do the job right, they are better off not to do the job at all.

HEIGHT

The height can be taken in several ways. You can make a height stick with yard sticks and a level, you can order one from Nasco or you can paint lines on the managers and estimate heights. No matter which method you choose, be sure to be consistent.

WEIGHT

Weight can be taken in several ways too. You can use the cloth weight tapes which tend to stretch over time, you can have a portable scale which is expensive, or you can use an 8ft stanley tape and a conversion chart (figure 3). Again, the key is to be consistent in your approach.

WORKSHEET

I like to use a work sheet each time I graph heifers so the data is together and easier to use (figure 4). This heifer hustle worksheet has worked the best for me and it becomes a nice record of each time you measure. I feel that the heifers should be graphed one or two times a year. The ones that are most prone to change is the heifers under one year of age.

The nice thing about the heifer hustle program is it allows you a way to monitor your recommendations. The down side to this program is it can show that not all your recommendations are correct. You need to accept the negatives along with any successes that occur.

NUTRITION

Another area that I get into with heifer management programs is nutrition. There are very few commercial or private nutrition companies that spend much time with heifer and calf rations. I have found that when I take the time to work on this area of nutrition that it leads into many other aspects of nutrition and often with time I get

the entire dairy herd's nutrition program. If the heifers grow right, they will indeed milk better as milk cows and you can show this difference.

COCCIDIA PREVENTION

One of the most significant programs we have added to our clients heifer nutrition program is coccidia prevention. This program has made significant changes in the health and growth patterns of their heifers. The nice thing about this is the farmer can see the results after 10 days of feeding the Deccox and appreciates eliminating the stress of coccidosis in their calves. This alone has opened many doors in our heifer management programs.

ENVIRONMENT

Environment is another key area to look at in heifer management programs. With a few rules of thumb and common sense, you can play a significant role in correcting or improving the environment of a heifer operation. Making the change here is rewarding and the farmer really gains confidence in your abilities. You go from a person trying to sell vaccines and medications to a person that is really interested in preventing disease problems in a herd. A veterinarian friend of mine, Dr. Jenks Britt once made a statement that if it can't be measured, it can't be managed. After a great deal of thought, I realized this is a very true statement for most areas of any dairy operation. Some other areas that I monitor on my heifer management programs are age at first calving and peak milk ratios. These two areas are easy to monitor and can make big impacts on producers.

I use two simple graphs (figure 5, 6) to illustrate these two parameters. When dairy producers see the economics behind late calvings or poor heifer performance, you can bet that they will want some help.

AGE TO FIRST CALVING

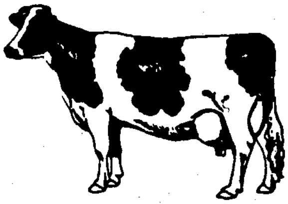
The age to first calving chart (figure 5) will open the doors to your entire heifer management programs. If the heifers are too old, you can use that as a starting point to your heifer hustle and nutrition programs. It also opens many doors to sound reproductive programs in heifers too. To point out the economic loss each month to the dairy producer seems to make the most impact and causes the most change.

PEAK MILK

The peak milk chart (figure 6) is very dramatic to most dairy producers. Not only does it point out heifer performance but also draws the dairy producers attention to his cows. Many times the heifers are doing fine but the cows are suffering. What a way to get involved in milk cow nutrition and management. Ideally I would like the heifers to peak around 75% or less, it indicates a real problem with the heifers. Peak milk is useful and can monitor performance on a monthly basis.

SUMMARY

There are many different ways to get involved with heifer management programs. The only limiting factor is the veterinarian and his ability to find the time to implement such programs. The excuse that the farmer isn't interested is not valid. The farmer is interested, however in most cases doesn't know how to get his veterinarian interested. The end result is often times that the producer finds someone else other than a veterinarian who is interested to do the job for them. Then the veterinarian wonders why the client isn't utilizing their programs. The ball is in our court and we can either walk away from business or make the commitment to give the dairy producers the programs they want and are willing to pay for.



TOTAL HERD MANAGEMENT SERVICES

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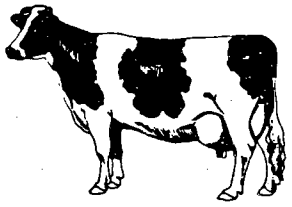
Quality

Client_______________________________

HEIFER RECORD

Calf I.D.	Birth Date	Dam I.D.	Bull I.D.	Brucellosis Ear Tag #	OCV Date	De-Worm	1st Virus L-5	2nd Virus L-5	Mag-Net	Miscellaneous



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CALF AND HEIFER GROWTH CHART

Holstein

Name_____

Date_____

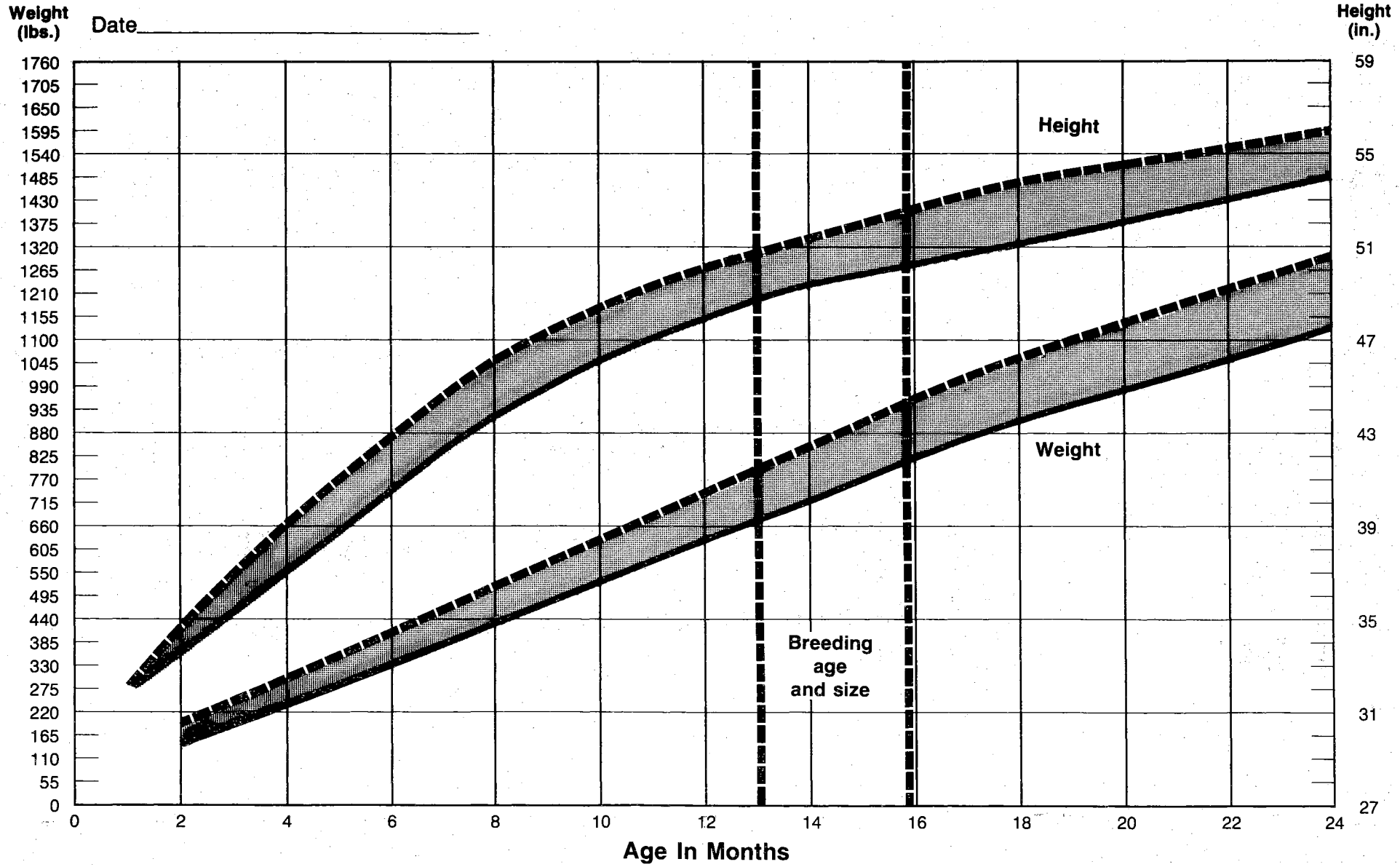


Figure 3

WEIGHT CONVERSION CHART AND GENERAL INFORMATION

Growth Rate: Calves

Week 1:	+0.14 lbs/day	Week 5:	+ 1.4 lbs/day
Week 2:	+0.45 lbs/day	Week 6:	+ 1.6 lbs/day
Week 3:	+0.71 lbs/day	Week 7:	+ 1.8 lbs/day
Week 4:	+0.86 lbs/day	Week 8:	+ 1.9 lbs/day

00-05 months:	1.57 lbs/day
06-10 months:	1.66 lbs/day
11-15 months:	1.45 lbs/day
16-20 months:	1.30 lbs/day
21-24 months:	1.45 lbs/day

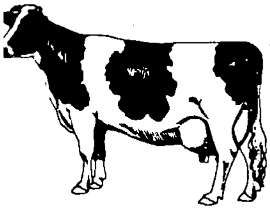
ESTIMATED WEIGHTS BASED UPON CHEST CIRCUMFERENCE MEASUREMENTS

This inches to pounds conversion table was constructed by laying a retractable steel tape measure next to the mentioned (*) heifer girth tape and comparing demarcations.

** Weight-by-Breed Dairy Management Tape: Nasco, 901 Janesville Ave., Fort Atkinson, Wisconsin 53538*

Girth, Inches	Holstein Weight	Guernsey Weight	Jersey Weight	Girth, Inches	Holstein Weight	Guernsey Weight	Jersey Weight
27	82	69	57	60	638	625	610
28	84	72	62	61	666	653	638
29	87	76	69	62	696	683	668
30	91	82	77	63	726	713	698
31	96	90	86	64	758	745	730
32	104	100	97	65	790	777	762
33	114	111	109	66	820	809	794
34	125	123	122	67	858	843	826
35	137	136	135	68	893	878	860
36	150	149	149	69	929	912	894
37	164	163	163	70	965	946	927
38	178	178	178	71	1002	979	959
39	193	193	193	72	1040	1012	990
40	209	209	208	73	1079	1045	1020
41	225	225	223	74	1119	1077	1048
42	242	241	238	75	1159	1109	1074
43	260	258	253	76	1200	1140	1095
44	278	275	268	77	1248	1170	1112
45	297	292	284	78	1282	1200	1124
46	316	310	300	79	1324	1230	1134
47	336	328	318	80	1366		
48	356	347	337	81	1408		
49	376	366	356	82	1449		
50	397	386	376	83	1490		
51	418	406	396	84	1528		
52	440	426	416	85	1564		
53	462	447	437	86	1600		
54	485	470	458	87	1636		
55	508	494	480	88	1670		
56	532	518	504	89	1703		
57	557	544	528	90	1735		
58	583	570	554	91	1767		
59	610	597	582	92	1798		

Figure 4



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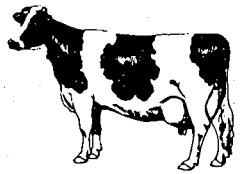
Quality

HEIFER HUSTLE WORKSHEET

CALF ID	CALF AGE	WEIGHT	HEIGHT	COMMENTS



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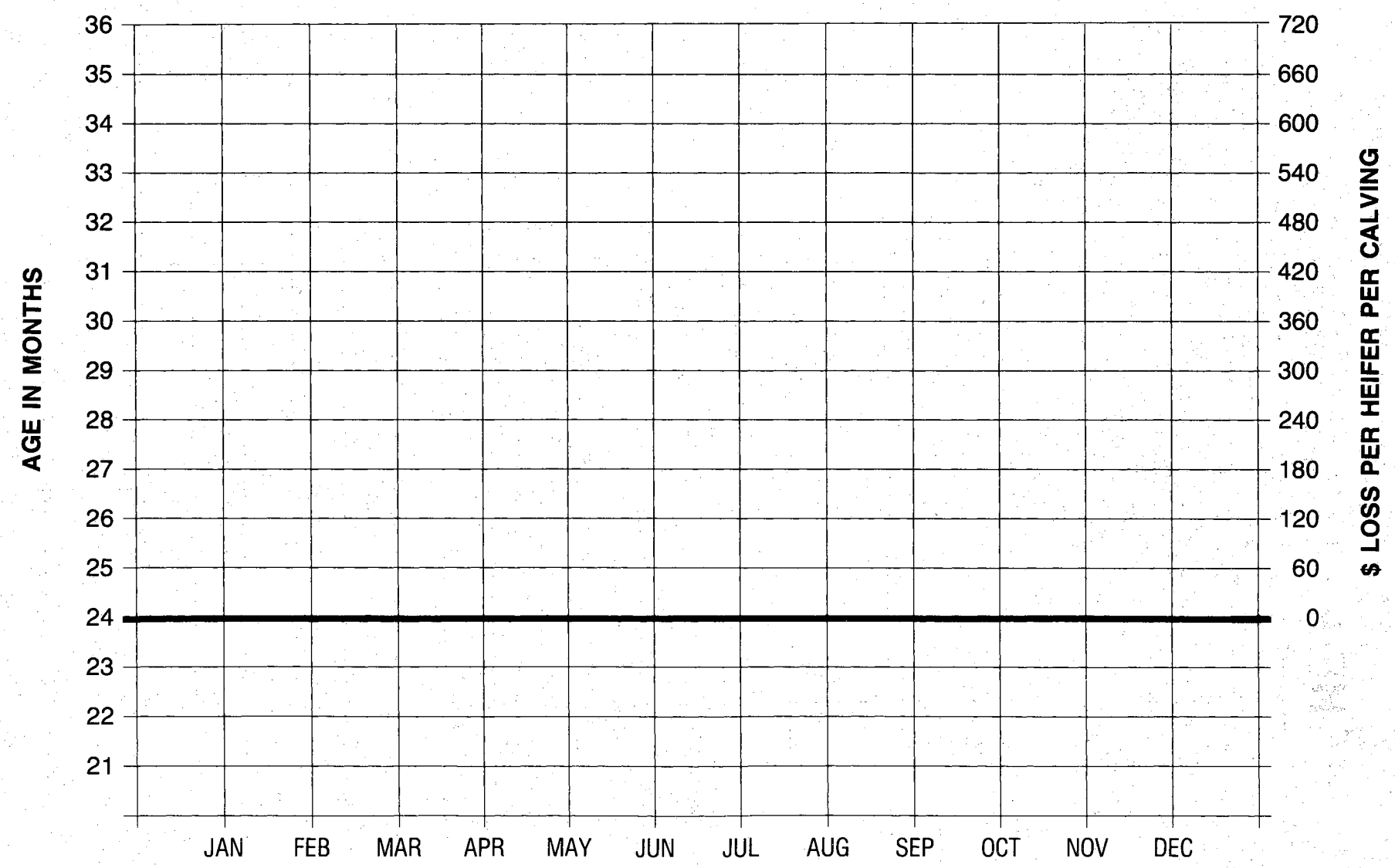
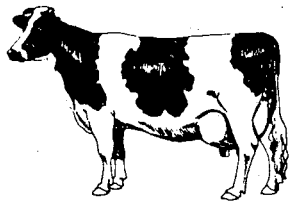
Quality

Client_____

AGE HEIFERS AT FIRST CALVING





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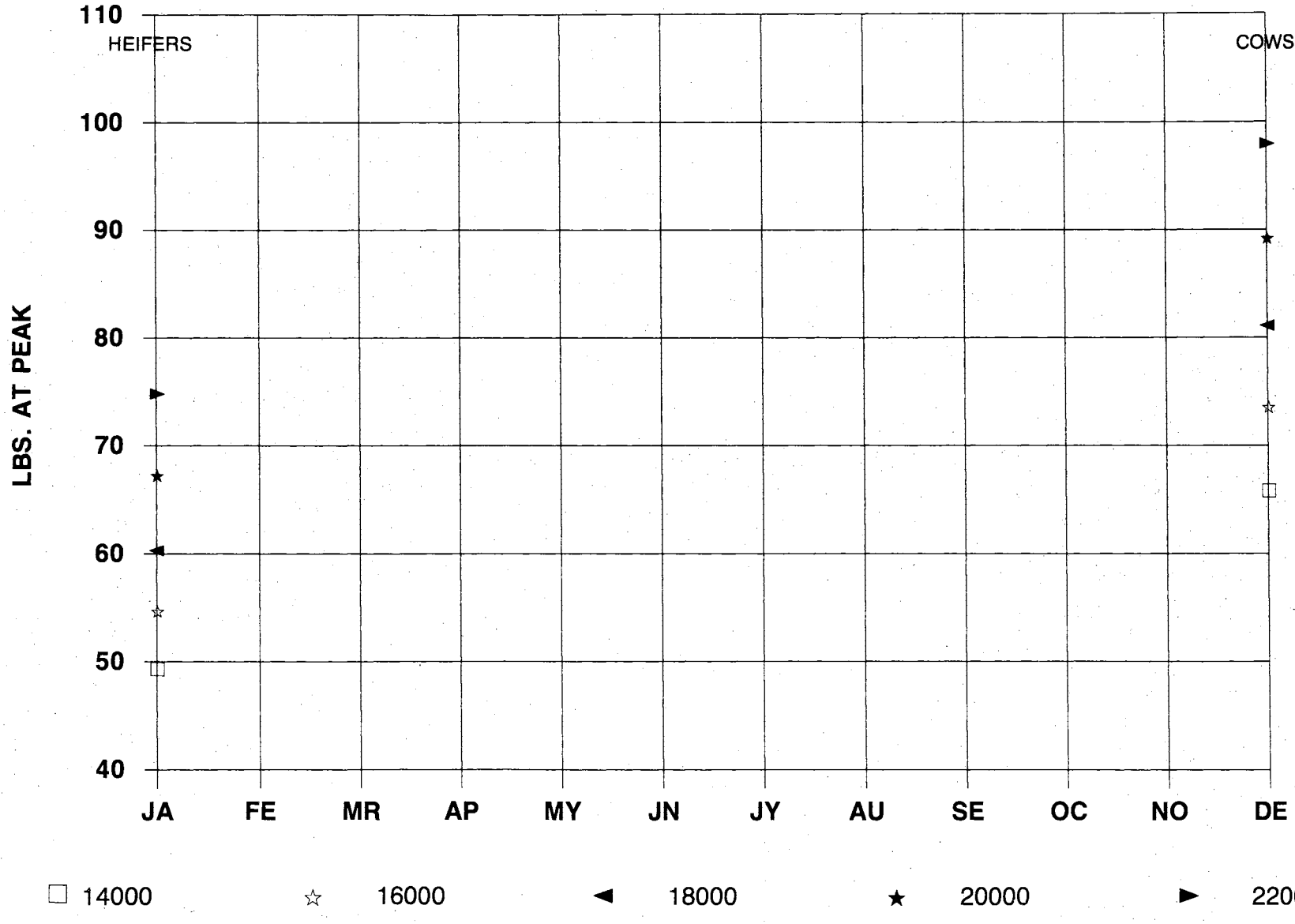
COW & HEIFER PEAK MILK



COMMON FEEDING PROBLEMS AND THEIR SOLUTION IN DAIRY HERDS

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Center for Animal Health and Productivity

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New Bolton Center, Kennett Square PA

Nutritional consulting is an important component of a herd health program. Feed cost form approximately 50-60% of the total cost of milk production and so even minor improvements in feeding efficiency are directly reflected in higher farm profit. Furthermore, since nutrition impacts on reproductive performances and metabolic disease prevalence, it has an indirect effect on economic efficiency as well.

The objectives of a herd health nutritional program are to optimize the long term profitability of the farm by "controlling" (not necessarily eliminating) the prevalence of nutritional diseases and to ensure optimal production efficiency (economic conversion of inputs into outputs). Feeding problems present themselves in a variety of forms as deviations from these objectives.

Historically, feeding problems have been investigated by emphasizing nutrient imbalances that either cause a specific metabolic disease problem or impair a production output (milk or reproduction). Many feeding problems result not only from nutrient imbalances but from management inefficiencies as well. Successful nutritional consulting must evaluate the role of both factors in problem solving and offer solutions that consider the total farm economic efficiency.

For the purpose of discussion, problems in the feeding management program can be divided into two main area's 1) Feed selection and 2) Feed Delivery. The common problems of each of these areas will be discussed.

I) Feed Selection:

Efficient economic selection of appropriate feeds is the first step that affects the total efficiency of a feeding program. Once an inefficient feed is purchased, it is often difficult to make up that inefficiency in enhanced production efficiency. Most farms produce their own forages and nutritionally complement them by purchasing energy and protein sources and supplements. The higher the nutrient quantity in forages the lower is the requirement for purchases of these nutrients. The type of energy and protein supplement that should be selected is a function of its; price and price stability, required nutrient content, flexibility, storage characteristics and home grown forages.

The nutrient content of a feed ingredient can be determined by taking an appropriate sample and having it analyzed by a competent

forage lab. It is important to realize that there is considerable variability in the ability of labs to measure various nutrients and that this variability is not constant across all nutrients. In general, dry matter, fiber (energy), protein, calcium and phosphorus have a coefficient of variation (standard deviation/mean value) of approximately 10% while trace elements are on the order of 20%. To overcome this magnitude of variation one has to resort to repeated analysis of the feed ingredient.

To help evaluate the efficiency of feed selection a variety of tools have been developed. The economic substitution value of a feed is based on the assumption that the economic value of a feed is a function of the sum of the value of its nutrients. However, with these types of calculations the value of the "nutrient density" is not taken into account. Hence the substitution value is the amount one should be willing to pay in alternative feed sources to attain the same amounts (not nutrient density) of nutrients. Linear programming techniques can be used to evaluate a feed ingredient by formulating feed combinations constrained to the nutrient density of the feed ingredient and then comparing cost.

The feed storage facilities available on the farm must also be considered when selecting feed ingredients. Some feed ingredients (wet brewers grains) have unique storage requirements. Many feed storage facilities require certain feed processing to minimize residual feed accumulation that can result in moldy feed. The volume capacities of the storage facilities are important in determine which price break level the producer will be facing. Small herds in geographic clusters can organize into to collectives to purchase various feed inputs at the lower price breaks as a large herds. Feed ingredients which have seasonal price fluctuations should be purchased at appropriate times in the year to minimize the total purchase and storage cost. Furthermore, the total feeding cost can potentially be reduced by strategically planning the purchases of feeds rather then allowing random purchases to occur.

The flexibility of a feed ingredient is also an important characteristic to consider during the selection process. Certain feed ingredients are flexible in that they can be used across lactation levels and in dry and heifer rations or can be immediately adjusted according to nutrient changes in forages or to changes in prices. While other feed ingredients, because of their nutrient composition might have limited flexibility.

II) Feed delivery

The objective of an economically efficient feed delivery system is to deliver the required nutrients to the various animals groups on the farm at a minimum cost. Flexible feeding systems allow changes to be made easily as the production profile of the herd

changes or as nutrient quality or cost of a feed ingredient changes. Many feed delivery systems are a compromise between total mixed rations and individual animal rations and a function of the physical nature of the farm and it's management. Regardless of the system, feed measuring devices must be calibrated to ensure that the appropriate feed amounts are used when mixing grains and in allocation to animals.

Nutrient imbalances can result from inappropriate levels in the feed at the start, or from poor feed bunk management practices resulting in imbalanced nutrient intakes. For example inadequate bunk space (less then 30 inches/cow), uncovered feed bunks, dirty and unshaded water can cause reduced dry matter intakes. Many feed delivery problems manifest themselves by high metabolic disease prevalence inefficient milk or fat production and or impaired reproduction.

Common Metabolic Diseases

Milk fever - excessive calcium, phosphorus, or both in dry cow rations.
Ketosis - underfeeding ketosis - inadequate energy intake
feeding ketosis - excessive butyrate
spontaneous ketosis - lipogenic and or glucogenic imbalance
Fat cow syndrome - overfeeding energy in late lactation and in the dry period
Hypomagnesemia - low magnesium,
Ruminal acidosis - pulsatile grain feeding; inadequate buffering in the diet

Common Production Problems

Milk fat depression - low fiber content; glucogenic/lipogenic imbalance
Poor peak production - Low energy or protein intakes and/or inadequate body reserves

Poor persistency - rapid changes in energy intake

Inefficient feed delivery - overfeeding crude protein to low production levels or dry cows

Common reproduction problems

Retained placenta - Deficiency of selenium, Vitamins A and E
Infertility - manganese deficiency, protein excess, energy deficiency

In summary, most farm feeding problems are the result of combinations of inefficient feed selection and delivery. Inefficient feed selection results in high input cost while inefficient delivery results in impaired physical conversion of feed into output. The economic magnitude of both areas must be considered during nutritional problem solving.

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DIAGNOSING NUTRITIONAL PROBLEMS THROUGH RECORDS ANALYSIS

Arden J. Nelson

INTRODUCTION

The AVMA commissioned Wisemark and Associates to study "The Market For Food Animal Veterinary Medical Services"[1] in 1986. The results of this extensive investigation into producer and veterinarian attitudes yielded some tough facts for our profession to face.

Karen Gavzer, Marketing Director for the AVMA, said it well in the Mar/Apr 1988 issue of Agripractice Magazine:[2] "The skills and expertise producers need from veterinarians are precisely those they perceive the veterinarian to be weakest in: - Production Management; - Environmental Engineering; - Genetic Counseling; - Nutritional Management, and - Business acumen in profitability analysis."

Wisemark Facts:

1. Veterinarians believe that herd management services provide the single greatest long-term growth potential for their businesses.
2. Producers believe:
   - That veterinarians are good at sick animal work, are good listeners and good at communicating what is known;
   - That veterinarians know no more than the producer does about herd management and nutrition;
   - That veterinarians know less than producers about agribusiness.

Dr. George Shelton,[3] Dean at Texas A&M College of Veterinary Medicine believes "The cruel facts of life seem to be that either we broaden our field of service and compete in an area we might call herd and

flock management or we lose much of our input to the field of food animal medicine. . . we must help the producer survive or we won't survive."

The demands for veterinary services by modern farms "center on disease prevention and health management and require greater knowledge of animal reproduction, genetics and breeding, nutrition, environmental requirements, and economics."

THE QUESTION

The question is, "How are we as veterinarians to gain the knowledge and expert status necessary to sell our developing herd management services?"

Let's look at the two parts of this question: a. How to acquire the knowledge and expertise? b. How to gain respect as experts in the eyes of the producers?

The answer to part a: Study and practice the areas necessary. The major areas necessary are, in chronological order:

1. Computer usage
1. Records analysis
2. Nutrition
3. Communication skills
4. Epidemiology
5. Environment/Housing
6. Business analysis

The answer to part b: Demonstrate to the client that you a. have an interest in the above areas and b. know something about them.

THE ANSWER

The answer to the Dairy Practitioner's needs lie in the analysis of DHI and disease incidence records. Present these collected facts

facts in a professional manner to the client and you can learn together the awesome power records contain!

The answer to the clients' needs will be found when they find a person to "target their troubles"[4] through records analysis; a person to help chart an action plan; and a person to then assist in taking corrective management action to save or generate more dollars.

That person is the local dairy service person that has the client's trust, is already intimately involved with cow care, is a good communicator of knowledge, and decides to do something! That person is the Dairy Veterinarian.

RECORDS USAGE EXAMPLE

Diagnosis

You, a newly trained and equipped production medicine veterinarian, have received a phone call from a prospective client, requesting help with herd management. The herd is a totally confined freestall herd of 150 milking cows. Harvestore silos, belt feeder and a computerized feeder are used to feed the herd.

The client relays that "the cows don't milk well enough to suit him." He heard you speak at a local meeting and would like to try your services... you had presented ideas that convinced him he needed a direction for his management changes. He sounds as if he is determined to change the efficiency of his business and he may be a potential good contract production medicine client. You agree to provide an initial comprehensive records analysis and visit the dairy for further investigation and records presentation. You provide the client with an estimate of the total costs, including the farm visit.

During your preparation you are deciding which areas of dairy management you feel should be addressed first in this dairy's situation.

TAKE CONTROL, MAKE YOUR BUSINESS PURR, MANAGE FOUR KEY COW AREAS:

P - Production

U - Udder Health

R - Reproduction

R - Replacements

Each of the management areas is ranked in the PURR acronym based specifically on its typical speed of impacting the financial health of a dairy. If the rate of growth in replacements slows, the impact is not felt soon in the cash flow of the business. Likewise, if your attack on replacement rearing inefficiency starts today, positive results on cash flow will not be realized for one to two years.

Should your management changes be directed towards solving the protein quality shortage in the fresh cows, your positive dollar impact can be felt and measured in days, not years. Finding excess input dollars in a ration can affect cash flow this month, not months from now.

It is ironic that the traditional approach to initial input by the veterinary profession in management assistance programs has been in reproduction. Reproductive programs require a fairly large outlay of funds and very slow return on investment. Progress can be seen prior to this, but the business reason for hiring a veterinarian. . to make money for the operaton. . . has been diluted by time. If a client quits reproductive herd health visits today, he sees a reduction in outgo dollars and no reduction in inflow dollars this month. This is

bad for the perspective! Perhaps this is why "Herd Health" required so much selling on the part of veterinarians, extension service, and the lay press to really be accepted by most dairy owners.

Three Year Graphs

Graphs A and B show milk and fat herd averages for the past three years. It is important to put the current situation in proper perspective; it facilitates a more accurate attack on the problem. Notice the decline in fat during the last 18 months, followed by a slight recovery.

Graph C shows fat test decline in each summer, but a large valley exists in months 13 through 7, (Mar-Sep 1987). Notice that protein test (Graph D) is high during this same time period.

Dairy Herd Profile Summary

Figure E shows how this herd's DHI numbers compare to the numbers for the production categories for the Northeast. You separate out the main areas of strength and opportunity. This herd's management opportunities all lie in the field of nutrition management. Days dry are excessive, but not because of a reproduction problem. Days dry are long probably due to poor persistence. You notice also that the fat pounds for this herd are less than expected, and protein pounds are more than expected for this production level. Current rolling averages for fat% and protein% are 3.43 and 3.29. Normal averages for Holsteins in the Northeast are 3.65 and 3.21.

Composite Lactation Curves

Average milk, fat%, and protein% curves for MPF Dairy start to nail down the exact areas of nutritional mismanagement (Graphs F-I).

Milk Curves:

Peak Milk Production: Note that heifers peak within 11 pounds of the high standard milk line. 2nd lactation cows peak out 16 pounds below the high line, and adult cows miss by 15 pounds. First calf heifers are performing better than older animals in this dairy.

Production Persistence: Heifers fade between tests 5 and 7 (50# milk). 2nd lactation cows drop abnormally between tests 4 and 6 (60-65# milk), and adult cows lose persistence between tests 5 and 6 (60# milk).

Fat% and Protein% Curves:

All lactations start on the very first test (Graphs F-I) with fat tests that are 2-3 points below normal and proceed to drop excessively, and stay too low for the first 4-5 tests. At the same time, protein test is slightly high during the same 4-5 tests.

Somatic Cell Linear Score Curves:

Graphs J-M show the linear scores by lactation for MPF herd. They are some of the best LS curves you have seen. Udder health is not the area putting a lid on production.

YOUR CONCLUSIONS PRIOR TO INITIAL VISIT

Nutrition management is the hole in the management net for MPF dairy. Production was the problem the owner asked you to help with initially. Certainly udder health, reproduction and replacements appear all to be under reasonable control. The P in PURR is where you will want to concentrate further efforts.

Questions you need answers to for a complete diagnosis of his production problem are:

a. Why do first calf heifers milk better than older cows?

b. Why the poor fat test on tests 1-5 for all lactations?

c. Why the change in milk solids and persistence at around the 60 lb production level?

d. Why is this herd stuck at breed average production if three of the four cow management areas are managed well?

YOUR FIRST VISIT TO THE MPF DAIRY

Your initial picture as you drive in shows neat, clean, new buildings, a pond in front of the barn, painted fence. Calves are in hutches in neat rows on gravel base with a super hutch for weanling calves. Tractors are well cared for and there is no junk machinery laying around.

Body Score Results:

Dry Cows:	2.7	Goal:	3.3 - 3.5
Bred Heifers:	3.1	Goal:	3.0
Milking Herd by Days in Milk:			
0-100:	2.5	Goal:	2.5
101-200:	2.7	Goal:	3.0
200+:	3.3	Goal:	3.2

Animal Comfort Inspection:

Very little wood shaving bedding, matted freestalls, alley scrapers, Slurrystore manure system. Many sore footed, sore legged cows. Many cows standing in stalls, some lying backwards. Many cows standing in alleyway. Alleys 7 feet wide. Animals have difficulty rising and many will not get up at all when kicked. Many misshapen, slightly overgrown feet.

Forage Inspection:

Harvestore silo for haylage and high moisture shell corn. Bunker silo for corn silage is neatly managed. Feed room is swept up and neat. All machinery is in good working order. High moisture corn is rolled well and haylage is high quality in appearance.

Records Presentation, Discussion:

Cows are fed on the computer feeder for the first half of lactation, and come off at about 60 lbs of milk. The owner has been concerned about the low fat test, too, but the biggest frustration is not being at 18-20,000 lbs of milk/cow/year. Their local veterinarian feels that cows freshen too thin, lose excessive weight. He diagnoses too many anestrus cows, and believes foot problems are the worst health problem.

VISIT CONCLUSIONS

1. Probable acidosis causing laminitis, low fat test, and inefficient ration utilization due to poor dry matter intake from the bunk and heavy grain feeding because "they milk better when we feed more grain through the feeder".
2. Dry matter intake from the bunk that "will support 60 lbs of milk production" appears to be low, based on poor DMI records.
3. Late lactation cows body score fairly well today, but you are convinced that tail end cows and/or dry cows are short on energy needed for weight gain and/or maintenance.
4. Cows are uncomfortable in the stalls, adding to feet and leg problems.

DIAGNOSTIC RATION ANALYSIS

Group	DMI	CP%	NEL(MCAL/#)	ADF%
High	38.2	19.0	.85	14.7
Medium	37.9	17.2	.75	17.5
Low	39.2	15.8	.70	25.0
Dry	24.7	10.7	.68	30.2

CHANGES RECOMMENDED(AND FOLLOWED)

The owner responds to the education and discussion aided by graphic displays of his herd records. Your explanation, tying all of the problems together motivates him further to change. He is a person, who once convinced, acts.

1. Reduce lead feeding amounts through computer feeder
2. Reduce rate of increase when challenge feeding with computer feeder
3. Reduce amounts of computer feeder grain by adding to bunk ration
4. Purchase stationery mixer so all feedstuffs can be measured and blended properly, prior to delivery on belt feeder
5. Increase fiber levels, reduce total grain levels to milking cows in high and medium groups, slowly but surely
6. Increase energy and protein to dry cows, and feed dry cows once daily instead of every other day
7. Feed at least enough ration for the number of dry cows being fed. . . better to overfeed than underfeed
8. Add Bovatec to dry and heifer rations
9. Increased energy density to low cows

10. Use five times as much bedding, in effort to make milking cows more comfortable
11. Place free choice bicarb and free choice granular salt out for all groups of milking cows
12. Sign year-long contract with you for monthly records analysis and nutrition service
13. Start record system for tracking forage dry matters, group cow numbers and dry matter intakes

THE RESULTS AFTER ONE YEAR

1. Dry matter intake has improved slightly
2. Milk production has improved slightly (See Graphs N-Q)
   a. Peak milk has increased across the herd:
      - 2 lbs on first calf heifers
      - 4 lbs on second calf heifers
      - 5 lbs on adult cows
   b. Persistence has improved across the herd
   c. Butterfat test has improved from rolling herd average of 3.43% to 3.78% in one year
   d. Although you and the herd owners are unhappy with current production levels, you and they have learned that records put to work will make money. Their confidence in their management abilities has grown, and their confidence in your ability as a dairy management consultant has grown.
3. They report that cash flow has never been better due to higher fat test and lower off-farm feed cost. (This is in direct contrast to the moans and groans you've been hearing from most other clients regarding the increase in feed cost the last half of 1988).

THE FUTURE FOR MPF DAIRY

The future looks better than it did, but it's not rosey yet. The team has the confidence, however, that they can permanently change the cow comfort problem which is a bigger problem than first appreciated. It will involve remodeling the stalls in this recently built barn.

The goal of 20,000 lbs RHA is out of sight now, but is around the next few corners in the management road. One planned and controlled step at a time will win the race.

THE FUTURE FOR THE VETERINARIAN

Take it easy and slow. You have just changed your outlook on dairy practice. You now believe that you can easily tap the hidden power in DHI records and use it to help your clients progress into the 1990's, making planned management changes and monitoring their impact on profitability. You believe that demonstrating to your clients your worth as an employee, monthly, is just part of the job. You will not make recommendations without complete knowledge of each client's management situation and you will not do anything without measuring it's effect. You have changed. . . you have just anchored your position as an employee in the dairy industry of tomorrow.

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Dairy Production Services
620 W. Hill Road, R.D. 4
Cortland, New York 13045
607-749-7514

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1. Wise, J. Karl, Wisemark Associates. "U.S. Market for Food Animal Veterinary Medical Services". JAVMA, June 15, 1987. p. 1530-1533.

2. Gavzer, Karyn. "What Dairy and Livestock Producers need from their Veterinarians". AGRIPRACTICE, Mar/Apr 1988, p. 33-34.

3. Shelton, George C. "Future of Veterinarians from the Perspective of Academic Veterinary Medicine". JAVMA, April 15, 1986, p. 812-813.

4. Johnson, Andrew P. "How I Motivate and Communicate with Clients in My Practice". AABP Proceedings, 1987. p. 11-12.

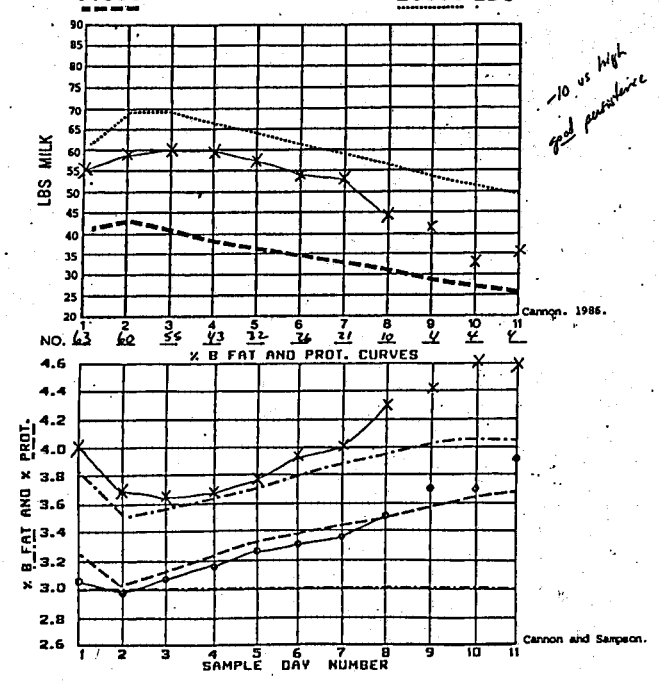
Millpride Farm

N 4/17/89

DAIRY PRODUCTION CONSULTANTS

AVERAGE LACTATION CURVES
1ST LACTATION

<14500 LBS >20000 LBS

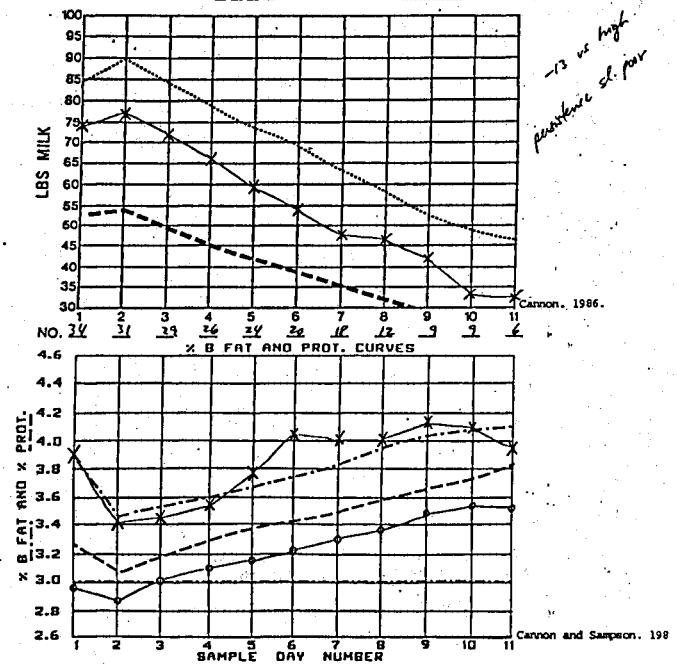


O

DAIRY PRODUCTION CONSULTANTS

AVERAGE LACTATION CURVES
2ND LACTATIONS

<14500 LBS >20000 LBS

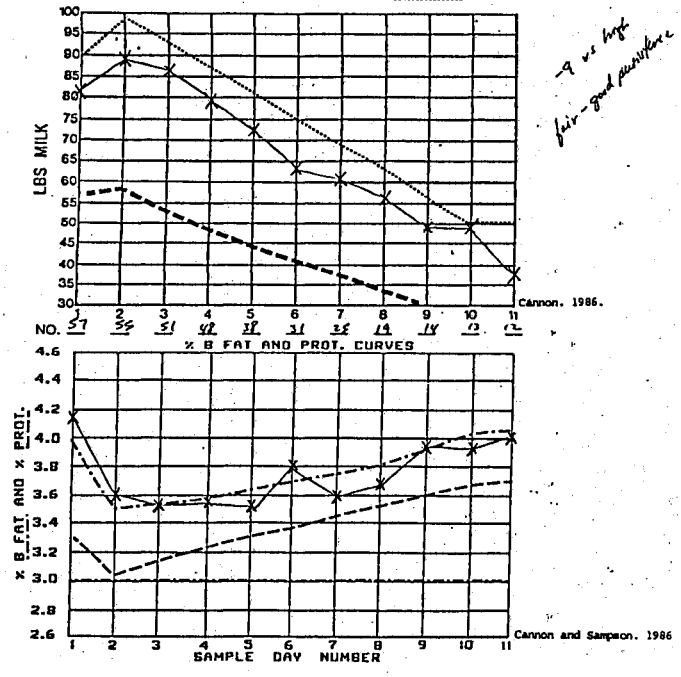


P

DAIRY PRODUCTION CONSULTANTS

AVERAGE LACTATION CURVES
3RD AND GREATER LACTATIONS

<14500 >20000 LBS



Q

DAIRY PRODUCTION CONSULTANTS

AVERAGE LACTATION CURVES
ALL LACTATIONS

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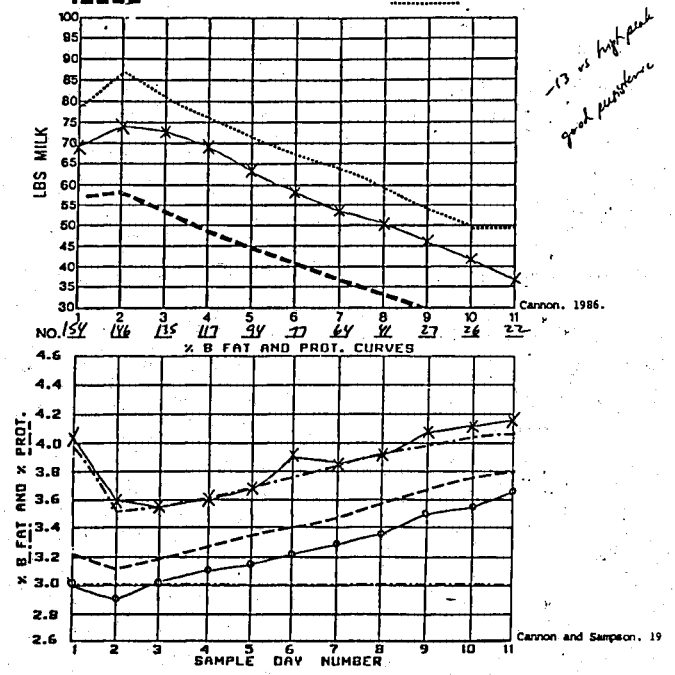
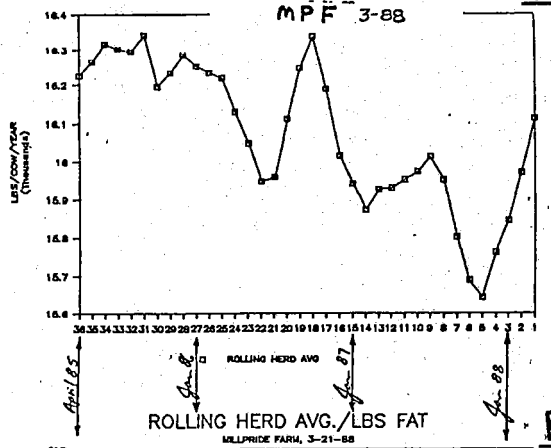


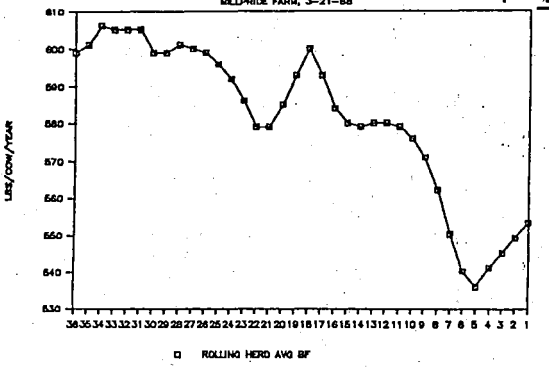
ROLLING HERD AVG./MILK LBS. A

MPF 3-88



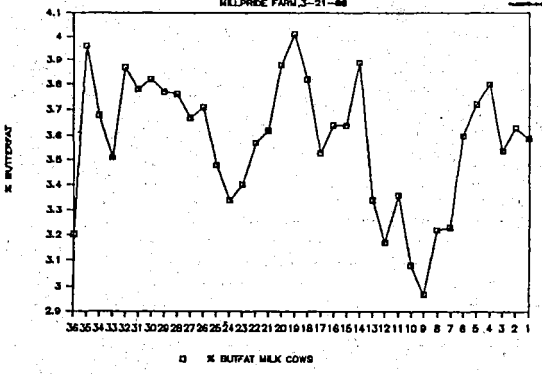
ROLLING HERD AVG./LBS FAT B

MILLPRIDE FARM, 3-21-88



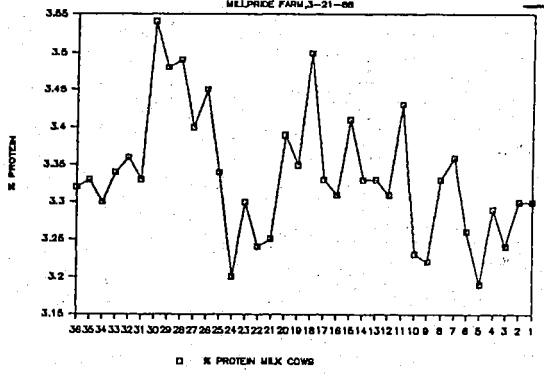
PER CENT BFAT MILK COWS C

MILLPRIDE FARM,3-21-88



PER CENT PROTEIN MILK COWS D

MILLPRIDE FARM,3-21-88



E

NYDHIC DAIRY HERD PROFILE SUMMARY

Millpride Fm 3/21/88

Rolling Herd Average Milk Production Classes

ITEM	< 13,000	13,001-15,000	15,001-17,000	17,001-19,000	>19,000	My Herd
# Farms	65	200	432	386	116	
# Cows	70	82	98	105	112	150
Age at Calving (mo)	55	53	51	50	50	(*) 44
Age at 1st Calving	31	30	29	28	28	(*) 25
BW at 1st Calving	1080	1098	1118	1134	1156 (*)	1160
Days Dry	(*) 72	68	65	62	61	75
Days Open	130	119	115	113	111	(*) 100
DIM 1st Breeding	92	85	82	82	82	(*) 67
DIM Last Breeding	126	116	113	112	110	(*) 100
Projected Calving Interval	13.4	13	12.9	12.9	(12.8)	12.8
SCC % cows >750	20	15	13	9	9 (*)	8
ETA Milk	246	268	276	280	298 (*)	309
EPA Youngstock <12 mo	527	669	779	794	866	—
EPA Youngstock >12 mo	436	495	568	574	609	—
Peak 1st 95 days (1)	46	52	57 (*)	61	68	58
Peak 1st 95 days >=2	63	72	(*) 79	86	95	78
Peak 1st 95 days - all	59	66	(72)	78	86	72
RHA Milk	11843	14149	16096 (*)	17885	20307	16,111
RHA Fat	434	513	(*) 587	655	728	553
RHA Protein	371	436	501 (*)	562	633	530

OPPORTUNITIES

STRENGTHS

Oppurtunities:

Production

(A) Fat test

(B) Milk

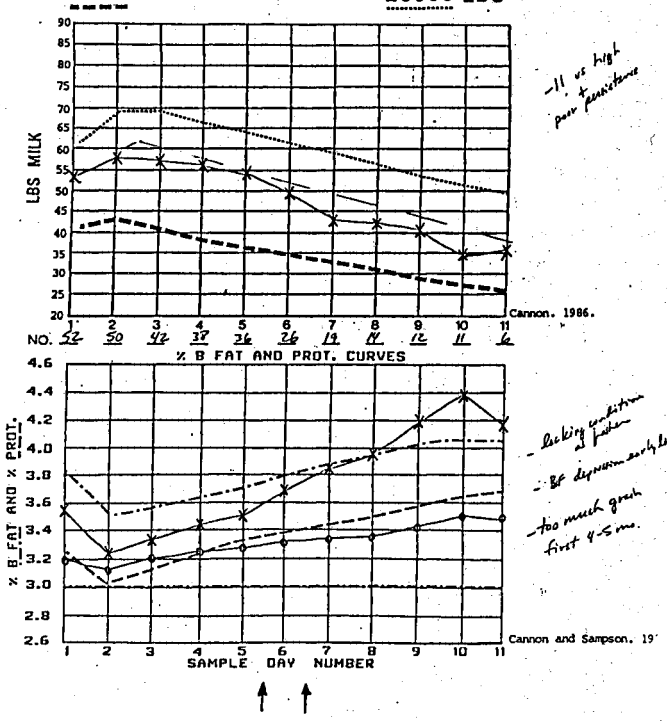
(C) Days Dry

T. Smith, 1986

F Millpride Fm 3/21/88

DAIRY PRODUCTION CONSULTANTS

AVERAGE LACTATION CURVES
1ST LACTATION
<14500 LBS >20000 LBS



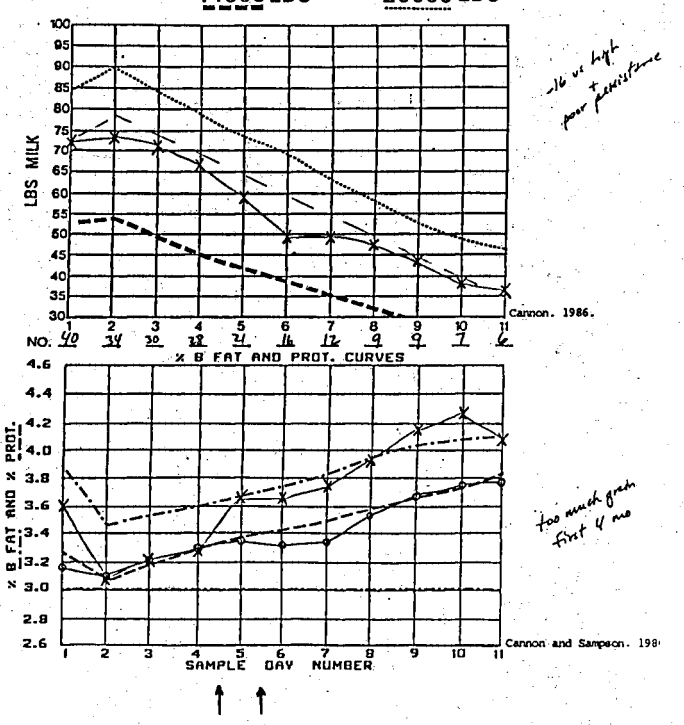
-11 vs high
poor persistence

- lacking volume in udder
- GF depression early last
- too much growth first 4-5 mo.

G

DAIRY PRODUCTION CONSULTANTS

AVERAGE LACTATION CURVES
2ND LACTATIONS
<14500 LBS >20000 LBS



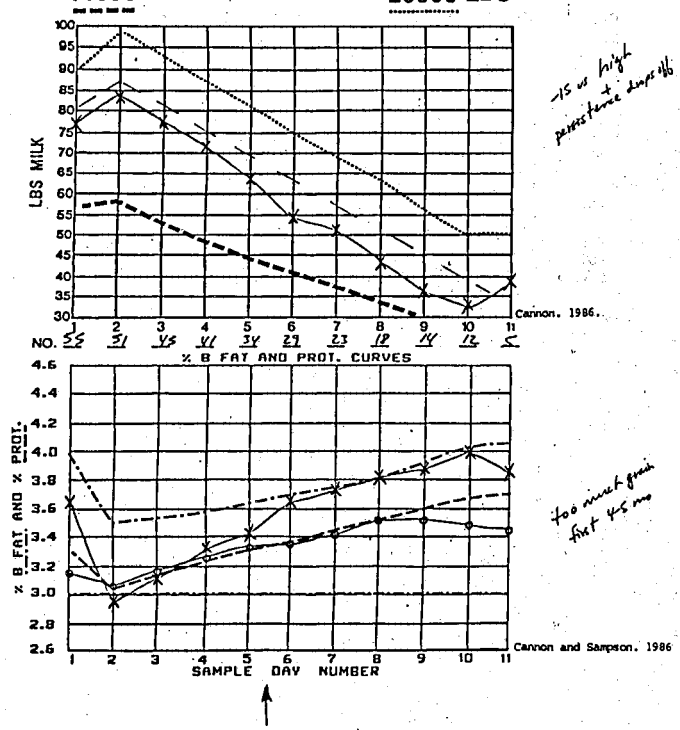
-16 vs high
poor persistence

too much growth first 4 mo

H

DAIRY PRODUCTION CONSULTANTS

AVERAGE LACTATION CURVES
3RD AND GREATER LACTATIONS
<14500 >20000 LBS



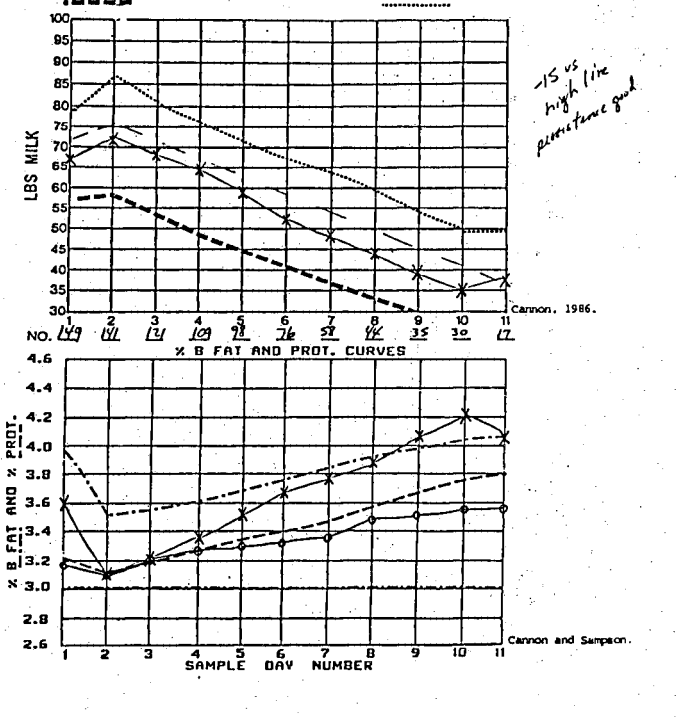
-15 vs high
persistence drops lbs

too much growth first 4-5 mo

I

DAIRY PRODUCTION CONSULTANTS

AVERAGE LACTATION CURVES
ALL LACTATIONS
<14500 LBS >20000 LBS



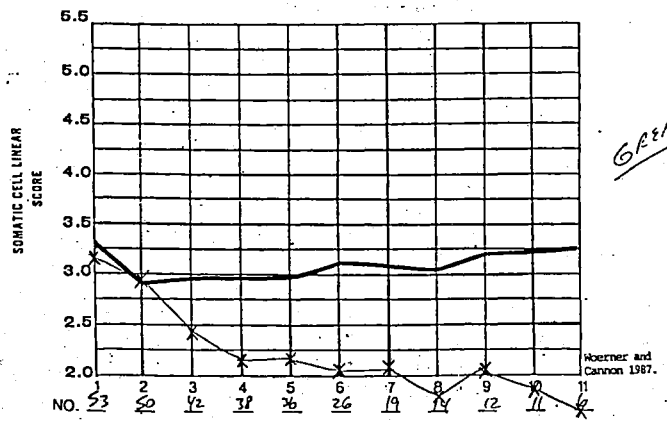
-15 vs high line
persistence good

Millpride Fm
3/21/08

J

DAIRY PRODUCTION CONSULTANTS

AVERAGE LACTATION CURVES
SOMATIC CELL LINEAR SCORE
1ST LACTATION

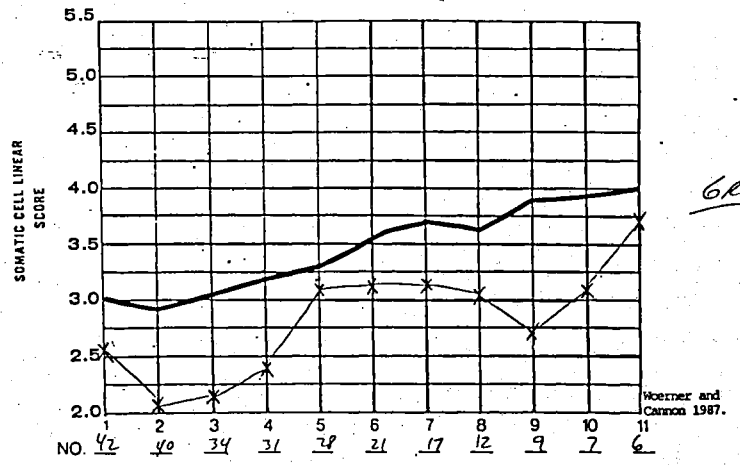


GREAT!

K

DAIRY PRODUCTION CONSULTANTS

AVERAGE LACTATION CURVES
SOMATIC CELL LINEAR SCORE
2ND LACTATIONS

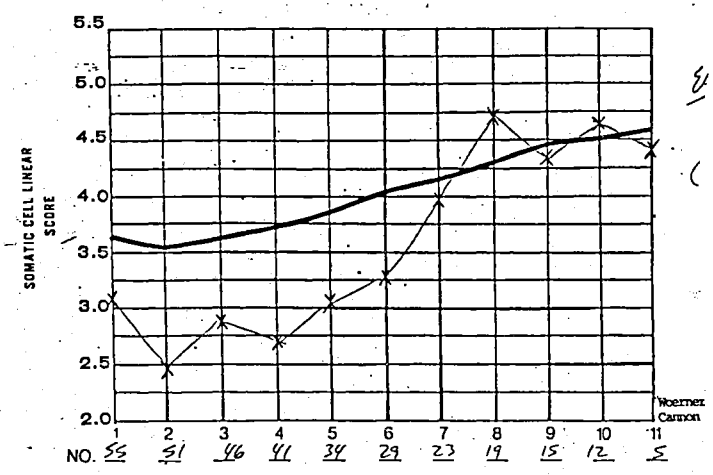


GREAT!

L

DAIRY PRODUCTION CONSULTANTS

AVERAGE LACTATION CURVE
SOMATIC CELL LINEAR SCORE
3RD AND GREATER LACTATIONS

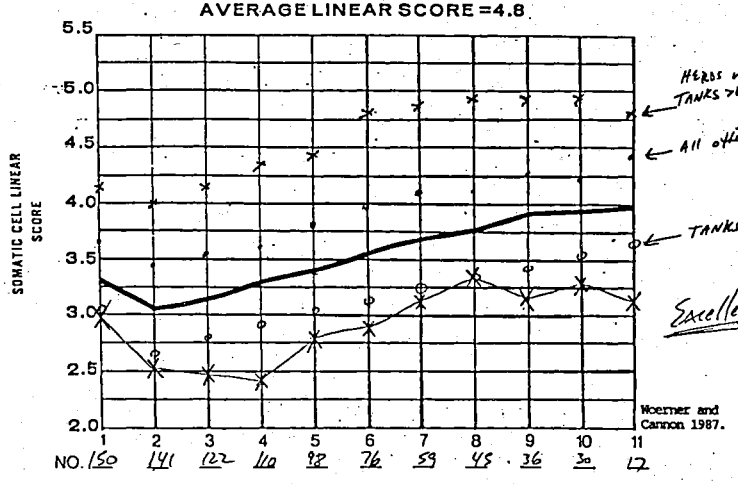


M

DAIRY PRODUCTION CONSULTANTS

AVERAGE LACTATION CURVES
SOMATIC CELL LINEAR SCORE
ALL LACTATIONS

AVERAGE LINEAR SCORE =4.8



Excellent!!

MILKING EQUIPMENT AND MASTITIS CONTROL: HOW TO MAKE MILKING MACHINE COMPANIES YOUR ALLIES

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GENERAL

Mastitis control is a hot topic at this time. Every magazine that you pick up talks about quality milk. Most dairy plants now pay extra premiums for better quality milk. Extension agents throughout the U.S. are promoting quality milk and the dairy farmers are starting to listen. But where is the veterinarian during all this excitement? Has the veterinarian been forgotten, or do most people think of the veterinarian only when a cow needs treatment for mastitis.

I have had the opportunity to be on many quality milk programs throughout the U.S. this past year and in most cases the only mention of veterinarians is for treatment of sick cows. This really makes my hair stand on end and I wonder where we made our mistake so our name isn't first on the list of mastitis control. After all, who better than the veterinarian can look at the total picture at one time and put together a complete mastitis control program.

I think the real problem is the veterinary profession's image of diagnosis and treatment programs rather than management and profitability programs. Part of the blame is our own because our profession has been too busy treating sick cows, pulling calves, cleaning cows and trimming feet to worry about somatic cell counts. As the farmers become more aware of quality milk, they start to ask questions and if the veterinarian doesn't give an excited and interested response the farmer will most likely seek advice somewhere else.

MASTITIS CONTROL PROGRAMS

Mastitis control has built my practice. The income potential from mastitis control alone exceeds most peoples wildest imaginations. More and more veterinarians are getting involved in complete mastitis control programs and finding out that these programs not only increase the profitability of the dairy farmer but also their own profitability. Getting involved in mastitis control programs is a

challenge that most of us must make. There is not a dairy operation that we go to that does not experience mastitis in one form or another. We can be the key person in every dairy operations mastitis control program.

MASTITIS TRIANGLE

Getting involved in mastitis control means we must get involved in the total program. We need to look at the MASTITIS TRIANGLE. This triangle is made up of the **cow**, the **man** and the **machine**. The key to our success is to be able to deal with each part of this mastitis triangle and to pull the entire program together for the farmer.

THE COW

The cow is the easy part. We must make sure that the farmer is keeping the cow clean, dry and comfortable 24 hours a day. Bulk tank culturing and individual cow culturing are areas in which we can help to identify specific problems so we can design specific solutions. Getting involved in DHIA somatic cell count interpretation is important. I always use the "Graph for Udder Health" is a tool to monitor somatic cell counts (figure 1). This simple tool keeps the farmer aware and makes you part of the decision making process. Using computer programs to evaluate and present useful information to the clients is also helpful. Each month our clients are sent a bulk tank contribution list for them to use in mastitis control (figure 2). This simple program has made our dairy producers more aware of the importance of each individual cow to quality milk.

THE MAN

The man and their milking procedures is the most important part of mastitis control. Under most situations, milking procedures are over 70% responsible for mastitis control. It amazes me how many veterinarians have been involved in a serious mastitis problem with a herd but failed to ever be at the farm when the cows were being milked. If we don't get to the field in which the battle is actually being fought, the chances are we will never win the war.

Taking the time to attend at milking time is essential to good udder health. I use a mastitis checklist (figure 3) that I use to go through the procedures that the farmer is using. I like to use Dr. Panky's GUP as the key to mastitis control. GUP stands for Good Udder Prep and I have a chart (figure 4) that hangs in the milk house for each client that reminds them what good udder prep is. Dairy farmers need to be reviewed on a regular basis as to their milking management. Many times it does not take much of a change to cause serious problems.

THE MACHINE

The milking machine is the key component to udder health. It is the most important machine on any dairy operation. All the other equipment on that farm is used to supply the fuel to the dairy cows to make milk and the milking machine is the only piece of equipment that actually harvests the real cash crop called milk. As veterinarians, we need to understand machine function and design so we can offer an independent opinion as to the function of the client's milking system.

The veterinarians role in milking equipment can vary tremendously. You can either get involved in complete system evaluation, partial system evaluation, system monitoring or system observation. The key to the veterinarians success is their independent point of view with nothing to sell.

Many times we can play a key role in helping the farmer decide whether he needs to upgrade his system or not or if the changes he wants to make are in the correct priority. If a veterinarian never puts a wrench or gauge to the system, he can still play a significant role in how the machine functions.

Being able to assist my dairy clients in making sure their milking equipment is not preventing them from producing quality milk is rewarding. The other factor that must be looked at is that the milking equipment is not holding back or limiting production. Milking equipment does get outdated and can limit milk production. Be sure the milking equipment can harvest the crop efficiently. You can prioritize the changes the farmer needs to make to eliminate any marginal components. Many farmers update the wrong item first and don't see the benefits from upgrading. You can make a difference by offering them an opinion in the upgrading.

EQUIPMENT TESTS

The veterinarian can offer a service on a monthly basis that becomes part of their herd management visit. The veterinarian can do a recovery time test and the regulator performance test and monitor the equipments function. These tests are simple to do and actually do the most good for the client as well as increasing your practice's income. I use a chart (figure 5) that records the regulator performance and this chart is a log of what is actually going on. Since the regulator is the key component of the milk system and the most common malfunctioning component found, someone needs to monitor it's function. This program has been very well received by the dairy producer.

I do the regulator tests each herd management visit as well as offer complete milk time analysis. This is the key. You have to offer milk time analysis to really know whether the system is working properly or not. You can miss a serious equipment malfunction by not checking the system under load. I will not check a system unless I can check it under load.

EQUIPMENT DEALERS AND MANUFACTURERS

As the veterinarian gets more and more involved with equipment a new problem develops. The dealers and the equipment manufacturers start to grumble. They don't like it when someone comes in and tells the farmer that the equipment is not working properly and is causing the mastitis problem. It embarrasses them and makes them look like they are not doing their job. Unfortunately for most dealers they have sold their soap routes as a way to keep the machine analyzed properly and most farmers are realizing that this program does not work.

The key to making the milking equipment dealer and the equipment manufacturers our allies rather than our constant enemies is to get them involved. The first step is to stop in and introduce yourself to the dealers. Make them aware of what you are doing and what you want to accomplish. Tell them that you will send them a copy of any system of theirs that you evaluate and that you would appreciate any comments that they might have from your report. Tell them that you are always trying to learn and you are always open to discuss disagreements that they might have.

Take the time to have all the dealers in your area into your office and have a brain storming session. Explain new ideas or installation ideas that will benefit the farmer and everyone in the room. If an installation is made for easy evaluation, everyone can do a better and more complete job. Don't wait for the dealers and equipment people to knock at your door since you have DVM behind your name but instead you take the time to initiate the meetings. Be sure that everyone is singing from the same sheet of music and that everyone has the same terminology.

Another way to form this ally relationship is to become aware of what each company has. You must know the specifics and the differences of each company's equipment. I would recommend that each veterinarian attend each company's training seminars to not only acquaint you with their equipment but give you a chance to meet the people that work in the main office.

Make it a point to invite the area representative from each company to your office and tell them what you are doing. Make them aware that your door is always open for criticism and information. Let them know that you want to be updated on new items and changes that they have. The better you are informed, the better you can inform your clients.

I have found an important way to develop an outstanding relationship with milking equipment dealers and manufacturers is to be sure that when I make recommendations to a farmer that the recommendations are such that the current equipment dealer can make the needed changes. I have seen reports that the veterinarians have made that were so restrictive that the veterinarian could just as well have mentioned the brand to buy. If one is not careful and does not know what each company has to offer, the recommendations can be such that you are really telling the farmer to change companies. I think every company can meet the needs of any dairy operation we have.

The most important way to develop the relationship with the dealers and the milking machine companies is to be creditable and accountable for what you say and do. It is important beyond any doubt that you must do the tests the same way each time and that your opinions do not change from farm to farm or from brand to brand of equipment. You are an independent consultant that has to be honest yet accountable. If your opinions vary from farm to farm, it does not take long for your

reputation to become damaged. This is something that is hard to fix.

I have seen equipment companies take veterinarians to court for statements that were made about their equipment. Before you condemn someone's equipment, be sure you know what is normal for that equipment and what is not. You will be in serious trouble if another veterinary expert comes along and says the opinions that you made on that system were not applicable to that brand of equipment. There are many new systems available now that do not go by the same set of standards that we have been using. Be prepared and know every brand of equipment before making an opinion.

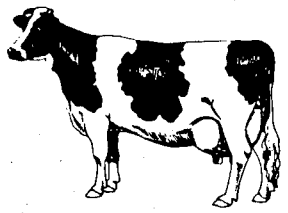
You can't let the fear of causing a controversy stop you from keeping your clients profitability in mind. If it weren't for controversy, I would have an easy life. To be successful you usually will make some waves and have some battles to fight, but keep an open mind and admit when you are wrong. Remember if your client survives, everyone survives and it is in everyone's best interest to have the dairy farmer producing the maximum quantity of quality milk as efficiently as possible.

Figure 1

GRAPH FOR UDDER HEALTH

Average Milk Loss Per Cow Per Day	Somatic Cell Count (X1000)	Linear Score	Graph your monthly somatic cell from your bulk tank provided to you by your milk plant. If you use DHIA somatic cell count, graph your herd's average count also.
7.5 Lbs.	1600 1400 1200 1000 801	7	
6.0 Lbs.	800 600 401	6	
4.5 Lbs.	400 300 201	5	AVERAGE
3.0 Lbs.	200 150 101	4	ABOVE AVG
1.5 Lbs.	100 75 51	3	EXCELLENT
0.0 Lbs.	50 25 10	2 1	SUPERIOR

Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec.



TOTAL HERD MANAGEMENT SERVICES
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TOTAL HERD MANAGEMENT SERVICES
ANDREW P. JOHNSON, DVM
824 WOODSIDE DRIVE
SEYMOUR, WI 54165 414/833-6617

CLIENT:
DATE: MARCH 1989

MONTHLY PRODUCTION PROFILE
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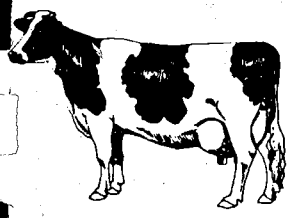
LIST #	COW NAME	LACT #	DIM	DAILY LBS MILK	4% FCM	SOMATIC CELL SCC	SOMATIC CELL L.SCORE	BULK TANK CONTRIB.	LBS MILK LOSS SCC>100	ACTION
5	RITA	5		53.50	53.50	5,817	8.86	92,525	7.8	
25	DANA	3		93.30	70.91	1,488	6.90	41,276	9.1	
9	GUCEI	4		46.80	46.10	2,777	7.80	38,639	5.6	
50	ALLIE	1		41.30	38.82	3,070	7.94	37,696	3.1	
26	MICKEY	3		46.50	45.11	2,620	7.71	36,221	5.5	
15	PENSTAT	4		65.10	60.22	1,860	7.22	36,000	6.9	
22	ROSEANN	4		67.00	60.97	1,552	6.96	30,915	6.6	
13	CATHY	4		85.50	73.96	1,216	6.60	30,911	7.7	
39	DAISY	2		78.30	68.90	920	6.20	21,417	6.3	
1	INEZ	8		94.00	82.72	696	5.80	19,451	6.6	
54	MISTY	1		45.80	44.43	1,398	6.81	19,036	2.6	
6	CHLOE	5		84.10	89.15	710	5.83	17,753	5.9	
10	WYN	4		34.60	38.75	1,458	6.87	14,998	3.3	
12	PRINCESS	4		90.00	79.20	516	5.37	13,807	5.3	
46	GLORY	2		77.60	71.78	548	5.45	12,643	4.8	
21	COCOA	4		51.60	48.50	734	5.88	11,260	3.7	
44	HELEN	2		64.80	40.50	568	5.51	10,943	4.1	
16	CHRIS	3		35.30	36.36	996	6.32	10,453	2.9	
33	CORLISS	2		34.30	31.21	990	6.31	10,096	2.8	
36	DIBBLE	2		57.50	51.46	547	5.45	9,351	3.5	
42	MAUREEN	2		73.30	66.70	381	4.93	8,303	3.5	
23	PETUNIA	3		65.10	80.72	415	5.05	8,032	3.3	
20	TELMA	3		65.00	65.00	376	4.91	7,266	3.1	
52	MAID	1		53.30	45.31	387	4.95	6,133	1.6	
2	DARLING	7		69.50	62.20	236	4.24	4,876	2.2	
18	RUM	4		74.10	78.55	200	4.00	4,406	1.9	
32	LUCINDA	2		44.30	49.62	331	4.73	4,360	1.9	
4	LOVELY	5		62.00	56.42	211	4.08	3,889	1.7	
11	GLADYS	3		48.10	42.33	197	3.98	2,817	1.2	
45	MELLOW	1		58.50	54.99	158	3.66	2,748	0.6	
3	LACEY	6		50.50	49.74	182	3.86	2,733	1.1	
51	VISTA	1		64.80	61.88	139	3.48	2,678	0.5	
14	MUGSY	4		102.00	97.41	58	2.21	1,759	0.0	
43	RIGA	2		68.30	64.20	69	2.46	1,401	0.0	
38	INGOT	2		60.30	62.11	78	2.64	1,398	0.0	
29	WHITEY	2		53.30	46.90	84	2.75	1,331	0.0	
28	AMITY	3		61.00	61.00	66	2.40	1,197	0.0	
8	IONE	5		93.80	76.92	42	1.75	1,171	0.0	
53	DELLA	1		37.00	40.33	104	3.06	1,144	0.0	
19	CASSIE	4		76.30	71.72	50	2.00	1,134	0.0	
7	ESTER	5		105.00	103.43	36	1.53	1,124	0.0	
49	JOSIE	1		39.50	44.24	88	2.82	1,033	0.0	
47	LIBRA	2		62.60	60.72	51	2.03	949	0.0	
27	CLAIR	2		18.50	20.17	160	3.68	880	0.3	
34	INDIES	2		44.30	44.96	66	2.40	869	0.0	
17	MAX	3		57.10	59.67	47	1.91	798	0.0	
24	PRINCES	3		96.50	80.58	27	1.11	775	0.0	



TOTAL HERD MANAGEMENT SERVICES
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MASTITIS PROBLEM CHECKLIST

Client_____ Date_____

A. MACHINE (25% Responsible): Manufacturer _____

1. Check Rubber Parts
   a) Inflations — one piece 1000-1200 milkings
   stretch 600-800 milkings
   silicone 8 months

   (_____Days X _____ # Milkings per day X _____ # Cows)

   ÷ _____# units = _____

   b) Slippage or Fall off? _____None _____Occasional _____Frequent

   c) Cracks or tears in rubber parts?. . . . . _____Yes _____No

   d) Milk hose length (stanchion pipeline) _____feet

   Avoid looping. . . . . _____Yes _____No

2. Pump — is it large enough? Rule of thumb is 1 unit per 1 hp motor, i.e., 3 hp motor = 3 units.
   Motor size _____ hp.

3. Plumbing — are there _____1 _____ 2 _____3 lines leaving balance tank?

4. Stainless Steel Pipeline Size _____inch. Units used per slope _____.
   Pulsation line size _____inch Galvanized_____ PVC_____
   Is there adequate slope _____

5. Regulators: Are they clean?. . . . . _____Yes _____No
   Type: Weight_____ Spring_____ Servo_____
   Recovery Time: _____seconds (Should be 3 or less)
   Is there any override?. . . . . _____Yes _____No
   Properly placed?. . . . . _____Yes _____No

6. Vacuum level _____inches (Should be between 12 and 15 inches).
   Gauge accurate?. . . . . _____Yes _____No

7. Stallcock and valve leaks in line?. . . . . _____Yes _____No
   Size _____5/8 _____9/16
   Location _____

8. Claw vents checked frequently?. . . . . _____Yes _____No

9. Has equipment been bastardized?. . . . . _____Yes _____ No
   How? _____

B. MAN (70% Responsible)

Use proper concentration of effective udder wash? _____Yes _____No

Product used _____

Wet prep with individual paper towels? _____Yes _____No

Start cows (strip cup)? _____Yes _____No

Predip? _____Yes _____No

Product used _____

Dry teats with individual towels? _____Yes _____No

Proper unit attachment? _____Yes _____No

Good unit alignment? _____Yes _____No

Teat dip with proven products _____Yes _____No

Product used _____

Milk infected cows last? _____Yes _____No

BE SURE UDDER WASH AND TEAT DIP COMPLEMENT EACH OTHER!
**REMEMBER, THE HUMAN ELEMENT WITH ATTENTION TO DETAIL IS 70% OF MASTITIS CONTROL!

DRYING TEATS IS THE #1 WAY TO LOWER CELL COUNTS AND
REDUCE CLINICAL FLARE-UPS! DO NOT DISREGARD!

C. COWS (5% Responsible)

Are they clean? _____Yes _____No

Are udders square? _____Yes _____No

Many 3 quartered cows? _____Yes _____No

Are there mud holes in yard? _____Yes _____No

Stall dimensions adequate? _____Yes _____No

Any signs of stray voltage? _____Yes _____No

Dry treatment of all quarters of all cows? _____Yes _____No

Product used _____

Sterile bulk tank culture done? _____Yes _____No

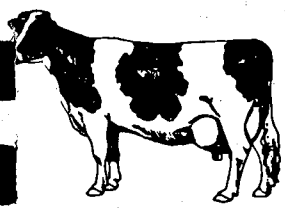
Staph aureus = chronic - milk machine and procedures
Strep ag = subclinical - milk machine and procedures
Coliforms = environment, procedures and sanitation
Non ag streps and nonhemolytic staphs = all of the above
High somatic cell count = primarily udder health indicator
High bacteria count = primarily a sanitation problem, not an udder health indicator

D. MILK PLANT milk quality information for past 2 months:

Present Mo. SCC_____ Bacteria Count_____

Previous Mo. SCC_____ Bacteria Count_____

Attach recent copy of DHIA Somatic Cell Count Report if available.



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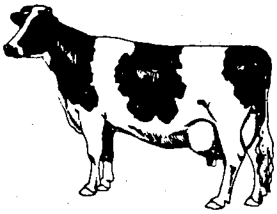
G.U.P.
GOOD UDDER PREPARATION

1. AN INSULATED MINNOW BUCKET FOR A WASH PAIL.
2. CLEAN, WARM WATER ADDED TO WASH PAIL.
3. ADD MEASURED AMOUNT OF QUALITY UDDER WASH TO WATER.
4. USE INDIVIDUAL PAPER TOWELS TO WASH TEATS — KEEP HANDS OUT OF WATER. HOLD TOWEL BY CORNER AND DIP INTO WATER PAIL.
5. WASH TEATS THOROUGHLY FOR 15 TO 30 SECONDS TO STIMULATE UDDER.
6. STRIP SEVERAL SQUIRTS OF MILK FROM EACH TEAT INTO A STRIP CUP.
7. WIPE TEATS THOROUGHLY DRY WITH SECOND INDIVIDUAL PAPER TOWEL.
8. APPLY UNIT TO TEATS 45 TO 90 SECONDS AFTER STIMULATION
9. ATTACH EACH TEAT CUP TO TEATS CAREFULLY SO AIR WILL NOT LEAK INTO THE UNIT. EXCESSIVE AIR LEAKS WILL CAUSE MASTITIS.
10. ALIGN UNIT SO IT HANGS SQUARE TO UDDER WITH A SLIGHT FORWARD PULL. USE HOSE HOOKS AND PLACE CLOSE TO COW'S SHOULDER.
11. LIMIT MACHINE STRIPPING TO 5 SECONDS OF DOWNWARD PRESSURE ON THE UNIT. DO NOT REMOVE INDIVIDUAL TEAT CUPS.
12. SHUT OFF VACUUM TO UNIT BEFORE REMOVING IT FROM THE UDDER.
13. IMMEDIATELY DIP EACH TEAT WITH A QUALITY TEAT DIP.

THE DAIRY FARMER AND THEIR MILKING HABITS ARE UNDER MOST CONDITIONS OVER 70% RESPONSIBLE FOR THE CONTROL OF MASTITIS. MASTITIS IS SIMPLY OUTSIDE BACTERIA GETTING INTO THE UDDER AND CAUSING AN INFECTION. MASTITIS CONTROL IS VERY SIMPLE. THE DAIRY FARMER MUST DO EVERYTHING IN THEIR POWER TO KEEP THE BACTERIA FROM ENTERING THE UDDER.



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REGULATOR FUNCTION TEST

DATE TESTED	CFM TO DROP VAC 1/2 INCH	OPERATING CAPACITY	PERCENT ►90%	COMMENTS