

Using Records For Large Herd Management

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Dairy producers have had access to systematic structured record programs since 1905. A key feature of those programs was a clearly defined flow structure for data to a central data base. For example, data flowed to the Animal Improvement Programs Laboratory for genetic evaluation and breed associations for registry work. Unfortunately, there was no reverse data flow. That is, a producer did not have ready access to his data files to use in herd management.

As computer technologies, especially microcomputers, have revolutionized the way in which data were calculated, new opportunities became available to move record management from a data gathering to a data evaluation system. Unfortunately, historical providers of dairy programs failed to appreciate the added power of on farm microcomputers and the resultant shift in needs and requirements by dairy producers for data base access.

Computational power has increased exponentially while cost has decreased in the same manner. This has resulted in an opportunity for dairy producers to evaluate management opportunities using their own on farm data base. No longer are producers limited to pre-defined forms or calculations that some "expert" felt the dairyman need to manage his dairy herd. Rather, with the new generation of software, he is no longer constrained by pre-defined reports and has the power to access his data base.

Today, the key issue in large herd management is access to "your" database. Data base access provides ways beyond historical "DHI" type programs to manage herds. Several programs are available that allow for this inside look at your database.

Current Test Day Analysis

One such program is the current test day analysis program (CTAP) that provides a sensitive way to evaluate management of a herd.

The basic design of the current test day (CTD) production profile is to divide the herd by stage of lactation (days in milk (DIM)) and by lactation number. The DIM divisions are <45, 45-100, 101-200, 201-300 and >300. Animals < 45 DIM are considered "fresh cows" or "start up cows". The <45 DIM also identifies animals with typically only one test day value. This group typically across herds will average approximately 20-25 DIM. The 45-100 DIM group are considered "peak cows". Across herds this group will average approximately 65-70 DIM. The 101-200 DIM group are termed "middle lactation" animals. The 201-300 DIM group are termed "late lactation" cows. The >300 DIM group are termed "long lactation" cows. This group typically contains reproductive problem cows who are above herd average in production.

The purpose of the CTD production profile to evaluate CTD production trends in a herd with the ultimate purpose to evaluate the current nutritional status of the herd.

The absolute values of milk pounds, fat percent and protein percent are strong indicators of the pre-partum body condition and nutritional management. Typically Holstein cattle will average 3.6 to 3.8 percent milk fat and 3.2 to 3.4 percent milk protein on start up animals

regardless of parity group. Jersey cattle will average 4.0 to 4.2 percent milk fat and 3.4 to 3.6 percent on start up animals regardless of parity group.

Milk fat values averaging greater than 4.0 percent (on Holsteins) as a group indicate that some of the individuals in this group will have elevated milk fat percent values. Elevated milk fat values are an indication of abnormal metabolism of body stores and assimilation of fatty acids by the Krebs cycle in the liver. Elevated milk fat values are typically seen in animals whom are over conditioned at calving or who have undergone extreme changes in body condition. If milk protein values are elevated with slightly depressed but not inverted milk fat percent values this may be an indication of udder health problems in the herd. Elevated milk protein percent in combination with a milk fat inversion is an indication of a poor energy protein relationship in the diet.

Milk fat percent below 3.6 to 3.8 percent are an indication that there is a lack of overall (energy) body stores in the animal. These animals are thin at calving. Milk protein below 3.1 percent in combination with an elevated fat percent is an indication that there is a lack of protein body stores in the animal. This is a common occurrence in animals fed high energy with low protein diets pre-partum.

The change in absolute value of milk pounds, fat percent and protein percent between start up and peak lactation groups. The amplitude of peak milk difference in combination with start up milk pounds has a very strong correlation to the 305 day lactation yield of a cow. Typical peak milk difference values range from 5 to 12 pounds regardless of breed. Peak milk difference is influenced by parity group. If peak milk difference is low or negative it may indicate; transition cow management problems, poor body condition or short dry periods. It usually takes about 40 to 60 days to see increases in start up milk values translate into increases in peak milk.

Large peak milk differences or delayed peaks are uncommon but typically indicates poor pre-partum (dry cow or heifer) nutrition.

Changes in milk component percents are sensitive indicators of rumen health. The normal decline in milk fat percent between start up and peak lactation is .4 to .5 units. Declines in milk fat percent greater than this are an indication of acidosis and/or extreme body weight loss.

Milk fat and protein percent may increase from start up to peak but this is unusual. Milk protein values which increase from start up to peak with a large decrease in milk fat percent between start up and peak milk is an indication of over conditioned animals who are deficient in protein. If both milk fat and milk protein increase from start up to peak this is an indication that the animals were nutrient deficient prior to calving.

When milk fat and milk protein percent become inverted (milk protein is greater than milk fat), this is an indication of abnormal rumen function in a dairy cow. This can be caused by overfeeding grain, poor rumen carbohydrate protein relationships, severe body weight loss or by feeding ionophores.

The trend of the change in absolute values for fat percent and protein percent between peak, middle, late and long lactation groups. Once the animal has passed peak milk flow, milk fat percent and milk protein percent should increase at a steady rate from peak to middle to late lactation. Long lactation animals may deviate a little bit based on days in milk. Milk fat percent and milk protein percent values are sensitive indicators of body store repletion in a dairy cow.

If milk fat percent and milk protein percent invert after peak milk flow it usually is an indication of a group change. Milk fat percent and milk protein percent are strongly influenced

by the acetic to propionic acid ratio; therefore anything that will alter this ratio will also alter the milk fat to milk protein ratio (examples; body condition, feeding programs and feed additives).

The interval change in milk production between peak, middle, late and long lactation groups compares changes in milk production this month across stages of lactation. The normal change in milk production is 10-15 percent across lactation groups (parity) and stage of lactation. First lactation animals fed total mixed rations (TMR) tend to have very small interval persistency values. This is a desirable trait. The interval change in milk production in long lactation cows may be influenced by the number of observations in the group as well as the average days in milk of the group. If there are a limited number of observations in this group the interval persistency may be greater than 100 percent. The cattle in the long lactation group tend to be reproductive problem cows who are above herd average in milk production. This can be verified by evaluating the days dry, days open and mature equivalent production averages of this group.

The average days dry (DD) in second, third and greater and all lactation groups. The average number of DD in the animals fresh this month (<45 DIM) in second and third and greater lactation groups as compared to the lactation group average.

The ideal DD of a herd will vary considerably from herd to herd. The dry period serves as a resting period between lactations. Therefore, first lactation animals will not normally have dry days. If this occurs it is usually one animal or a small group of animals who were recently purchased and entered the herd. If the DD is outside (high or low) the ideal range (as determined by the analyst) it will affect peak milk flow. The CTD production profile allows the analyst to evaluate the DD dry between first and second lactation as well as second and third and greater lactations. In addition the DD of the animals fresh this month (<45 DIM) as compared to the yearly average can also be evaluated.

The relationship of the milk fat percent and protein percent in late and long lactation animals in first lactation as compared to the start up fat percent and protein percent in second lactation animals. This trend is also evaluated between second and third and greater lactation animals.

The use of Student's T test verifies that the milk fat percent of the last test day of first lactation is approximately equal to the start up milk fat percent of second lactation. The milk fat percent of the last test day of second lactation is approximately equal to the start up milk fat percent of third lactation.

When the milk fat percent of the last sample day of the first lactation is greater than the milk fat percent of the first sample day of the second lactation this is an indication that the animals lost weight and or body condition between first and second lactations.

When the milk fat percent of the last sample day of the first lactation is less than the milk fat percent of the first sample day of the second lactation this is an indication that the animals gained weight and or body condition between first and second lactations.

When the milk fat percent of the last sample day of the second lactation is greater than the milk fat percent of the first sample day of the third lactation this is an indication that the animals lost weight and or body condition between second and third lactations.

When the milk fat percent of the last sample day of the second lactation is less than the milk fat percent of the first sample day of the third lactation this is an indication that the animals lost weight and or body condition between second and third lactations.

Lactation Curves

Another way to look at herd performance is to monitor lactation curves. A lactation curve is a set of points graphically displaying the production output of a cow or group of cows over a period of time. Curves may be drawn for milk, milk fat, protein, somatic cells, and body condition scores, to name a few. By viewing a graphical representation of his herd, a producer is able to recognize a shortcoming without wading through a pile of numbers.

Lactation curves are not only useful for determining general trends in the main herd, but also for re-grouping the herd into calving groups, feeding groups or by individual cows. Patterns emerge that represent a critical area. Two major contributions to decreased lactation milk production become evident upon examination. They are peak milk production and persistency of lactation.

Lactation curves provide a means to highlight herd weaknesses and show differences among certain groups. For example, in comparing first lactation cows to older cows, it is known that first lactation cows peak lower, but are more persistent in production. The difference in curves is readily apparent when the two are compared side by side. Thus, providing a way to determine if they are receiving proper management. Another way is to compare herds with standard curves.

Milk production graphs along with milk fat and protein percent curves provide an additional means of pinpointing management opportunities. Fat percent provides clues as to the adequacy of the ration. The fat-to-protein relationship also bears examination, because it is normally a stable relationship, except when management practices cause it to fluctuate such as body weight loss or changes associated with group changes. Graphs of somatic cells provide the producers with another method of monitoring cow health and production. Since somatic cell counts are related to level of milk production and mastitis status.

Your Data Base

Microcomputers have redefined and restructures the process of managing your dairy herd. Using programs to access on farm data bases will increase a producers ability to realize and maintain profit in today's roller coaster milk market. You now have the ability to manage your dairy herd from your data base. Use this resource to increase your ability to be in charge of your herd management opportunities.

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