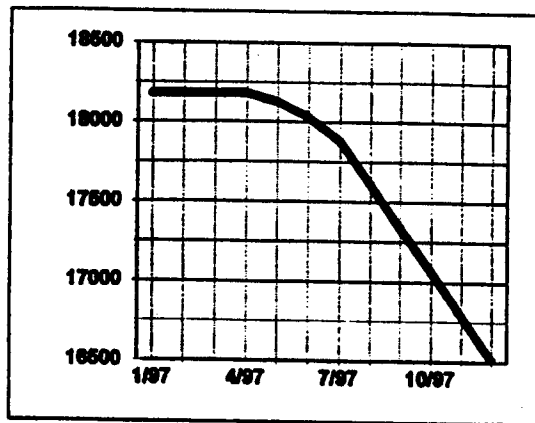


# MONITORING MILK PRODUCTION

Milk Production on dairy farms can be monitored in many ways. Each way has some advantages, and disadvantages. Understanding the short comings of a method of monitoring milk production is better than trying to interpret misinformation. For Example, consider the following graph of the Rolling Herd Average in production in a dairy herd.



The above graph would suggest that there was a tremendous decline in production that started in the early summer. In reality, the production of 60 pounds per cow per day did not change through the entire year. The only thing that changed in this simulated herd was that the percentage of dry cows in the herd increased from 17% to 32%. There are many non-milk related factors that affect milk production "averages" like the commonly used Rolling Herd Average just because of the way that they are calculated. Knowing how these calculations are done, and what factors other than milk production are affecting milk records can be helpful.

## ROLLING HERD AVERAGE:

**Calculation basis:** Estimated annual milk production averaged on a per cow basis "rolled" over the last 12 months. A 12 month rolling average is one that when each new months records are added the oldest months records are dropped from the constantly evolving 12 months that are averaged.

### Some factors that influence rolling herd averages(RHA):

- Longer dry periods decrease RHA
- Higher percent of cows as dry (seasonal breeding, or purchased dry) decrease RHA
- Higher percent of 1st lactation animals in herd (calved or purchased) decrease RHA
- Higher cull rates will increase RHA(culled cows reduce dry days)
- Reproductive problems that increase days in milk(DIM) and/or days dry will decrease RHA
- New herds will have inaccurately low RHA for the first 12 months
- Seasonal affects can normally increase production(Apr-Jun)  
and decrease production(Oct-Dec).

### Uses and considerations:

- RHA is useful to assess long term production within herds and as a,  
crude comparison of productivity between herds
- RHA is a poor indicator of current production(averaged over 12 months)

## **MANAGEMENT LEVEL MILK(MLM):**

**Calculation basis:** Complex formulas that estimated average milk production on test day as if all cows in the (breed specific) herd were 150 days in milk, in their second lactation, and producing milk that contains 4.0% fat, and 3.3% protein. Two Examples are:

<u>Cow 1:</u>	<u>Cow 2:</u>
5th lactation	2nd lactation
250 days in milk	100 days in milk
55 lbs milk	65 lbs milk
<u>3.9% fat, 3.3% protein</u>	<u>3.9% fat, 3.3% protein</u>
76 lbs MLM	58 lbs MLM

### **Some factors that influence MLM:**

- MLM poorly represents actual herd production if a substantial portion of the herd milks longer than 305 days since the calculation excludes milk from cows over 305 days in milk.
- Seasonal affects can normally increase production(Apr-Jun) and decrease production(Oct-Dec).
- Heat Stress can lower production

### **Uses and considerations:**

- MLM is not a real number, but it is a very useful monitor of the effects that management changes, and environmental stresses have on production performance.

## **MILK PER COW PER DAY**

**Calculation basis:** The monitoring of milk shipped is only of economic value unless the number of cows that contribute milk is also recorded. Dairy farmers are encouraged to write down the number of cows in the tank along side the correct dates on the milkhouse bulk milk slips. Milk per cow is a simple average of milk collected divided by cows milked, and should be similar to "milk" listed under "Test Day Average Production" on the DHIA herd summary sheet.

### **Some factors that influence milk per cow per day:**

- Milk per cow decreases with increasing days in milk
- Milk per cow is usually lower in the first lactation and slightly lower in the second lactation.
- Reproductive problems can lower milk per cow by increasing days in milk.
- Seasonal affects can normally increase production or decrease production.
- Heat stress can lower production.

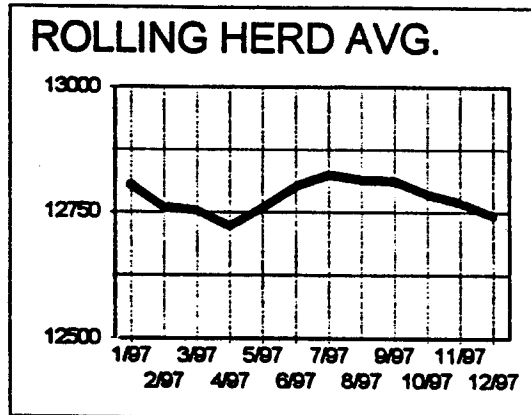
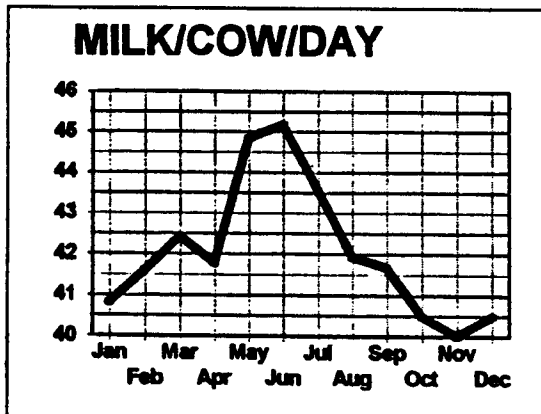
### **Uses and considerations:**

- If milk per cow per day varies consistently between DHIA and bulk milk it may indicate a DHIA metering error, or a bulk tank measuring error.
- Milk per cow per day is the most time sensitive measure of milk production. Graphing this number on a daily or weekly basis can be helpful as an early detection of changes.
- Large herds can evaluate milk per cow on a group or pen of cows, and it can be used to

monitor the performance of different milking personnel by selectively checking the bulk tank weights with the tank measuring stick.

### SEASONAL CHANGES

Milk production will naturally increase and decrease between seasons. The months of April-June tend to allow for the production of around 5 more pounds of milk per cow per day than do the months of October-December. Comparing production from the same time of year from one year to the next will avoid such variation. If production in around May to June is around 5 pounds per cow more than production in October to December then it is likely that no real change in production has occurred. Changes of more or less than 5 pounds over this time period are more likely to indicate a real change. A change of 5 pounds of milk per cow per day may only result in a small change in the rolling herd average.



### PEAK MILK PRODUCTION:

**Calculation basis:** Peak Milk is chosen from either the highest test weight in the first 100 days or the else a 305-day based calculated estimation of what the highest production would be depending on which value is higher. This either or method of determining the peak milk is used to improve accuracy because testing monthly may not catch the truest peak milk level. Peaks milk is calculated for individual cows and then averaged for the herd (separated by first lactation and older animals). Peak milk generally match the rolling herd average according to the following relationship:

$$\text{Expected RHA (lbs/cow/year)} = (\text{Cow Peak Milk} \times 257.7) - 3310$$

$$\text{Expected RHA (lbs/cow/year)} = (\text{Heifer Peak Milk} \times 335.9) - 2926$$

In a cow, a one pound increase in peak milk can result in an increase of 258 pounds of milk for the lactation. (336 pounds for a heifer).

### Some factors that influence peak milk:

- Peak Milk is determined early in the lactation, and is not affected by reproduction. A herd with reproductive problems may have a low RHA but good peak milk values.
- Peak Milk will tend to be lower in summer months.

### Uses and considerations:

- Peak Milk is more specifically influenced by dry cow, transition cow, and fresh cow

management changes.

-Improvements in Peak Milk can more quickly and more powerfully predict increases in herd performance.

-Peak milk of the first lactation should be around 75% of the second and greater peak.

Potential reasons for the peak to be higher than 75% of mature peak in heifers is :

- Poor cow performance due to the accumulated affects of rumen acidosis
- Exceptional heifer group

Potential reasons for the peak to be lower than 75% of mature peak in heifers is:

- Poor youngstock management resulting in heifers that are too small, or too thin or too fat at calving.
- Over crowding at the bunk will decrease consumption in heifers more than in most older cows.

## **MATURE EQUIVALENT PRODUCTION**

**Calculation basis:** According to complex formulas are used on an individual cow basis. Each cows accumulated test day production is standardized to 2X milking, a 305 day lactation, mature lactation, and season of calving.

**Some factors that influence Mature Equivalent(ME):**

- Reproductive performance and thus days in milk will not influence ME.
- Most if the ME is locked in after the first half of a lactation, so it poorly predicts short term changes.

**Uses and considerations:**

- Herd ME's is of little value in evaluating the significance of actual herd production changes
- ME is most useful for adding in culling decisions, and for spotting potential good cows.
- Herds with chronic rumen acidosis problems may typically have the first lactation ME much higher than the mature cow ME(23,000 to 18,000) because of the accumulated damaged and poorer performance of older cows.
- It is typical to have a 1500 pound difference between ME and RHA. Reproductive problems and longer days in milk, and well as an increase in the percent of heifer in a herd will increase this difference between ME and RHA

## **LACTATION CURVES**

The comparison of individual cow or herd performances against a "standard" lactation curve is of little value. The normal, individual variation in a lactation curve is too great to make this comparison of much value. Lactation curves are derived as a statistical event from large numbers of test day records, and are mainly used to assist in understanding and interpreting other more sensitive indicators of production.

**John Roberts, DVM**

**Rural Electric Power Services**

**Wisconsin Department of Agriculture, Trade and Consumer Protection**

Much of the material in this article was obtained from "Monitoring Milk Production Responses in Dairy Herds" by Garrett Oetzel, DVM, MS, School of Veterinary Medicine, UW-Madison.