Utilizing dairy records to maximize reproduction*

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Abstract
A description of the basic process of analyzing reproductive performance utilizing primarily PCDart and DairyComp305 is described. The basis of the approach is to utilize information available within the dairy production records system to evaluate how efficiently pregnancies are generated on the dairy operation.

Keywords: Dairy, reproduction, records, PCDart, DairyComp305

Introduction
The analysis of reproductive performance utilizing dairy records continues to be a very important aspect of maximizing reproductive performance. It is important to understand the objectives established for each dairy farm and establish a systematic approach to assessing the dairy’s ability to achieve that performance. The use of the dairy records software is a skill acquired by repetition and interaction with other users of the software. It is vital, however, to make the software answer the questions the practitioner has formulated in his analytical approach. The questions and the establishment of realistic and understandable performance attributes are what make an effective evaluation.

There are many approaches possible. One reasonable approach is to establish some basic understanding of the dairy and the facilities. The region of the country is also important because of the environmental adjustments which must be considered in the analysis. For this description we will begin by assuming no significant environmental challenges occur during the year. As we progress with the analysis it will become apparent how to make the adjustments. Nevertheless we will review some of the possible adjustments at the end of the discussion.

This discussion will utilize PCDart1 from the Dairy Records Processing Center (DRPC) at Raleigh, NC as the software basis for discussion and illustration. Information about the use of this software will be introduced within this seminar but it is strongly recommended that the practitioner become very familiar with the excellent help system available with this software. An attempt to replicate the detail provided within this system is well beyond the scope of this review. DairyComp 3052 will also be mentioned as appropriate to demonstrate similarities and differences in software. There are excellent sources of information and instruction for this software as well. One source that is strongly recommended is available at the University of Minnesota. Their web address is: (http://www.cvm.umn.edu/outreach/events/dairy_comp305/course1/home.html).

General dairy information
It is important to understand some general information about the dairy before progressing with the reproductive analysis. The physical attributes of the dairy such as whether the cows are managed in a freestall, pasture, dry lot, etc., must be determined through observation or discussions with the dairy. The specific dairy’s policies related to milking frequency, dry period length, length of the voluntary waiting period, lactation group differences such as housing and reproductive management, use of artificial insemination, bulls and seasonal breeding plans must all be determined. You should determine overall and individual pen stocking rates because overstocking is very common and may impact health and reproductive performance. How cows are managed before and after freshening up to the time of breeding eligibility must be reviewed on each farm.

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Understanding the producer’s goals

The goals established by the dairyman should be reviewed. This will serve multiple purposes. First, it provides information about what the dairyman would like to achieve in their reproductive program. Secondly, the factors used in the dairyman’s description will help you understand how to communicate the results from the evaluation. As you will appreciate, the multiple reproductive parameters are often related. Most dairymen today rely on pregnancy rate or the 21 day pregnancy rate as the primary indicator of reproductive success. You may find, however, that the dairyman may not fully appreciate what this means. Other parameters we will discuss include days open, calving interval and pregnancies generated. If you are asked to work with breeders on larger dairies, other measures or performance indicators may be more appropriate. All of the factors must be consistent and provide the cow flow patterns required for the dairy. Again, environmental adjustments may be required.

Approach to the analysis of reproductive performance

The approach outlined within this discussion is one the author has employed for many years. This approach provides a logical approach that is applied consistently from farm to farm and provides the basic information that relates the current reproductive performance of the dairy. It also is performed in a minimal amount of time which is important to the practitioner with a limited amount of time. If a particular parameter is not within desired limits, more detail is obtained in what is referred to as a “Drill Down”. This will be illustrated within the seminar. The basic approach is as follows:

• Determine the number of total cows in the herd (TC).
• Determine the total number of pregnant cows in the herd (TPC)
• Determine the average days in milk for the herd (DIM).
• Determine the desired calving interval (DCI). This value is different than the historical calving interval or the projected minimum calving interval which is available in PCDart. This value is the length of time required in months to start a new lactation on the total herd. For example, if the herd size is 500 cows, the desired calving interval may be 13 months. If you then estimate that 100 percent of the herd becomes pregnant over a period of 13 months then 7.7 percent must become pregnant each month. If the interval is 12 months, the percent that must become pregnant per month must be 100/12 or 8.3 percent. This value is known as the percent pregnant per month (PPM). Other considerations for determining the desired calving interval are related to facility constraints because the actual herd calving interval will determine cow flow through the dairy facility such as the number of dry cows, fresh cows, etc.
• Determine the percent of the total herd which has been confirmed pregnant (PP).
• Compare the percent of the total herd confirmed pregnant with goals. This value will change based in the average days in milk of the herd. Another way to think of this is that a herd which has a relatively low average days in milk will have fewer cows pregnant than one which has longer days in milk. One way of estimating this value is as follows:
  1. Convert DIM to months in milk (MIM). MIM=DIM/30
  2. Determine the percentage of the herd which must become pregnant each month based on the desired calving interval. This was discussed above with the desired calving interval.
  3. Determine the minimum estimated percent of the herd which should be pregnant (MPHP). MIM * PPM = MPHP. For example, if the months in milk is 6 months (the equivalent of 180 average days in milk) and the desired calving interval is 13 months, the MPHP = 6*7.7=46.2 percent. If the average days in milk is 210 or 7 months, then the MPHP should be 53.9 percent.
• Determine 21 day pregnancy rate (PR). This value is directly available as a report in PCDart and as the bredsum command in DairyComp 305. This value can be estimated by understanding the values above. Twenty one day pregnancy rate is the percent of cows eligible to become pregnant
which actually become pregnant in a 21 day time period. A typical dairy herd will have about 30-35 percent of the herd eligible to become pregnant at almost any one time. The exceptions to this are the extremely seasonal herds which occur in some regions. If 35 percent are eligible and 7.7 percent become pregnant with a 13 month desired calving interval, the a 21 day pregnancy rate can be estimated by 7.7/35 or 22 percent pregnancy rate.

- The next phase of the reproductive evaluation is an evaluation of the process. The entire herd is evaluated and the stratified by lactation group. The lactation groups are first lactation, second lactation and third and greater. The factors are best evaluated both numerically and graphically. This includes the following historical reproductive parameters:
  - Days to first service – desired goal of about 72 days in most herds
  - Services per conception – desired goal of 2.5 to 3 in most herds.
- Another useful value is the calculated breeding interval. This is calculated utilizing the following formula:
  - (Average Days Open – Average Days to First Service) divided by Services per conception in all cows minus one.
  - Example: (150-72)/2.5=31.2 days
  - The best herds typically are in the range of 28 days.

Adjustments
A few adjustments which are worth mentioning are seasonal variations and new herd startups. The seasonal herd calculations must be adjusted for the actual number of months in which breeding actually occurs. For example, if you do not breed during the summer months of June, July, and August and you want a thirteen month calving interval, then the monthly goals are 13-3 or 10 months. That equates to an average of 10% of the pregnancies occurring during the other 10 months. A new herd startup is the most difficult because cow numbers are changing so rapidly. The adjustments to this situation must occur at least monthly and frequently even more often. Other situations requiring adjustment certainly occur but due to their unique nature of many are beyond the scope of this review.

Summary
The basic approach to reproductive analysis should reflect the herd’s ability to generate pregnancies in a timely way. This information should provide the basis of such an evaluation. The reasons for not achieving goals are many and should be ascertained by formulating relevant questions and then gaining insight through the data available within the herd’s record system. The primary objective with the dairy herd is to establish realistic and understandable goals which can be monitored on a regular and consistent interval.

References
1. PCDart, Dairy Records Processing Center, Raleigh, NC. www.drms.org