

## DCRC Reproduction Awards Judging Process

### Reproductive management can be categorized into three aspects:

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**Management** includes many dimensions relating to how the herd controls insemination; it is reflected in first-service heat detection rate and heat detection rate to later services.

**Biology** has a large influence on the outcome of reproduction. Conception rate and conception rate across service number, age groups, and season reflect the influence of biology. Of course, the inseminator can influence these numbers as well.

**Culling** and “potential culling” based on cows pregnant over a proportion of services will influence reproduction measures.

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### THE REPRODUCTION AWARDS

To recognize dairy operations who lead the industry in all three aspects of their reproduction program, the Dairy Cattle Reproduction Council (DCRC) has created an award to honor these producers. To better understand how the winners are selected, the following outlines the process the judging panel has developed to accurately select winners.

### THE JUDGING PROCESS

- ✓ All initial applications must be submitted by April 30, 2017, by nominators who work closely with the dairy operation. Nominators can include veterinarians, genetic and pharmaceutical company representatives, DHIA field personnel, or extension specialists.
- ✓ Following the application deadline, six judges will independently review and judge the nomination forms.
- ✓ The dairy operations selected by a majority of the judges will move to the finalist round.

The nominators of the finalist herds will be asked to submit a data file that includes the following information on every cow that calved between January 1, 2016, and December 31, 2016. This includes all cull cows.

- Birth date
- Calving date
- All breeding dates
- Cull date with reason for leaving the herd
- Lactation number
- Pregnancy status
- Times bred in previous lactation
- Projected 305-day milk yield

The raw data is then analyzed in an independent analytical program. For an example listing of parameters calculated in the analysis, see the end of this document.

The finalists are ranked from best to worst for each of the following parameters:

- Voluntary wait period calculating as when 5% of herd bred for the first time
- Average days to first service
- First service insemination rate
- Repeat service insemination rate
- Overall conception rate
- Conception rate for first lactation
- Pregnancy rate for overall herd
- Pregnancy rate for first lactation
- Pregnancy rate to first service
- %<150DO = percent of pregnant cows with <150 days open
- Mean DO = average days open
- Second service conception rate
- First service conception rate across all services
- Mar-May = first service conception rate by season of calving
- Percent of interbreeding intervals <10 days
- Percent of interbreeding intervals 10-17 days
- Percent of interbreeding intervals 18-24 days
- Percent of interbreeding intervals 25-35 days
- Percent of interbreeding intervals 36-48 days
- Percent of interbreeding intervals ≥49 days
- Average interbreeding interval in days
- Percent of herd culled
- Percent of culls culled for reproductive reasons
- Economic value of difference between performance and standard PR, milk price, replacement costs, calf price, etc.
- Internal herd growth
- Pregnancy rate in previous lactation
- Average number of lactation
- Reported pregnancy rate in from data source

The rankings are then summed across all categories, and the scores are then indexed. The herd's indexed rankings are summed together, re-indexed with the combined scores, and ranked lowest to highest. All finalist herds are divided into platinum, gold, silver, and bronze categories by the judging panel based on the final ranking.

**Pregnancy rate (PR)** is calculated using a life table method, as in SAS. A PR is calculated for each 21-day period. Then an average based on weighting across periods gives the average PR. The complete distribution of cows over all breeding intervals is used to calculate PR most accurately. This method has been validated against binomial models of varying pregnancy rates and herd sizes with known inputs. The estimated PR is done with heat detection rate and conception rate to see if there may be a skewing in the data distribution—a high proportion of censored cows. Herds that have a high conception rate and a high FSTHDR can skew data as a heavy weighting occurs in the first cycle compared to later cycles. The PR calculation begins at the VWP for the individual herd.

**Value of Reproduction (Value)** is the calculated value of reproduction based on inputs such as milk price, milk yield, cull cow value, calf value, etc. It weights the value of pregnant cows within each 21-day period. The VWP is used to value pregnancies. Hence, “value” is included in the ranking, since this is sensitive to VWP. Actual sequential milk yields from cows were used to construct lactation curves and examine change in milk per day with varying calving intervals. Varying PR were used with varying VWP and culling rates to calculate effects on milk produced per day (MPD) and calves born per year (CPY) to generate effects of PR on MPD and CPY for the influence on Value.

The methods used in these calculations have been validated with actual data from close to a million cow records and close to a million simulation runs. The approach is the least biased method that DCRC has found to compare reproductive performance on dairy farms. One of the main problems with most analysis is the pattern of recalving. The most fertile cows are dropped from the analysis because they recalve within the period being analyzed. This is accounted for in this analysis.

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## PARAMETERS CALCULATED FROM THE RAW DATA:

- Number of active cows in the herd
- Number of cows culled
- Number of cows coded as pregnant
- Number of cows that are pregnant based on nonreturn to breeding
- Number of cows that are coded as pregnant and it is more than 300 days since last breeding date
- Total number of pregnant cows (pregnant + estimated pregnant based on nonreturn to breeding)
- Percent of active cows that are pregnant
- Number of first lactation active cows
- Number of second lactation active cows
- Number of third plus lactation active cows
- Voluntary wait period (VWP)—5% bred all lactation cows
- Voluntary wait period for first lactation cows—when 5% are bred
- Voluntary wait period for second lactation cows—when 5% are bred
- Voluntary wait period for third and greater lactation cows—when 5% are bred
- The interval between VWP and days to first breeding on average
- Days for first breeding—average for all cows
- Days to first service for first lactation cows—when 5% are bred
- Days to first service for second lactation cows—when 5% are bred
- Days to first service for third and greater lactation cows—when 5% are bred
- Heat detection to first service for all lactations
- Heat detection to second and greater services
- Heat detection to first service for first lactation cows
- Heat detection to first service for second lactation cows
- Heat detection to first service for third and greater lactation cows
- Overall average heat detection rate
- Conception rate average for all lactations
- Conception rate to first service for current active cows
- First service conception rate
- Second service conception rate
- Third service conception rate
- Fourth service conception rate
- First service conception rate for first lactation cows
- First service conception rate for second lactation cows
- First service conception rate for third and greater lactation cows
- First service conception rate for those cows that either calved or were bred first time Mar to May
- First service conception rate for those cows that either calved or were bred first time Jun to Aug
- First service conception rate for those cows that either calved or were bred first time Sep to Nov
- First service conception rate for those cows that either calved or were bred first time Dec to Feb
- Difference between pregnancy rate from data and pregnancy rate calculated from heat detection rate and conception rate
- Pregnancy rate calculated with first service conception rate
- Pregnancy rate calculated from heat detection rate and conception rate
- Pregnancy rate analyzed from the data
- The calculated value of reproduction based on inputs of milk price, cull cow value, calf value. It weights the value of pregnant cows within each 21-day period. The same values are used for each herd.
- Number of breedings with <10-day interval between breedings
- Number of breedings with 10- to 17-day interval between breedings
- Number of breedings with 18- to 24-day interval between breedings
- Number of breedings with 25- to 35-day interval between breedings
- Number of breedings with 36- to 49-day interval between breedings
- Number of breedings with >49-day interval between breedings
- Total number of breedings included in the interval analysis
- Percent of culled cows that were culled for repro
- Average DIM at time of culling for cows culled for repro

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