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Reproductive management in large dairy herds

Manejo reproductivo de hatos lecheros grandes

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Abstract

Record keeping and the evaluation of records are paramount for a successful reproductive management program in a large dairy herd. A variety of reproductive measurements as tools to evaluate reproductive performance are analyzed throughout this presentation. The author discusses different methods of heat detection including their pros and cons. The relationship between general cow management, health, and reproduction are also discussed in this presentation.

Resumen

El mantenimiento de los registros de información es necesario para poder tener un programa de manejo reproductivo exitoso en hatos lecheros grandes. En esta presentación se evalúan diferentes herramientas para medir el funcionamiento de los programas reproductivos. También se evalúan métodos diferentes de detección de celo utilizados por el autor y se presentan las ventajas y desventajas de cada uno. También se discute la relación existente entre el manejo general del hato y su salud, con los resultados del programa reproductivo.

Failure to conceive and maintain pregnancy is still the number one reason for cows leaving the herd in dairy farms. Reproductions is one of the most important economic drivers of dairy farms. Maintaining good results with reproductive programs as the herds become increasingly larger is a challenge for the dairy farmers and their management teams. As the dairy farm expands, the record system and the accuracy of the records become even more important. It is imperative that management and consultants establish record keeping as one of the main priorities of a good reproductive program. What cannot be measured, cannot me managed. However, to ensure good measurements it is essential to have good records and thus discipline. It is very important to establish an appropriate coding system. Such systems must be applied with consistency. It is very important to be able to evaluate different outcomes and the performance of different reproductive programs.

Many reproductive outcomes can be calculated and used for evaluating the success or failure of a reproductive program. They will be discussed briefly as a guide to the practicing veterinarian.

Calving interval. Is the time lapse between the previous and the current calving dates for each cow in the herd. Even though it has been used widely over the years and it is easy to understand for producers, an outcome reflects the performance of the program in retrospect because the time lag between the outcome and what generated the results is too large. Today's calving interval is affected by what happened 9 months before. It also is highly influenced by the cull rate of the farm.

Heat detection rate: This calculates the number of cows that were detected in heat out of the total number of cows eligible to be in heat. Uses the voluntary

waiting period as the start date for calculating the rate and assumes every open cow in the herd is coming in heat every 21 d, unless identify as a DNB (do not breed). This measurement is important to evaluate but it only tells part of the reproductive story.

Conception rate. This calculates the number of cows pregnant out of the number of cows inseminated during a period. It is easy to understand and very useful when evaluating inseminator performance and semen performance. It is also a useful tool to investigate differences between primiparous and multiparous cows as well as effectiveness by the number of services. Often, it is interpreted as more important than it is at the expense of low insemination (heat detection) rate.

Days to first service. This calculates the average amount of days in milk at which all cows are getting inseminated for the first time in their lactation. It is an indication of how the cows are recovering from negative energy balance as well as how good heat detection rate is early in lactation.

Palpation pregnancy rate. This measurement evaluates the number of cows diagnosed pregnant at a day in time (pregnancy check day) as a percent of the cows presented for pregnancy diagnosis only. It is an indirect measurement of heat detection and not of conception rate. It is more current and it does not assume that all cows passed the voluntary waiting period are cycling. It only considers those cows that had been inseminated. It assumes if they were inseminated is because they were in heat therefore they were cycling. This measurement assumes that if a cow was inseminated 40 d before (or the days since bred chosen to do the pregnancy diagnosis) and she is open, then the heats between insemination and presented for pregnancy diagnoses were missed. It is not a measurement of conception because if the cow did not conceive and she was inseminated again, she would not have been presented for pregnancy diagnosis.

Twenty-one-day pregnancy rate. This is a more dynamic and a more current measurement of the reproductive program because it uses the number of cows eligible to become pregnant and the number of cows that became pregnant in 21-d cycles. It includes heat detection rate and conception rate in the calculation. It is influenced by the percent of "DNB" (do not breed) cows and by the percent of pregnancy losses which in turn is influenced by the days of gestation at which pregnancy diagnosis is performed. With the used of ultrasound to detect open cows as early as possible (28 d) after breeding with the goal to enroll the cow again in an ovulation synchronization program, a higher number of pregnancies are diagnosed only to find out that 10 to 15% of those pregnancies are lost at d 40 post-insemination.

Percent of pregnant cows by 150 d in milk. This measurement calculates the number of cows that have pregnant less than 150 d in milk out of all the pregnant cows in the herd. It is an important measurement because if cow gets pregnant too late in lactation there are economic losses due to lower milk production in late lactation. It can also result in having to dry the cow early resulting in higher feed cost for a cow that is not producing milk. It could also indicate problems with negative energy balance or cow transition problems resulting in cows not cycling until late in lactation.

Heat detection. At the beginning of the commercial implementation of artificial insemination in the mid 50's, it was predicted that heat detection was going to be the number one obstacle to achieving successful results in artificial insemination programs. Nothing could be closer to the truth until the mid-2000's when the ovulation synchronization programs where fined tuned and became popular. Such programs eliminate the need to detect heats. However, the cows that do not get pregnant would need to be re-synchronized or heat detected and if they are re-synchronized the same decision would have to be done again with the open cows. Therefore, many dairies using the synchronization programs do have to use heat detection to a degree. Also with more consumer perception concerns on the use of hormones in animal agriculture, these methods of ovulation synchronization may be challenged in the future.

Heat detection continues to be a mayor challenge in reproduction management of large dairy herds. As dairy farms become larger, the cows are expected to produce more milk, and they are fed more concentrate and are confined and milked more times per day, the amount of time the cow spends in standing heat decreases, making it more difficult for the observers to detect heat. At the same time, as dairy farms get larger, they are more dependent on hired labor with different backgrounds and expectations making it more difficult

to have consistency with the task. Indirect methods of heat detection become very important as dairies become larger. Methods of heat detection used by the author will be discuss.

Tail head markers: According to the author's experience Kamars, Estrotect, and chalk are all good methods to identify cows that were not observed in heat but were mounted by other cows indicating that they were in heat. All three methods require management and attention to detail. They need to be put on the right place of the tail head, chalk must be refreshed every day, Kamars take more work to put them in and glued them and are not as sensitive so they give less false positives but at the same time could give false negatives. Estrotect is easy to apply, it is very sensitive giving a higher number of false positives. Chalk is more dependent on interpretation of the reader and requires a lot more experience. All require intensive management and they will not solve any problems if not maintained properly and with extreme attention to detail.

Gomer bull with chin ball: Very good method of heat detection but it also requires management and attention to detail. Maintaining the animal is an expense and it is occupying the space of a cow that could be producing milk, the chin-ball needs to be checked often and rigorously and ink must be present always. The animal must maintain libido and rest periods must be given making it necessary to have a replacement animal to do the job. Soundness and absence of lameness is a paramount for the gomer bull or cow to do the job.

Activity meters: This is an indirect method that uses changes in the behavior of the cow to determine if the cow is in heat or not. A baseline of the normal activity of the cow and the group is established and variations from that baseline are used to determine estrous activity or illness. The information is read by antennas and transmitted to a device used by the producer. The author has had experience with three different systems. Afikim pedometers, Alpro collars and Cow Manager ear tags. The quality and reliability of the technology continues to improve. These systems work well. However, all systems require a lot of management and attention to detail just like the low technology devices. The assumption that one can eliminate employees because the electronic device is doing the heat detection is not the case. Pedometers, collars and ear tags, fall off, get ripped off, get tangled up, get deactivated, lose battery power, need to be put on the cow, Wi-Fi needs to be working, communication with other computer software is required and cows still need to be found. Therefore, at the end of the day, the quality and engagement of management and employees is what makes the heat detection program work more so than the technology that is used.

Natural service. Even after more than 60 years of artificial insemination, 25% of dairy cows and 40% of heifers are impregnated by natural service in the United States. Therefore, it is imperative that veterinarians get involved in natural service programs and do not assume that the bull automatically does the job. The disadvantages of natural service are the expense of the feed, the safety of the employees, the possibility of transmission of venereal disease, and the lack of genetic progress. However, with the development of genomics, the genetic disadvantage of using natural service is reduced significantly and a well-managed natural service program can generate great results. It requires that the bulls be fertility tested and a full breeding soundness exam be performed. It is also important that the bulls be vaccinated against the same diseases as the cow herd plus *Campylobacter foetus* and, that the bulls be kept young, and that a very intense policy for culling bulls that show the slightest signs of aggressiveness be implemented. Bulls should also be rotated from the breeding pens at least every 3 months, so that good libido is maintained.

Estrous-ovulation synchronization programs (TAI). The biggest advantage of these programs is the elimination of having to do heat detection. However, protocol compliance is a challenge and once again, the success of the program depends on the attention to details and management of the employees in charge of giving the injections as well as inseminating the cows. The open cow still needs to be dealt with, either by re-synchronizing her or by heat detection. The most common reasons for failure of these programs is not giving all the injections to all the cows due to cows not found, the quantity of the injection is not appropriate, or the cow being in the wrong pen or lose in the headlocks or the injection is given to the wrong cow, due to poor identification or poor vision from the employee.

Transition of the cow from dry to voluntary waiting period. This is the most critical period for the cow.

Failure to manage this time properly results in a series of metabolic and non-metabolic challenges such milk fever, ketosis, retain placenta, metritis mastitis, lameness and significant lost in body condition because of an extended period of negative energy balance. These metabolic problems are all interrelated and all have a negative impact in the probability of the cow getting pregnant and staying in the herd for another lactation. Cow comfort, nutrition, cleanliness, and qualified personnel are the most important aspects of management for a smooth transition of the cow from the dry period to the voluntary waiting period.

Conclusion

Successful reproductive management programs in large dairy herds are highly dependent on personal management and employee engagement. The technology used is less important than the execution of the protocols established by the owner, manager, and their team of advisors. Every successful reproductive program has reliable records and a systematic approach to evaluate them. Reproduction management should never be looked independently of the other aspects of milk production, as it is highly dependent on cow health and nutritional balance.