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MANAGEMENT FACTORS TO IMPROVE HEALTH IN NEWBORN CALVES

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INTRODUCTION

For most beef cow herds, the single most important means of increasing income is increasing the number of calves weaned and sold relative to the number of cows in the operation, or by definition, increasing reproductive efficiency. While certain production and carcass traits can be most directly influenced by genetic selection, reproductive performance is overwhelmingly influenced by management. Increasing the profitability of a ranch operation therefore relies very heavily on adjusting management practices to improve reproductive efficiency. In order to accomplish this, we first need to know what factors are most influential in reproductive performance. We specifically need to identify those factors that can be improved by changes in management. Individual ranchers need to assess which of these are most important in their operation and which can be improved in an economically viable fashion.

The aims of this presentation are to highlight the factors that most commonly affect calf health and survival, identify the management practices that influence them, and evaluate how effectively we institute these practices at present. There is considerable information available about management factors that improve calf survival, but much of it is not being employed.

CAUSES OF CALF LOSS

Several large scale studies have surveyed the causes of reproductive inefficiency and calf loss. Similar trends are consistently found. The two overwhelmingly important causes of decreased reproductive performance are cows that fail to become pregnant and calves that die within the first two to three weeks after birth. This presentation will focus on the loss of neonatal calves.

The most recent large scale survey of cow/calf production was conducted by the USDA, Animal and Plant Health Inspection Service, Veterinary Services as part of the National Animal Health Monitoring System. This study was conducted during 1992 to 1993 and has been reported as the Cow/Calf Health And Productivity Audit (CHAPA). The target population of this study represents 75% of predominantly spring calving beef operations in the United States with five or more beef cows. The 18 states surveyed represented 70% of the national beef cow inventory, with greater than 50% of calves being born from January to June. Some results of this study will be highlighted in this presentation to illustrate some of the management areas that cow/calf producers need to consider more carefully in order to reduce calf losses.

Let's look first at summarizing the reasons why calves are lost. Most studies show average mortality estimates from birth to weaning of 8 to 10% of all calves delivered. The majority of calf loss occurs at or near birth. More than 50% of the losses occur within 24 hours of birth, about 70% occur by three days of age and about 75% occur within the first week. The CHAPA study similarly showed an overall death loss of 4.7% by 24 hours of age and 7.2% by three weeks. Thus, our most important period of calf loss is within the first several days after delivery, and the vast majority of losses occur during the neonatal period (first three to four weeks of life).

Dystocia is the single most commonly identified direct cause of the early losses. Attributing calf deaths to other specific causes is difficult because many factors often interrelate to contribute to calf death. Such factors include environmental conditions, maternal nutrition, mothering and bonding, age of the dam, calf vigor, calf body heat production, colostral quality, maternal immunoglobulin transfer to the calf, and infectious disease.

Drawing from the results of a variety of studies, we can conclude the following important points:

1. Dystocia is the number one contributor to calf death
2. Dystocia can affect calves severely enough to cause mortality directly, or can contribute to other problems and indirectly increase calf death
3. Heifers have a higher incidence of dystocia than mature cows, and calves from heifer dams have increased death loss
4. Environmental conditions such as cold, wind and moisture increase calf death
5. Calves affected by dystocia or other maternal health problems such as deficient or excessive body condition adapt poorly to life outside the uterus and succumb to environmental problems more easily
6. Poor maternal nutrition reduces calf vigor, calf body heat production, and calf immunoglobulin absorption
7. Infectious disease problems increase in calves with dystocia, calves that initially adapt poorly to life outside the uterus, and calves with poor maternal immunoglobulin absorption
8. Infectious disease is the most important cause of death in calves greater than three days old

INFLUENCE OF MANAGEMENT

As mentioned earlier, reproductive performance is most directly affected by management. The single most important cause of dystocia is disproportion between calf size and pelvic size (i.e. the calf is too large for the size of the dam). Therefore, the occurrence of dystocia can be dramatically reduced by management that ensures an adequately sized maternal pelvis and a reasonably sized calf. Selection of heifers for breeding should include an assessment of overall size and pelvic dimensions. Selection of bulls for breeding, especially to replacement heifers, should include a heavy emphasis on calving ease. Dams, especially replacement heifers, should have appropriate prepartum nutrition to ensure adequate growth and body condition maintenance.

While management can decrease the incidence of dystocia, the problem cannot be entirely eliminated. The adverse influence of difficult delivery on calf survival can be significantly reduced by prompt and appropriate intervention at the time of calving. This requires close observation for signs of prolonged delivery, accurate assessment of the problem, and prompt and appropriate intervention to deliver the calf.

Just as dystocia cannot be completely eliminated by management, neither can the occurrence of calves with poor vigor be totally prevented. Even in the best of circumstances, some calves will not respond to birth optimally, and will be identified as weak, compromised, or poor-doing calves. Such calves will carry a higher risk of subsequent disease and death. Their chances of survival can be substantially improved if problems are detected early and they are properly cared for. Supportive care procedures for these calves include warming and drying, providing shelter, administration of high quality colostrum, encouraging maternal attention and bonding, and supplemental feeding in some cases. Because the risk of these problems is higher in calves with difficult delivery, they can be anticipated before they occur and a regimen of supportive care can be routinely employed. Thus, all calves affected by dystocia can be promptly dried and warmed, fed colostrum milked from the dam, placed in a warmed and sheltered environment, and penned with the dam for a period of time, even if the delivery problem did not seem severe and the calf did not initially appear to be badly affected.

EVALUATION OF CURRENT MANAGEMENT

Once we know the factors that contribute to calf losses, we should be able to develop a management plan to solve the problems that negatively influence reproductive efficiency. In a general sense, this exercise is not particularly difficult. Numerous management procedures have been evaluated that can effectively combat the problems described above. Realistically, however, each ranch has its own idiosyncrasies and no single management plan can be instituted to work equally well on all operations. Each rancher needs to evaluate carefully to see which problems are typical of the herd, to develop a plan of management to solve these problems, and to calculate the economic impact of these management changes. If the plan is to be effective, it must conform to the individual circumstances of the ranch.

Perhaps the most important first step in establishing management changes is to evaluate the current status of the herd. Specifically, we need to identify what the current management practices are and where current problems lie. We need to identify how closely the problems of an operation match those outlined above, then we can predict the effect of proposed management changes and finally, evaluate the real outcome. To this end, it is very important to have well established records of performance and to have accurate animal identification and tracking of performance. In this regard, findings from the CHAPA Study are very sobering; 28% of operations had no records at all, and approximately two-thirds of all operations maintain only handwritten records. Only 60% of operators individually identified cows, and even fewer (53%) individually identified baby calves. There are certainly some individuals who maintain excellent handwritten records, but this method of data keeping handicaps the producer when making an appropriate assessment of their current animal production problems and assessment of the impact of potential changes.

Recognizing the overall high impact of dystocia on calf production, we need to look hard at those management features that can decrease dystocia occurrence. Results from the CHAPA Study illustrate that heifers have much higher dystocia rates than the mature cows. Only 2.5% of mature cows required calving assistance. In contrast, over 20% of heifers required assistance, with 8.3% of heifers experiencing an easy pull delivery and 11% experiencing a hard pull. Cesarean section delivery was required in 1.2% of heifers. As expected, the impact of this dystocia rate is high. Mortality of calves within the first 24 hours of birth was 10.7% for calves from heifer dams, about three times higher than for calves from cows. Mortality of calves by three weeks after birth was 13.9% from heifer dams compared with 5.9% from mature cows. Looking at the management procedures that can be useful in decreasing dystocia occurrence, we see that only 3% of operations used pelvic measurement as a means of selecting replacement heifers. Only 7.9% of operations weigh the heifers, which is the simplest tool for evaluating growth and appropriate size for breeding. Breeding heifers earlier than the mature cows allows more intensive management of heifer deliveries during the calving season and provides additional time for the heifers to return to their next breeding after delivery, but if breeding early, it is very important to watch growth. Only 12.7% of operations breed the heifers two weeks or more before the adult cow herd. Despite the proven importance of body condition as an indicator of adequate energy nutrition for growing heifers, body condition scoring of replacement heifers was practiced on only 4.6% of operations. Furthermore, the heifers were fed separate from the cow herd to allow appropriate dietary modifications in only 31.8% of the operations surveyed.

Even with the occurrence of dystocia, calf survival can be enhanced by appropriate calving management procedures. Prompt delivery assistance is extremely beneficial, and we recommend intervention if the delivery exceeds 60 to 90 minutes, or earlier if steady progress is not observed. In the CHAPA Study, the average number of hours animals were allowed to labor before assistance was provided was 2.9 hours for heifers and 2.6 hours for cows. Approximately half of the operations allowed one to two hours before assistance, thirty-two percent of the operations allowed three to four hours of labor, and 13% of operations allowed five or more hours before assistance was provided. These shortcomings likely reflect a lack of observation of the pregnant cattle more than anything else. The average number of times that cattle were observed within a 24-hour period was 2.9 times for heifers and 1.9 times for cows. Only 16.4% of operations observed cows five or more times per day for possible delivery problems. About 22% of operations observed the cattle three to four times, and 57% of operations observed them one to two times per day. Almost 5% of operations did not assign time for cattle observation.

Although it has been well established that nutrition can have far reaching effects on calf survival, the percent of operations calculating a winter feed schedule based on animal requirements and feed quality was only 48.7%. Laboratory analysis of feed nutritional value was employed on only 8% of the operations. The use of feed supplements and grain can be very expensive, but the need for such feeding can be accurately determined only based on the knowledge of nutritional requirements and an assessment of what is available in the primary feedstuffs. Under some circumstances, the use of such feed constituents can pay dividends. Despite lacking specific knowledge of feed composition and with less than half of operators basing feeding programs on calculations, approximately 50% of producers used feed supplements from January through March, and more than 27% of operators fed additional grain during this

same time. In addition to the importance of protein and energy requirements, and the need to have adequately sized heifers with appropriate body condition, the mineral composition of the feeds also has an impact on calf survival. There is increasing evidence that trace mineral deficiencies and imbalances are common problems in range cows fed only native pasture or locally harvested hay. The CHAPA Study estimated the percentage of operations that had identified specific deficiencies of minerals including phosphorus, magnesium, cobalt, copper, iodine, manganese, selenium and zinc. While magnesium deficiency was identified by 5% of the operations, the remainder of these minerals were known to be deficient in 0.5 to 3.9% of the herds.

Environmental conditions can have a tremendous impact on calf survival. Adverse weather conditions can take a heavy toll on newborn calves, while increased crowding can encourage the spread of infectious problems. As a result, calving location and time of year of the calving season are particularly important management issues. During bad weather, calves may require additional shelter, but the additional or close confinement may contribute to the spread of disease. Choosing the time of year in which calving takes place would seem to be a very important management decision. This decision alone will determine what type of needs an operation will have for shelter, how intensively the shelter will be utilized and, in turn, how crowded the operation is likely to become during the critical neonatal period of a calf's life. With this in mind, it is interesting to note that 52.7% of operations use no specific factors to determine the time of calving season. The percentage of operations using certain factors for this determination include the market cycle (4.9%), maximum age/weight at weaning (5.2%), forage availability (5.6%), tradition (11.9%), labor availability (2.9%), time of cattle movement ((0.8%), weather (14.2%), and other factors (1.8%). It may be time for many operators to think through the pros and cons of a different calving time since 76% of the calves considered in the CHAPA Study were born between the months of February and April when harsh weather conditions are very likely and native pasture feed availability is scant.

Considering the likely spread of infectious disease to newborn calves when animals are confined together, it is interesting that only 15% of operations separate cow-calf pairs from the pregnant cow herd within one week of delivery. There are numerous interplays between the needs for close observation of delivery, shelter from harsh environmental conditions, and the undesirability of crowding. Considering the previous information about the time of calving season, it is interesting to note that 41.6% of calves are born in a calving pasture or calving lot, less than 1% of calves are born in an individual calving pen, and 2.9% are born in a covered shed. In addition to what these data tell us about infectious disease spread and exposure to harsh environmental conditions, they also provide food for thought about the operator's preparedness to promptly identify poor-doing calves and provide additional supportive care.

SUMMARY

Improvements in newborn calf survival can have a very beneficial effect on reproductive efficiency, and consequently the profitability of an operation. Furthermore, calf survival is most directly influenced by certain management practices. While many interrelated factors can be involved in newborn calf survival, most studies show a very consistent pattern of factors that

contribute to newborn calf survival. Management practices that decrease the rate of dystocia, that lessen the impact of dystocia on the calf, and that identify and provide care for compromised or sick calves are the most important means of improving overall calf survival. Reviewing information from the recent CHAPA Study conducted by the USDA in 1992 to 1993 suggests that many management practices that could have a favorable impact on calf health are not extensively employed.